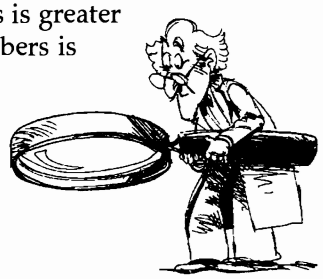
Answer Column

23. The product of 2 different whole numbers is 7. Their sum is
A) 6 B) 7 C) 8 D) 14 — 23.

24. The sum of 2 positive whole numbers is greater than their product if one of the numbers is
A) 1 B) 2 C) 3 D) 4 — 24.

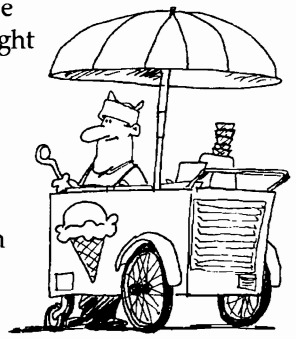


25. When I look at our alphabet, I see that the letter ? has four times as many letters before it as after it.
A) E B) G C) T D) U — 25.

26. I have 22¢. If I doubled the number of nickels I have, I would then have 37¢. Exactly how many nickels do I have?
A) 3 B) 4 C) 5 D) 6 — 26.

27. If paper clips cost 48¢ a dozen, then ? paper clips cost $1.
A) 24 B) 25 C) 26 D) 96 — 27.

28. Lee, Pat, and Sam bought ice pops. Lee bought 3 times as many as Pat. Sam bought twice as many as Lee. If Sam bought 18 ice pops, how many did Pat buy?
A) 1 B) 3 C) 6 D) 9 — 28.



29. Along a straight road, an ice cream vendor is 2 km from the bus and 5 km from the train. The *least* possible distance between the bus and the train is
A) 3 km B) 5 km C) 7 km D) 10 km — 29.

30. My giant sunflower doubles its size every day. On Saturday, it is ? times as big as it was on the preceding Sunday.
A) 2 B) 6 C) 49 D) 64 — 30.

The end of the contest 4

Visit our Web site at http://www.mathleague.com

Steven R. Conrad, Daniel Flegler, and *Jeannine Kolbush,* contest authors

M A T H

FOURTH GRADE MATHEMATICS CONTEST

Math League Press, P.O. Box 17, Tenafly, New Jersey 07670-0017

Sample 4th Grade Contest

Spring, 2005

4

Instructions

- **Time** Do *not* open this booklet until you are told by your teacher to begin. You will have only *30 minutes* working time for this contest. You might be *unable* to finish all 30 questions in the time allowed.
- **Scores** Please remember that *this is a contest, not a test*—and there is no "passing" or "failing" score. Few students score as high as 24 points (80% correct). Students with half that, 12 points, *should be commended!*
- **Format and Point Value** This is a multiple-choice contest. Each answer will be one of the *capital letters* A, B, C, or D. Write each answer in the *Answer Column* to the right of each question. We suggest (but do not require) that you use a pencil. Each question you answer correctly is worth 1 point. Unanswered questions receive no credit. You **may** use a calculator *unless* your school does *not* allow you to use one.

Please Print

Last Name _____ First Name _____

School _____ Teacher _____ Grade Level ____

Do Not Write In The Space Below

To the Teacher:
Please enter the student's score at the right before you return this paper to the student. *Student's Score:* _____

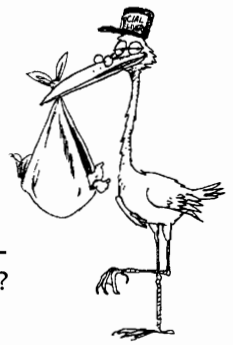
The school's top scorer will receive the book *Math Contests—Grades 4,5,6 (Vol. 3).* Other high scorers will receive Certificates of Merit. In any one school year, no student may win both a book and a certificate. The book and certificates were in the original contest package.

If needed, duplicate book awards may be ordered as described below.

Answer Column

1. How many 10¢ gumballs can I buy for $1?
   A) 2 B) 5 C) 10 D) 20 — 1.

2. $2 \times 0 \times 0 \times 5 =$
   A) 0 B) 10 C) 100 D) 2005 — 2.



3. Ork the stork delivers 2 babies every day. How many babies does Ork deliver in one week?
   A) 2 B) 7 C) 14 D) 21 — 3.

4. What number is 5 less than 2 more than 52?
   A) 47 B) 49 C) 54 D) 57 — 4.

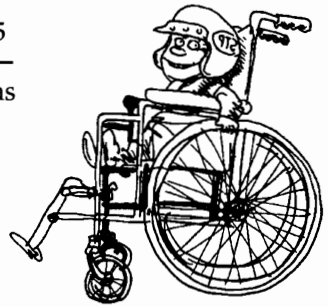
5. My birthday was Monday. Two days before my birthday was
   A) Saturday B) Sunday C) Wednesday D) Friday — 5.

6. $15-14 + 13-12 + 11-10 + 9-8 + 7-6 + 5-4 =$
   A) 6 B) 7 C) 12 D) 114 — 6.

7. What time is it 45 minutes after 4:45?
   A) 4:00 B) 5:00 C) 5:15 D) 5:30 — 7.

8. 2 dollars + 20 pennies = 1 dollar + ? pennies
   A) 100 B) 120 C) 200 D) 220 — 8.

9. Divide 205×205 by 205. The quotient is
   A) 1 B) 2 C) 25 D) 205 — 9.



10. A small wheel on my wheelchair has a diameter that's 16 cm long. This small wheel's radius is ? cm long.
    A) 4 B) 8 C) 32 D) 196 — 10.

11. $1 \times (2 + 3) \times 4 =$
    A) 10 B) 14 C) 20 D) 24 — 11.

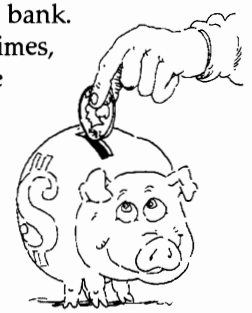
12. How many 0s are needed to write the numeral for *ten thousand*?
    A) 3 B) 4 C) 5 D) 6 — 12.

Go on to the next page ➡ 4

Answer Column

13. $60 \times 60 = 20 \times 20 \times$?
    A) 3 B) 9 C) 80 D) 900 — 13.

14. Three friends and I put dimes in a piggy bank. After the 4 of us put in equal numbers of dimes, I had 3 dimes left over. I put those in the piggy bank too. The total number of dimes we put in the bank *could* have been
    A) 23 B) 24 C) 25 D) 26 — 14.



15. $(8-3) \times (2-1) =$
    A) 1 B) 3 C) 5 D) 9 — 15.

16. Each of the following is divisible by 6 *except*
    A) 3366 B) 4422 C) 6630 D) 6633 — 16.

17. I'm thinking of a number. When I multiply it by 5, the product is 0. When I multiply the number by 6 instead of by 5, the product is
    A) 0 B) 1 C) 6 D) 12 — 17.

18. 10 hundreds + 100 tens = ? ones
    A) 1000 B) 2000 C) 10 000 D) 20 000 — 18.

19. The perimeter of my square hammock is 64. How long is each side of my hammock?
    A) 4 B) 8 C) 16 D) 32 — 19.

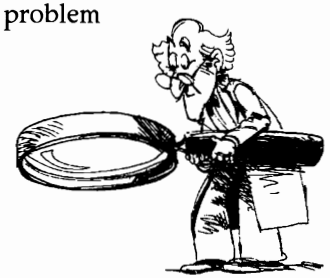
20. If I fold my square hammock exactly in half, the two halves *cannot* be
    A) triangles B) rectangles C) polygons D) squares — 20.

21. The smallest whole number divisible by both 8 and 12 is
    A) 4 B) 16 C) 24 D) 48 — 21.

22. The product of 2005 and any odd number is *always*
    A) 2005 B) even C) odd D) prime — 22.

Go on to the next page ➡ 4

	Answers
23. The two whole numbers are 1 and 7. Their sum is $1+7=8$. A) 6 B) 7 C) 8 D) 14	23. C
24. As you can see from the solution to problem 23, one of the numbers must be 1. A) 1 B) 2 C) 3 D) 4	24. A
25. Of the 25 letters besides U, 5 (V, W, X, Y, and Z) come after U, and $25-5=20$ letters come before. A) E B) G C) T D) U	25. D
26. Since $37¢-22¢=15¢$, doubling my nickels gave me 3 nickels' worth more. So I must have had 3 nickels before doubling. A) 3 B) 4 C) 5 D) 6	26. A
27. 12 clips for $48¢$ = 1 for $4¢$. For \$1, I get $100¢\div 4¢=25$ paper clips. A) 24 B) 25 C) 26 D) 96	27. B
28. Sam bought twice as many ice pops as Lee. Since Sam bought 18, Lee bought 9. Lee bought 3 times as many as Pat. Since Lee bought 9, Pat bought 3. A) 1 B) 3 C) 6 D) 9	28. B
29. If the bus & train are on the same side, one 2 km and one 5 km from the vendor, then the distance between the bus and train is $(5-2)$ km = 3 km. A) 3 km B) 5 km C) 7 km D) 10 km	29. A
30. My sunflower doubles in size 6 times: First it's 2 times, then 4 times, 8 times, 16 times, 32 times, and finally 64 times as big. A) 2 B) 6 C) 49 D) 64	30. D



The end of the contest **4**

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Steven R. Conrad, Daniel Flegler, and *Jeannine Kolbush,* contest authors

FOURTH GRADE MATHEMATICS CONTEST

Math League Press, P.O. Box 17, Tenafly, New Jersey 07670-0017

Information & Solutions

Spring, 2005

4

Directions for Grading

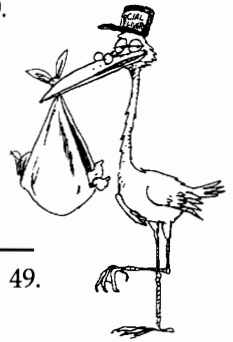
- **Date** You may give this contest anytime after April 15. The *4th Grade Contest* is for use in your own school or district. We've enclosed a registration form for next year. Since results are *not* used for interschool comparisons, ***we do not enclose a score report form***.
- **Urgent questions?** Call 1-201-568-6328.
- **Scores** Remind students that *this is a contest, not a test*—and there is no "passing" or "failing" score. Few students score as high as 24 points (80% correct); students with half that, 12 points, *should be commended!*
- **Solutions** Detailed solutions appear in each question box, and letter answers are in the *Answers* columns on the right. You may copy this solution key and give a copy to every student who took this contest.
- **Awards** The original contest package contained 1 book award (and a bookplate you should affix to the book's inside front cover) for the 1st place student. We also enclosed 5 *Certificates of Merit*—1 each for the runner-up on each grade level, plus extras for ties.
- **Additional Book Awards & Additional Certificates** If you want to give more than 1 book award, you may purchase additional books as described below. Do you need more Certificates of Merit? If so, send your name, school, and school mailing address to our mailer at: ***Math Certificates, P.O. Box 17, Tenafly, NJ 07670-0017.***, and *include a self-addressed, stamped envelope* (***2 stamps required***) *large enough to hold certificates.*

  The school's top scorer will receive the book *Math Contests—Grades 4,5,6* (*Vol. 3*). Other high scorers receive Certificates of Merit. In any one school year, no student may win both a book and a certificate. The book and certificates were in the original contest package. Special "bumper sticker" awards are included for high scoring students.

  If needed, duplicate book awards may be ordered as described below.

1. I can change my $1 into 10 dimes. Each gumball costs 1 dime.
   A) 2 B) 5 C) 10 D) 20 — **1. C**

2. If 0 is a factor, the value of the product is 0.
   A) 0 B) 10 C) 100 D) 2005 — **2. A**



3. Ork the stork delivers 2 babies every day. In 7 days, Ork delivers $2 \times 7 = 14$ babies.
   A) 2 B) 7 C) 14 D) 21 — **3. C**

4. 2 more than 52 is 54, and 5 less than that is 49.
   A) 47 B) 49 C) 54 D) 57 — **4. B**

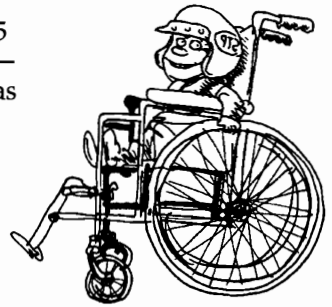
5. One day before Mon. is Sun., so two days before Mon. is Sat.
   A) Saturday B) Sunday C) Wednesday D) Friday — **5. A**

6. $(15-14)+(13-12)+(11-10)+(9-8)+(7-6)+(5-4) = 6 \times 1 = 6.$
   A) 6 B) 7 C) 12 D) 114 — **6. A**

7. 45 = 15+30, 15 mins. after 4:45 is 5:00, & 30 mins. later is 5:30.
   A) 4:00 B) 5:00 C) 5:15 D) 5:30 — **7. D**

8. $\$2 + 20¢ = \$1 + \$1 + 20¢ = \$1 + 100¢ + 20¢ = \$1 + 120¢.$
   A) 100 B) 120 C) 200 D) 220 — **8. B**

9. $(205 \times 205) \div 205 = 205 \times (205 \div 205) = 205 \times 1 = 205.$
   A) 1 B) 2 C) 25 D) 205 — **9. D**



10. A small wheel on my wheelchair has a diameter that's 16 cm long. This wheel's radius is half as long, 8 cm.
    A) 4 B) 8 C) 32 D) 196 — **10. B**

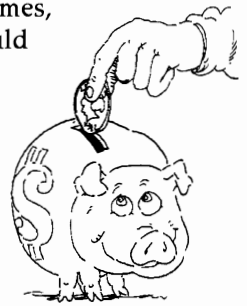
11. $1 \times (2 + 3) \times 4 = 1 \times 5 \times 4 = 20.$
    A) 10 B) 14 C) 20 D) 24 — **11. C**

12. Ten thousand is written as 10 000. The number of 0s needed is 4.
    A) 3 B) 4 C) 5 D) 6 — **12. B**

Go on to the next page ➡ **4**

13. $60 \times 60 = 3 \times 20 \times 3 \times 20 = 20 \times 20 \times 3 \times 3 = 20 \times 20 \times 9.$
    A) 3 B) 9 C) 80 D) 900 — **13. B**

14. Use trial and error. If we each put in 4 dimes, then the total number of dimes used would have been $4 \times 4 + 3 = 16+3 = 19$. If we each put in 5 dimes, the total would have been $4 \times 5 + 3 = 23$, choice A.
    A) 23 B) 24 C) 25 D) 26 — **14. A**



15. $(8-3) \times (2-1) = (5) \times (1) = 5.$
    A) 1 B) 3 C) 5 D) 9 — **15. C**

16. Since 6633 is *not* even, it *cannot* be divisible by 6.
    A) 3366 B) 4422 C) 6630 D) 6633 — **16. D**

17. When I multiply a number by 5 and the product is 0, then the number itself is 0. When I multiply 0 by 6, that product is also 0.
    A) 0 B) 1 C) 6 D) 12 — **17. A**

18. $(10 \times 100) + (100 \times 10) = 1000 + 1000 = 2000 =$ 2000 ones.
    A) 1000 B) 2000 C) 10 000 D) 20 000 — **18. B**

19. The perimeter of my square hammock is 64. Each side of my hammock is $64 \div 4 = 16$.
    A) 4 B) 8 C) 16 D) 32 — **19. C**

20. As shown here, ⬚⬚, I can form triangles or rectangles, both of which are polygons.
    A) triangles B) rectangles C) polygons D) squares — **20. D**

21. Neither 4 nor 16 is divisible by 12, but 24 is divisible by 8 and 12.
    A) 4 B) 16 C) 24 D) 48 — **21. C**

22. The product of *any* two odd numbers is *always* odd.
    A) 2005 B) even C) odd D) prime — **22. C**

Go on to the next page ➡ **4**

Answers

22. Charlie grills 3 hot dogs for every 8 hamburgers he grills. If he grills 48 hamburgers, he grills _?_ hot dogs.

A) 18 B) 43 C) 80 D) 128

23. Today is my birthday. If my age in months is 99 greater than my age in years, how many years old am I now?

A) 9 B) 11 C) 12 D) 14

24. The radius of a circle is half the length of the side of a square. The square's perimeter is equal to the diameter of the circle multiplied by

A) 2 B) 4 C) 8 D) 16

25. When each of the following is divided by 8, only _?_ has a remainder that is a prime number.

A) 548 B) 569 C) 678 D) 778

26. My aunt can fold 16 paper cranes in 4 minutes. My uncle can fold 15 paper cranes in 5 minutes. How long would it take them to fold 42 cranes if they work together at those rates?

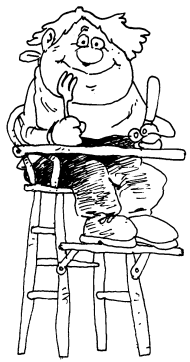
A) 6 minutes B) 9 minutes C) 12 minutes D) 13 minutes

27. If $1 + 3 + 5 + 7 + 9 + \ldots + 99 = 2500$, then $3 + 5 + 7 + 9 + \ldots + 101 =$

A) 2500 B) 2600 C) 2601 D) 2700

28. Alfonse's high chair is 10 times as tall as his cat. His cat is 8 times as tall as his pet rat. His rat is 6 times as tall as his pet cricket. If his cricket is 4 mm tall, how tall is Alfonse's high chair?

A) 28 mm B) 480 mm C) 960 mm D) 1920 mm



29. Ray runs every other day. If he ran for the first time last month on a Monday, then he ran for the tenth time last month on a

A) Monday B) Tuesday C) Friday D) Sunday

30. How many of the whole numbers less than 100 are 10 greater than an odd whole number?

A) 45 B) 46 C) 90 D) 91

The end of the contest 4

Visit our Web site at http://www.mathleague.com

Steven R. Conrad, Daniel Flegler, and *Adam Raichel,* contest authors

M A T H

FOURTH GRADE MATHEMATICS CONTEST

Math League Press, P.O. Box 17, Tenafly, New Jersey 07670-0017

Sample 4th Grade Contest

4

Spring, 2013

Instructions

- **Time** Do *not* open this booklet until you are told by your teacher to begin. You will have only *30 minutes* working time for this contest. You might be *unable* to finish all 30 questions in the time allowed.
- **Scores** Please remember that *this is a contest, and not a test*—there is no "passing" or "failing" score. Few students score as high as 24 points (80% correct). Students with half that, 12 points, *should be commended!*
- **Format and Point Value** This is a multiple-choice contest. Each answer will be one of the *capital letters* A, B, C, or D. Write each answer in the *Answer Column* to the right of each question. We suggest (but do not require) that you use a pencil. Each question you answer correctly is worth 1 point. Unanswered questions receive no credit. You **may** use a calculator *unless* your school does *not* allow you to use one.

Please Print

Last Name _____ First Name _____

School _____ Teacher _____ Grade Level _____

Do Not Write In The Space Below

To the Teacher:

Please enter the student's score at the right before you return this paper to the student. ***Student's Score:*** _____

1. $2 \times 0 \times 1 \times 3 =$

   A) 0 B) 6 C) 12 D) 2013

2. Rollo delivers 3 packages to each of the 4 houses on Sixth Street. Rollo delivers a total of ? packages.

   A) 7 B) 12 C) 13 D) 72

3. What is the remainder when 16 + 16 + 16 + 16 is divided by 4?

   A) 16 B) 4 C) 2 D) 0

4. Which of the following is a factor of 380?

   A) 3 B) 6 C) 8 D) 10

5. If there are 8 pencils in each box, how many pencils are in 80 boxes?

   A) 10 B) 88 C) 640 D) 808

6. $(60 \div 5) \times 4 =$

   A) 3 B) 16 C) 48 D) 96

7. Stan earns two dimes for every glass of lemonade he sells. If Stan earned $20, how many glasses of lemonade did he sell?

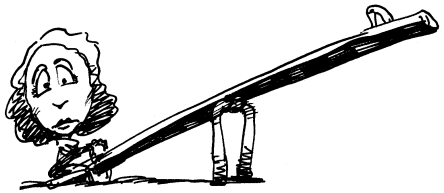
   A) 10 B) 20 C) 40 D) 100

8. How many whole numbers are greater than 9 and less than 60?

   A) 49 B) 50 C) 51 D) 59

9. Sue sits on a seesaw waiting for her friend Seth. Seth left on a Saturday and will be back seventeen days later. Seth will be back on a

   A) Sunday B) Tuesday
   C) Thursday D) Friday



10. The greatest odd factor of 30 is

    A) 5 B) 6 C) 15 D) 21

11. Wayne goes to bed exactly 65 minutes after 8:30 P.M. At what time does Wayne go to bed?

    A) 9:05 P.M. B) 9:25 P.M. C) 9:35 P.M. D) 9:45 P.M.

Go on to the next page ➡ 4

12. Roy has rowed his rowboat 1000 m from where he started. Roy has rowed his rowboat ? cm.

    A) 10 B) 100
    C) 10 000 D) 100 000

13. My pocketful of coins includes quarters, dimes, nickels, and exactly 8 pennies. Of the following, which could be the total value of my pocketful of coins?

    A) $14.56 B) $16.32 C) $18.85 D) $21.93

14. $4 \times 4 \times 20 \times 20 = 80 \times$?

    A) 80 B) 20 C) 4 D) 2

15. If the sum of the lengths of the sides of a rhombus is 24, then each side of the rhombus has a length of

    A) 3 B) 4 C) 6 D) 8

16. If 20 years ago Allen was half as old as he is today, how old was he 10 years ago?

    A) 20 B) 30 C) 40 D) 50

17. If the sum of 7 whole numbers is even, at most ? of the numbers could be odd.

    A) 6 B) 4 C) 3 D) 1

18. (10 hundreds) + (10 ones) = ? tens

    A) 10 B) 101 C) 110 D) 1010

19. Sam loves spaghetti and meatballs. He prepares a plate of spaghetti with some meatballs. If the number of meatballs is divisible by 4, 5, 6, 7, and 8, there must be at least ? meatballs.

    A) 210 B) 420 C) 840 D) 6720

20. The number that is 25 less than the number that is 50 less than 125 is

    A) 0 B) 25 C) 50 D) 75

21. The product of 2 odd numbers is always

    A) divisible by 3 B) odd C) prime D) even

Go on to the next page ➡ 4

22. Charlie grills 3 hot dogs for every 8 hamburgers he grills. If he grills 48 hamburgers, that is 6 groups of 8 burgers. So he grills $6 \times 3 = 18$ hot dogs.

A) 18 B) 43 C) 80 D) 128 — **22. A**

23. Today is my birthday. My age in months is 12 times my age in years and is also 99 greater. Since $9 \times 12 = 108$ and $9 + 99 = 108$, I am 9 years old.

A) 9 B) 11 C) 12 D) 14 — **23. A**

24. If a radius of a circle is half the length of a side of a square, a diameter is equal to the length of one side. The perimeter is 4 times the diameter.

A) 2 B) 4 C) 8 D) 16 — **24. B**

25. The remainder upon division by 8 is shown next to each answer choice. Of the remainders shown, only 2 is a prime. (1 is not prime.)

A) 548 R4 B) 569 R1 C) 678 R6 D) 778 R2 — **25. D**

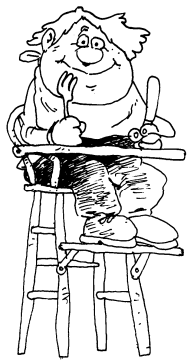
26. My aunt can fold 4 paper cranes in 1 minute. My uncle can fold 3 paper cranes in 1 minute. Together they fold 7 paper cranes in 1 minute. It takes them $42 \div 7 = 6$ minutes to fold 42 paper cranes.

A) 6 minutes B) 9 minutes C) 12 minutes D) 13 minutes — **26. A**

27. The second sum replaces 1 with 101, so the total is 2500 + 100 = 2600.

A) 2500 B) 2600 C) 2601 D) 2700 — **27. B**

28. Work backwards. Alfonse's rat is $6 \times 4 = 24$ mm tall. His cat is $8 \times 24 = 192$ mm tall. His high chair is $10 \times 192 = 1920$ mm tall.



A) 28 mm B) 480 mm C) 960 mm D) 1920 mm — **28. D**

29. If Ray ran for the first time last month on a Monday, then he ran on Wed., Fri., Sun., Tues., Thurs., Sat., Mon., Wed., and Fri. The tenth day was a Friday.

A) Monday B) Tuesday C) Friday D) Sunday — **29. C**

30. Add 10 to 1, 3, 5, 7, . . . , 87, and 89. None of these sums is more than 99. There are 45 such sums.

A) 45 B) 46 C) 90 D) 91 — **30. A**

The end of the contest **4**

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Steven R. Conrad, Daniel Flegler, and *Adam Raichel,* contest authors

FOURTH GRADE MATHEMATICS CONTEST

Math League Press, P.O. Box 17, Tenafly, New Jersey 07670-0017

Information & Solutions

Spring, 2013

4

Directions for Grading

- **Date** You may give this contest any time after April 15. The *4th Grade Contest* is for use in your own school or district. We've enclosed a registration form for next year. Instructions for optionally submitting results are included on a separate sheet entitled "*Using the Score Report Center*."
- **Urgent questions?** Write to comments@mathleague.com, or call 1-201-568-6328.
- **Scores** Remind students that *this is a contest, and not a test*—there is no "passing" or "failing" score. Few students score as high as 24 points (80% correct); students with half that, 12 points, *should be commended!*
- **Solutions** Detailed solutions appear in each question box, and letter answers are in the *Answers* columns on the right. You may copy this solution key and give a copy to every student who took this contest.
- **Awards** The original contest package contained 1 book award (and a bookplate you should affix to the book's inside front cover) for the 1st place student. We also enclosed 5 *Certificates of Merit*—1 for each runner-up, plus extras for ties.
- **Additional Book Awards & Additional Certificates** If you want to give more than 1 book award, you may purchase additional books as described below. Do you need more Certificates of Merit? If so, send your name, school, and school mailing address to our mailer at: ***Math Certificates, P.O. Box 17, Tenafly, NJ 07670***, and *include a self-addressed, stamped envelope (**2 stamps required**) large enough to hold certificates.*

  The school's top scorer will receive the book *Math Contests—Grades 4,5,6 (Vol. 4).* Other high scorers will receive Certificates of Merit. In any one school year, no student may win both a book and a certificate. The book and certificates were in the original contest package. Special "bumper sticker" awards are included for high-scoring students.

  If needed, duplicate book awards may be ordered as described below.

	Answers
1. The product of a number multiplied by 0 is 0. A) 0 B) 6 C) 12 D) 2013	1. A
2. Rollo delivers 3 packages to each of the 4 houses on Sixth Street. Rollo delivers a total of $3 \times 4 = 12$ packages. A) 7 B) 12 C) 13 D) 72	2. B
3. Since $16 \div 4$ has remainder 0, the remainder is $0 + 0 + 0 + 0 = 0$. A) 16 B) 4 C) 2 D) 0	3. D
4. Since $380 = 10 \times 38$, 10 is a factor of 380. A) 3 B) 6 C) 8 D) 10	4. D
5. There are $80 \times 8 = 640$ pencils in 80 boxes. A) 10 B) 88 C) 640 D) 808	5. C
6. $(60 \div 5) \times 4 = 12 \times 4 = 48$. A) 3 B) 16 C) 48 D) 96	6. C
7. Stan earns 20¢ for every glass of lemonade he sells. Stan earns \$20, which is 2000¢, so he sells $2000¢ \div 20¢ = 100$ glasses of lemonade. A) 10 B) 20 C) 40 D) 100	7. D
8. There are 60 whole numbers from 0 to 59. That's 50 without 0 to 9. A) 49 B) 50 C) 51 D) 59	8. B
9. Seventeen days is the same as 14 days + 3 days. Since 14 days is two weeks, Seth will be back 3 days after Saturday. He will be back on Tuesday. A) Sunday B) Tuesday C) Thursday D) Friday	9. B
10. The smallest even factor is 2; $30 \div 2 = 15$, the greatest odd factor. A) 5 B) 6 C) 15 D) 21	10. C
11. Wayne goes to bed exactly 65 minutes after 8:30 P.M. Since 65 minutes = 1 hour + 5 minutes, Wayne will go to bed at 9:35 P.M. A) 9:05 P.M. B) 9:25 P.M. C) 9:35 P.M. D) 9:45 P.M.	11. C

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	Answers
12. Roy has rowed his rowboat 1000 m from where he started. Since 1 m = 100 cm, Roy rowed $1000 \times 100 = 100000$ cm. A) 10 B) 100 C) 10000 D) 100000	12. D
13. My pocketful of coins includes quarters, dimes, nickels, and exactly 8 pennies. Since 8 pennies is 3 more than 5¢, my amount of money must end with a 3 or an 8. A) \$14.56 B) \$16.32 C) \$18.85 D) \$21.93	13. D
14. $(4 \times 20) \times (4 \times 20) = 80 \times 80$. A) 80 B) 20 C) 4 D) 2	14. A
15. If the sum of the lengths of the sides of a rhombus is 24, then each side of the rhombus has a length of $24 \div 4 = 6$. A) 3 B) 4 C) 6 D) 8	15. C
16. If 20 years ago Allen was half as old as he is today, then today he is 40. Thus, 10 years ago he was 30. A) 20 B) 30 C) 40 D) 50	16. B
17. If the sum of 7 whole numbers is even, there must be an even number of odd numbers. The total number of odd numbers could be 6. A) 6 B) 4 C) 3 D) 1	17. A
18. (10 hundreds) + (10 ones) = 1000 + 10 = 1010 = 101 tens. A) 10 B) 101 C) 110 D) 1010	18. B
19. Sam prepares a plate of spaghetti with so many meatballs that the number of meatballs is divisible by 4, 5, 6, 7, and 8. The lcm of 4, 5, 6, 7, and 8 is $4 \times 5 \times 3 \times 7 \times 2 = 840$. A) 210 B) 420 C) 840 D) 6720	19. C
20. The number that is 50 less than 125 is 75. The number that is 25 less than 75 is 50. A) 0 B) 25 C) 50 D) 75	20. C
21. The product of 2 odd numbers, such as $5 \times 7 = 35$, is always odd. A) divisible by 3 B) odd C) prime D) even	21. B

Go on to the next page ➡ 4

	Answers
23. Jake bought cheese slices to put on his daily sandwich. If he puts 6 cheese slices on each sandwich, then one day he will have 2 cheese slices left over. If he puts 5 cheese slices on each sandwich, then one day he will have 3 cheese slices left over. He could have started with _?_ cheese slices. A) 13 B) 14 C) 26 D) 38	23.
24. In Olive's kingdom, castles have 8 beds and homes have 2 beds. If there are 48 beds and 3 castles, how many homes are there? A) 12 B) 16 C) 24 D) 48	24.
25. How many whole numbers greater than 100 and less than 1000 have all three digits different from one another? A) 648 B) 720 C) 729 D) 900	25.
26. Of the following intervals, which includes the most prime numbers? A) 20 and 30 B) 30 and 40 C) 40 and 50 D) 50 and 60	26.
27. Simona has only dimes and quarters, which total exactly one dollar. If she has at least one dime and at least one quarter, how many coins **must** she have all together? A) 4 B) 7 C) 9 D) 10	27.
28. Briana can solve 6 puzzle cubes in 4 minutes, and Avima can solve 5 puzzle cubes in 6 minutes. At these rates, Briana can solve one cube _?_ seconds more quickly than Avima can. A) 24 B) 27 C) 30 D) 32	28.
29. _?_ is the product of exactly 2 prime numbers. A) 2018 B) 2020 C) 3018 D) 3020	29.
30. At most how many 1-by-3 rectangles that do not overlap can fit in a 5-by-7 rectangle? A) 9 B) 10 C) 11 D) 12	30.

The end of the contest 4

Visit our Web site at http://www.mathleague.com

Steven R. Conrad, Daniel Flegler, John Hagen, and *Adam Raichel,* contest authors

FOURTH GRADE MATHEMATICS CONTEST

Math League Press, P.O. Box 17, Tenafly, New Jersey 07670-0017

Sample 4th Grade Contest

Spring, 2019

4

Instructions

- **Time** Do *not* open this booklet until you are told by your teacher to begin. You will have only *30 minutes* working time for this contest. You might be *unable* to finish all 30 questions in the time allowed.
- **Scores** Please remember that *this is a contest, and not a test*—there is no "passing" or "failing" score. Few students score as high as 24 points (80% correct). Students with half that, 12 points, *should be commended!*
- **Format and Point Value** This is a multiple-choice contest. Each answer will be one of the *capital letters* A, B, C, or D. Write each answer in the *Answer Column* to the right of each question. We suggest (but do not require) that you use a pencil. Each question you answer correctly is worth 1 point. Unanswered questions receive no credit. You **may** use a calculator *unless* your school does *not* allow you to use one.

Please Print

Last Name _____ First Name_____

School _____ Teacher _____ Grade Level_____

Do Not Write In The Space Below

To the Teacher:
Please enter the student's score at the right before you return this paper to the student. ***Student's Score:***_____

The school's top scorer will receive the book *Math Contests—Grades 4,5,6 (Vol. 4).* Other high scorers will receive Certificates of Merit. In any one school year, no student may win both a book and a certificate. The book and certificates were in the original contest package.

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Twenty-one books of past contests, *Grades 4, 5, & 6* (*Vols. 1, 2, 3, 4, 5, 6, 7*), *Grades 7 & 8* (*Vols. 1, 2, 3, 4, 5, 6, 7*), and *High School* (*Vols. 1, 2, 3, 4, 5, 6, 7*), are available, for $12.95 per volume, from Math League Press, P.O. Box 17, Tenafly, NJ 07670-0017.

Answers

1. Which of the following sums and products is an odd number?

   A) 2018×2019 B) 2019×2020 C) $2018 + 2019$ D) $2019 + 2021$

2. If Zach multiplied the whole number on his shirt by itself, which of the following could be his result?

   A) 24 B) 25 C) 26 D) 27

3. What is the product of 49 ones?

   A) 1 B) 7 C) 49 D) 50

4. 4 dozen socks = _?_ pairs of socks

   A) 2 B) 24 C) 48 D) 96

5. If the number of months in a year is divided by the number of days in a week, what is the remainder?

   A) 0 B) 2 C) 5 D) 7

6. Henry the Hamster first danced on November 1, 2018. By April 1, 2019, for how many months had he been dancing?

   A) 5 B) 6 C) 7 D) 8

7. $20 - 18 + 20 - 18 + 20 - 18 = ?$

   A) 2 B) 4 C) 6 D) 8

8. What is the ones digit in the product $12 \times 13 \times 14$?

   A) 2 B) 4 C) 6 D) 8

9. Which of the following is greatest?

   A) $1 \times 2 \times 12$ B) $2 \times 3 \times 4$ C) $4 \times 2 \times 2$ D) $2 \times 4 \times 4$

10. Sandra uses two entire erasers for every 15 questions she answers. If erasers come in packs of 12, at least how many packs does she need for her 100-question test?

    A) 2 B) 3 C) 4 D) 5

11. The greatest whole-number multiple of 7 that is less than 100 is

    A) 91 B) 93 C) 97 D) 98

12. The digit _?_ appears only one time in the sum of 654 and 456.

    A) 0 B) 1 C) 2 D) 3

Go on to the next page ➡ 4

Answers

13. Ella wears a sweater of a different color each day of the week—red for Sundays, blue for Mondays, etc. Each of her many sweaters is one of 7 different colors. She donates each sweater to charity after wearing it 4 times! The least number of sweaters Ella wears during December is

    A) 7 B) 8 C) 10 D) 12

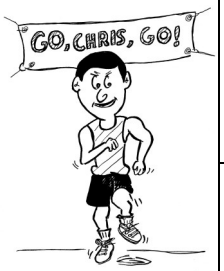
14. How many whole numbers greater than 10 and less than 200 can be written using only even digits?

    A) 16 B) 20 C) 25 D) 50

15. Noah has a soccer game every day and scores two goals in every game. How many weeks will it take him to score 56 goals?

    A) 3 B) 4 C) 5 D) 18

16. Chris ran each lap of his 10-lap race in 90 seconds. After running for 6 minutes, how many laps did Chris have *left* to run?



    A) 3 B) 4 C) 5 D) 6

17. How many pairs of unequal whole numbers greater than 40 and less than 60 sum to 100?

    A) 9 B) 10 C) 18 D) 20

18. $2 \times 4 \times 5 \times 25 = ?$

    A) 6×125 B) 6×150 C) 8×150 D) 10×100

19. The average of 3 numbers is a whole number. If one number is 2, and the other 2 numbers are equal, the other numbers could each be

    A) 3 B) 4 C) 5 D) 6

20. $\$2000 - 200¢ + \$20 - 2¢ =$

    A) \$1999.98 B) \$2017.80 C) \$2017.98 D) \$2020.20

21. Joey has only large and small boxes. In each large box there are exactly four small boxes. If Joey has 20 boxes total, the lowest possible number of small boxes that Joey has is

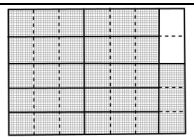
    A) 4 B) 5 C) 15 D) 16

22. How many whole numbers between 100 and 200 are divisible by both 4 and 6?

    A) 6 B) 7 C) 8 D) 10

Go on to the next page ➡ 4

	Answers
23. Divide the answer choices by 6 and by 5. Find the choice that leaves a remainder of 2 when divided by 6 and a remainder of 3 when divided by 5. Since 38 is the only choice that satisfies these conditions, choice D is correct. A) 13 B) 14 C) 26 D) 38	23. D
24. The 3 castles have $8 \times 3 = 24$ beds. That leaves $48 - 24 = 24$ beds for the homes. Since each home has 2 beds, there are $24 \div 2 = 12$ homes. A) 12 B) 16 C) 24 D) 48	24. A
25. There are 9 possible hundreds digits. There are then 9 possible tens digits left. This leaves 8 ones digits for a total of $9 \times 9 \times 8$ numbers. A) 648 B) 720 C) 729 D) 900	25. A
26. The 3 prime numbers between 40 and 50 are 41, 43, and 47. A) 20 and 30 B) 30 and 40 C) 40 and 50 D) 50 and 60	26. C
27. Simona has only dimes and quarters. She must have two quarters and five dimes. She has a total of 7 coins. A) 4 B) 7 C) 9 D) 10	27. B
28. Briana can solve 6 cubes in 240 seconds or 1 in 40 seconds. Avima can solve 5 cubes in 360 seconds or 1 in 72 seconds. Briana can solve 1 cube 32 seconds more quickly than Avima can. A) 24 B) 27 C) 30 D) 32	28. D
29. 2018 is the product of the primes 1009 and 2. A) 2018 B) 2020 C) 3018 D) 3020	29. A
30. As shown, eleven 1-by-3 rectangles can fit in a 5-by-7 rectangle. A) 9 B) 10 C) 11 D) 12	30. C



The end of the contest **4**

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Steven R. Conrad, Daniel Flegler, John Hagen, and *Adam Raichel,* contest authors

FOURTH GRADE MATHEMATICS CONTEST

Math League Press, P.O. Box 17, Tenafly, New Jersey 07670-0017

Information & Solutions

Spring, 2019

4

Directions for Grading

- **Date** You may give this contest any time after April 15. The *4th Grade Contest* is for use in your own school or district. We've enclosed a registration form for next year. Instructions for optionally submitting results are included on a separate sheet entitled "*Using the Score Report Center*."
- **Urgent questions?** Write to comments@mathleague.com, or call 1-201-568-6328 or 1-516-365-5656.
- **Scores** Remind students that *this is a contest, and not a test*—there is no "passing" or "failing" score. Few students score as high as 24 points (80% correct); students with half that, 12 points, *should be commended!*
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	Answers
1. Choice C is an odd number since 2018 + 2019 = 4037. A) 2018 × 2019 B) 2019 × 2020 C) 2018 + 2019 D) 2019 + 2021	1. C
2. Since 25 = 5 × 5, the whole number on his shirt could be 5 and the product would be 25. A) 24 B) 25 C) 26 D) 27	2. B
3. The product of any number of ones is 1. A) 1 B) 7 C) 49 D) 50	3. A
4. 4 dozen = 4 × 12 = 48. Each pair is 2 socks, so there are 24 pairs. A) 2 B) 24 C) 48 D) 96	4. B
5. The number of months in a year is 12; the number of days in a week is 7. When 12 is divided by 7, the remainder is 5. A) 0 B) 2 C) 5 D) 7	5. C
6. There are 5 months from November 1, 2018, until April 1, 2019: November, December, January, February, and March. A) 5 B) 6 C) 7 D) 8	6. A
7. (20 – 18) + (20 – 18) + (20 – 18) = 2 + 2 + 2 = 6. A) 2 B) 4 C) 6 D) 8	7. C
8. The ones digit of 12×13×14 is the same as the ones digit of 2×3×4. A) 2 B) 4 C) 6 D) 8	8. B
9. As shown below, choice D is greatest. A) 1×2×12 = 24 B) 2×3×4 = 24 C) 4×2×2 = 16 D) 2×4×4 = 32	9. D
10. Sandra uses two entire erasers for every 15 questions. She needs 12 erasers for 90 questions. That's one pack so far. Since there are 10 more questions, she needs one more pack. A) 2 B) 3 C) 4 D) 5	10. A
11. Since 100 ÷ 7 = 14R2, the greatest such multiple of 7 is 7 × 14 = 98. A) 91 B) 93 C) 97 D) 98	11. D
12. Since 654 + 456 = 1110, the digit 0 appears only once in the sum. A) 0 B) 1 C) 2 D) 3	12. A

	Answers
13. December has 31 days on which Ella wears sweaters. Ella needs 7 different sweaters each week. After four weeks, a total of 28 days, she can donate 7 sweaters. Ella needs sweaters for the remaining 3 days, so she needs a total of 7 + 3 = 10 sweaters. A) 7 B) 8 C) 10 D) 12	13. C
14. The tens digit may be 2, 4, 6, or 8, and the ones digit may be 0, 2, 4, 6, or 8. That's 4 × 5 = 20 such whole numbers. A) 16 B) 20 C) 25 D) 50	14. B
15. Noah scores 2 × 7 = 14 goals each week. Since 56 ÷ 14 = 4, it will take Noah 4 weeks to score 56 goals. A) 3 B) 4 C) 5 D) 18	15. B
16. Chris ran each lap in 90 seconds. After running for 6 minutes = 360 seconds, he had run 360 ÷ 90 = 4 laps. He had 6 laps left to run. A) 3 B) 4 C) 5 D) 6	16. D
17. The pairs are 41 and 59, 42 and 58, . . . , 48 and 52, and 49 and 51. There are 9 such pairs. A) 9 B) 10 C) 18 D) 20	17. A
18. 2 × 4 × 5 × 25 = (2 × 5) × (4 × 25) = 10 × 100. A) 6 × 125 B) 6 × 150 C) 8 × 150 D) 10 × 100	18. D
19. The sum must be divisible by 3. If one number is 2, the other 2 numbers could each be 5 since the sum of all 3 would be 2 + 5 + 5 = 12. A) 3 B) 4 C) 5 D) 6	19. C
20. $2000 – $2 + $20 – 2¢ = $2018 – 2¢ = $2017.98. A) $1999.98 B) $2017.80 C) $2017.98 D) $2020.20	20. C
21. Joey can have at most 4 large boxes since each large box contains 4 small boxes. If Joey has 4 large boxes, he has 4 × 4 = 16 small boxes, for a total of 20 boxes. A) 4 B) 8 C) 12 D) 16	21. D
22. Any number divisible by both 4 and 6 must be divisible by the l.c.m. of 4 and 6, 12. There are 8 multiples of 12 between 100 and 200. A) 6 B) 7 C) 8 D) 10	22. C

Answer Column

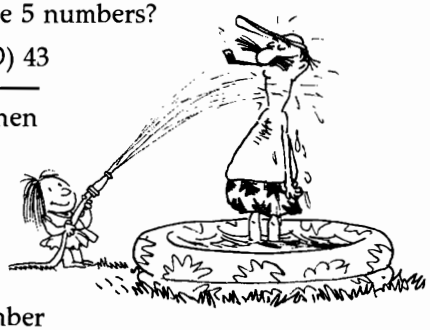
22. The product of my number and twice my number is 72. What is half my number?
A) 3 B) 6 C) 12 D) 36 — 22.

23. Mary got either a 90 or a 100 on each of her 5 math tests. The average of all her math tests is 98. How many 90s did she get?
A) 1 B) 2 C) 3 D) 4 — 23.

24. In the division (121 121 121 006)÷(11), the remainder is
A) 6 B) 5 C) 4 D) 3 — 24.

25. The greatest common divisor of 60, 160, and 260 is
A) 5 B) 6 C) 20 D) 60 — 25.

26. The sum of 5 consecutive whole numbers is 2005. What is the sum of all the digits of these 5 numbers?
A) 15 B) 25 C) 34 D) 43 — 26.



27. If 3 splishes = 2 splashes, then 18 splashes = ? splishes.
A) 12 B) 27 C) 36 D) 48 — 27.

28. Of the 100 numbers 1, 2, 3, . . . , 100, how many are both 5 more than some number in the list *and* 5 less than some other number in the list?
A) 89 B) 90 C) 91 D) 100 — 28.

29. How many 2-digit whole numbers are multiples of *both* 6 and 9?
A) 2 B) 3 C) 4 D) 5 — 29.

30. If 2+4+6+. . .+100 = 2550, then 1+3+5+. . .+99 =
A) 2400 B) 2450 C) 2500 D) 2550 — 30.

The end of the contest 5

Visit our Web site at http://www.mathleague.com

Steven R. Conrad, Daniel Flegler, and *Jeannine Kolbush,* contest authors

M A T H

FIFTH GRADE MATHEMATICS CONTEST

Math League Press, P.O. Box 17, Tenafly, New Jersey 07670-0017

Sample 5th Grade Contest

Spring, 2005

5

Instructions

- **Time** Do *not* open this booklet until you are told by your teacher to begin. You will have only *30 minutes* working time for this contest. You might be *unable* to finish all 30 questions in the time allowed.
- **Scores** Please remember that *this is a contest, not a test*—and there is no "passing" or "failing" score. Few students score as high as 24 points (80% correct). Students with half that, 12 points, *should be commended!*
- **Format and Point Value** This is a multiple-choice contest. Each answer will be one of the *capital letters* A, B, C, or D. Write each answer in the *Answer Column* to the right of each question. We suggest (but do not require) that you use a pencil. Each question you answer correctly is worth 1 point. Unanswered questions receive no credit. You **may** use a calculator *unless* your school does *not* allow you to use one.

Please Print

Last Name _____ First Name _____

School _____ Teacher _____ Grade Level ____

Do Not Write In The Space Below

To the Teacher:
Please enter the student's score at the right before you return this paper to the student. *Student's Score:* _____

The school's top scorer will receive the book *Math Contests—Grades 4,5,6 (Vol. 3)*. Other high scorers will receive Certificates of Merit. In any one school year, no student may win both a book and a certificate. The book and certificates were in the original contest package.

If needed, duplicate book awards may be ordered as described below.

Answer Column

1. $200 + 300 + 400 = 100 + 200 + 300 + \underline{?}$
   A) 100 B) 200 C) 300 D) 400 — 1.

2. To fill a big hole, I used 2 fewer than 2-dozen truckloads of dirt. I used $\underline{?}$ truckloads of dirt.
   A) 10 B) 12 C) 20 D) 22 — 2.

3. $27 \div 3 = 3 \times \underline{?}$
   A) 3 B) 6 C) 9 D) 27 — 3.

4. I threw 9 coins into the air. If twice as many coins landed heads up as landed tails up, how many coins landed heads up?
   A) 3 B) 4 C) 5 D) 6 — 4.

5. If you subtract 19 ones from 19 tens, the result is
   A) 1871 B) 342 C) 171 D) 9 — 5.

6. $4 \times 8 \times 12 = 16 \times \underline{?}$
   A) 32 B) 24 C) 20 D) 16 — 6.

7. If my neck grows 5 cm every 10 days, it takes $\underline{?}$ days for my neck to grow 50 cm.
   A) 5 B) 10 C) 25 D) 100 — 7.

8. $(33 + 44 + 55 + 66) \div 11 =$
   A) 18 B) 11 C) 9 D) 7 — 8.

9. Of the following, which is divisible by 6?
   A) 166 B) 266 C) 366 D) 466 — 9.

10. Pete paid for 4 identical frozen pizzas with a $20 bill. If Pete got $3.60 in change, how much did one frozen pizza cost?
    A) $4.10 B) $5 C) $6.25 D) $9 — 10.

11. $(48 \times 2) + (48 \times 3) + (48 \times 4) = 48 \times \underline{?}$
    A) 24 B) 9 C) 5 D) 3 — 11.

Go on to the next page ➡ 5

Answer Column

12. (perimeter of my square) ÷ (sum of 2 side-lengths of my square) =
    A) 1 B) 2 C) 4 D) 8 — 12.

13. Tom is 12 years old. What is the average of his age 4 years ago and his age 6 years ago?
    A) 11 B) 7 C) 5 D) 4 — 13.

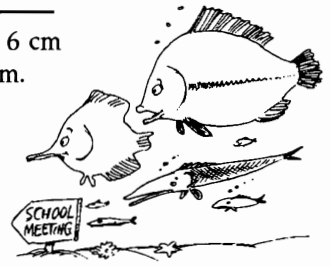
14. I was wandering around the house at 12 hours and 12 minutes before noon. I was wandering around at
    A) 11:48 A.M. B) 12:12 A.M.
    C) 11:48 P.M. D) 12:12 P.M. — 14.

15. Two million equals
    A) 200×100 B) 200×1000 C) 2000×1000 D) $20\,000 \times 10$ — 15.

16. The number 2005 is a 4-digit number. What is the sum of the *greatest* 3-digit number and the *greatest* 4-digit number?
    A) 9998 B) 9999 C) 10 000 D) 10 998 — 16.

17. If an ape ate 1 banana every 4 hours, it ate $\underline{?}$ bananas in 5 days.
    A) 20 B) 24 C) 30 D) 120 — 17.

18. One side of an equilateral triangle is 6 cm long. The triangle's perimeter is $\underline{?}$ cm.
    A) 2 B) 6 C) 18 D) 36 — 18.



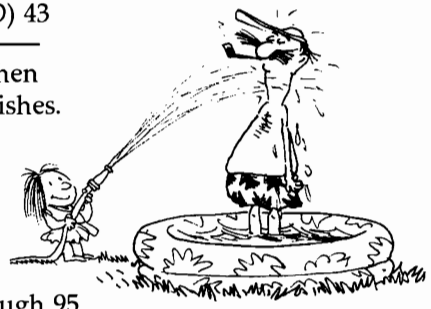
19. The school meeting is on the 199th day of the calendar year, in
    A) May B) June C) July D) August — 19.

20. The number 728 is divisible by all of the following *except*
    A) 7 B) 8 C) 28 D) 72 — 20.

21. I multiplied 1111×1111 and wrote down the product. When I wrote the product, the largest *odd* digit that I wrote was
    A) 1 B) 3 C) 4 D) 5 — 21.

Go on to the next page ➡ 5

	Answers
22. Use trial & error. Double each choice to try to get my original #. For *A*, half my # is 3, my # is 6, twice it is 12. The product is 72. A) 3 B) 6 C) 12 D) 36	22. A
23. If Mary got all 100s, her average would have been 100. Since 98 is just a little less than 100, try four 100s and one 90. Finally, $(400+90)\div 5 = 98$, as required. A) 1 B) 2 C) 3 D) 4	23. A
24. Since 121 is divisible by 11, the remainder is 006, or 6. A) 6 B) 5 C) 4 D) 3	24. A
25. The g.c.d. of 6, 16, & 26 is 2, so the g.c.d. of 60, 160, & 260 is 20. A) 5 B) 6 C) 20 D) 60	25. C
26. The middle # is $2005\div 5 = 401$. The sum of the digits of the 5 #s is $(3+9+9)+(4+0+0)+(4+0+1)+(4+0+2)+(4+0+3) = 43$. A) 15 B) 25 C) 34 D) 43	26. D
27. If 2 splashes = 3 splishes, then (9×2) splashes = (9×3) splishes. A) 12 B) 27 C) 36 D) 48	27. B
28. The smallest such number is 6, and the largest such number is 95. There are 90 whole numbers from 6 through 95. A) 89 B) 90 C) 91 D) 100	28. B
29. The l.c.m. of 6 & 9 is 18. The 5 numbers are 18, 36, 54, 72, & 90. A) 2 B) 3 C) 4 D) 5	29. D
30. $1+3+\ldots+99 = (2-1)+(4-1)+\ldots+(100-1) = 2550-50 = 2500$. A) 2400 B) 2450 C) 2500 D) 2550	30. C



The end of the contest **5**

Visit our Web site at http://www.mathleague.com

Steven R. Conrad, Daniel Flegler, and *Jeannine Kolbush,* contest authors

MATH

FIFTH GRADE MATHEMATICS CONTEST

Math League Press, P.O. Box 17, Tenafly, New Jersey 07670-0017

Information & Solutions

Spring, 2005

5

Directions for Grading

- **Date** You may give this contest anytime after April 15. The *5th Grade Contest* is for use in your own school or district. We've enclosed a registration form for next year. Since results are *not* used for interschool comparisons, ***we do not enclose a score report form***.
- **Urgent questions?** Call 1-201-568-6328.
- **Scores** Remind students that *this is a contest, not a test*—and there is no "passing" or "failing" score. Few students score as high as 24 points (80% correct); students with half that, 12 points, *should be commended!*
- **Solutions** Detailed solutions appear in each question box, and letter answers are in the *Answers* columns on the right. You may copy this solution key and give a copy to every student who took this contest.
- **Awards** The original contest package contained 1 book award (and a bookplate you should affix to the book's inside front cover) for the 1st place student. We also enclosed 5 *Certificates of Merit*—1 each for the runner-up on each grade level, plus extras for ties.
- **Additional Book Awards & Additional Certificates** If you want to give more than 1 book award, you may purchase additional books as described below. Do you need more Certificates of Merit? If so, send your name, school, and school mailing address to our mailer at: ***Math Certificates, P.O. Box 17, Tenafly, NJ 07670-0017.***, and *include a self-addressed, stamped envelope* (***2 stamps required***) *large enough to hold certificates.*

  The school's top scorer will receive the book *Math Contests—Grades 4,5,6 (Vol. 3)*. Other high scorers receive Certificates of Merit. In any one school year, no student may win both a book and a certificate. The book and certificates were in the original contest package. Special "bumper sticker" awards are included for high scoring students.

  If needed, duplicate book awards may be ordered as described below.

Answers

1. $(100+100)+(200+100)+(300+100) = 100+200+300+300$.
   A) 100 B) 200 C) 300 D) 400
   1. C

2. Two-dozen truckloads of dirt = $2\times12 = 24$ truckloads. Two fewer than that is $24-2 = 22$ truckloads.
   A) 10 B) 12 C) 20 D) 22

   2. D

3. $27 \div 3 = 9$, and $9 = 3\times3$.
   A) 3 B) 6 C) 9 D) 27
   3. A

4. For each coin that lands tails up, two land heads up. Make a list. Look for a sum of 9: 1*t*,2*h*; 2*t*,4*h*; 3*t*,6*h*. Finally, $3+6 = 9$.
   A) 3 B) 4 C) 5 D) 6
   4. D

5. 19 tens − 19 ones $= (19\times10)-(19\times1) = 190-19 = 171$.
   A) 1871 B) 342 C) 171 D) 9
   5. C

6. $4\times8\times12 = 4\times(4\times2)\times12 = (4\times4)\times(2\times12) = 16\times24$.
   A) 32 B) 24 C) 20 D) 16
   6. B

7. My neck, which grows 5 cm in 10 days, grows $10\times5 = 50$ cm in $10\times10 = 100$ days.
   A) 5 B) 10 C) 25 D) 100
   7. D

8. $(33+44+55+66)\div11 = 3+4+5+6 = 18$.
   A) 18 B) 11 C) 9 D) 7
   8. A

9. Even numbers divisible by 3 are divisible by 6.
   A) 166 B) 266 C) 366 D) 466
   9. C

10. Pete got \$3.60 in change, so 4 frozen pizzas cost Pete \$20.00 − \$3.60 = \$16.40. One frozen pizza cost Pete \$16.40 ÷ 4 = \$4.10.
    A) \$4.10 B) \$5 C) \$6.25 D) \$9
    10. A

11. $(48\times2) + (48\times3) + (48\times4) = 48\times(2 + 3 + 4) = 48\times9$.
    A) 24 B) 9 C) 5 D) 3
    11. B

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Answers

12. The ratio (4 side-lengths) ÷ (2 side-lengths) $= 4\div2 = 2$.
    A) 1 B) 2 C) 4 D) 8
    12. B

13. Four years ago, Tom was 8. Six years ago, he was 6. The average of 8 and 6 is 7.
    A) 11 B) 7 C) 5 D) 4

    13. B

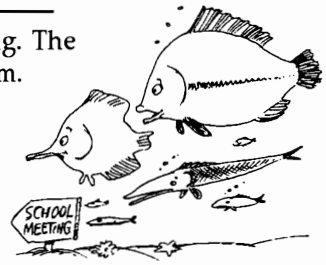
14. 12 hours before noon is 12 midnight. 12 minutes before 12 midnight is 11:48 P.M. I was wandering around at 11:48 P.M.
    A) 11:48 A.M. B) 12:12 A.M.
    C) 11:48 P.M. D) 12:12 P.M.
    14. C

15. Two million = 2 000 000 = 2000×1000.
    A) 200×100 B) 200×1000 C) 2000×1000 D) $20\,000\times10$
    15. C

16. The *greatest* 3-digit number is 999, and the *greatest* 4-digit number is 9999. Their sum is $999 + 9999 = 10\,998$.
    A) 9998 B) 9999 C) 10 000 D) 10 998
    16. D

17. The ape ate 6 bananas daily. It ate $5\times6 = 30$ bananas in 5 days.
    A) 20 B) 24 C) 30 D) 120
    17. C

18. Every side of the triangle is 6 cm long. The triangle's perimeter is $6+6+6 = 18$ cm.
    A) 2 B) 6 C) 18 D) 36



    18. C

19. First 6 months take about $6\times30 = 180$ days, so day 199 falls in month 7, July.
    A) May B) June C) July D) August
    19. C

20. When 728 is divided by 72, the remainder is 8.
    A) 7 B) 8 C) 28 D) 72
    20. D

21. The product 1111×1111 equals 1 234 321. The largest *odd* digit in this product is 3.
    A) 1 B) 3 C) 4 D) 5
    21. B

Go on to the next page ➡ **5**

22. Maria had 28 dreams last month. If 16 of them involved monkeys, 15 involved squirrels, and 4 involved no animals, then at least how many dreams involved both monkeys and squirrels?

A) 3 B) 7 C) 9 D) 11 — 22.

23. The lengths of three consecutive sides of a _?_ could be 3, 3, and 8.

A) triangle B) square
C) parallelogram D) trapezoid — 23.

24. I have 500 pennies. If I spend 6 pennies a day until I can no longer do so, at the end of one of the days I will have exactly _?_ pennies left.

A) 6 B) 8 C) 10 D) 12 — 24.

25. A "combo" ticket to enter the fair and ride unlimited rides is $30. A "per ride" ticket costs $12.50 to enter and $5 per ride. For a "combo" ticket to cost less than a "per ride" ticket, a person must go on at least _?_ rides.

A) 3 B) 4 C) 6 D) 7 — 25.

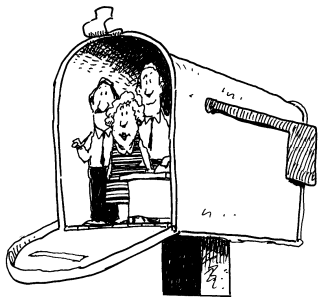
26. The ones digit of $9\times8\times7\times6\times5\times4\times3\times3\times4\times5\times6\times7\times8\times9$ is

A) 0 B) 4 C) 6 D) 9 — 26.

27. A football team scores an average of 31 points per game in its first four games and an average of 30 points per game in its first five games. How many points did the team score in its fifth game?

A) 26 B) 27 C) 28 D) 29 — 27.

28. The 7 people in my mailbox leave. I write X for each man and O for each woman as they leave. I have 3 X's and 4 O's, with no 2 X's in a row. There are _?_ different orders in which the X's and O's could be written.



A) 4 B) 6 C) 8 D) 10 — 28.

29. Mo and Jo have a total of 120 coins; Bo and Ko have 153; and Mo and Bo have 127. In all, Jo and Ko have _?_ coins.

A) 106 B) 128 C) 135 D) 146 — 29.

30. The largest perimeter a rectangle made of 100 2 x 2 squares can have is

A) 88 B) 100 C) 400 D) 404 — 30.

The end of the contest 5

Visit our Web site at http://www.mathleague.com

Steven R. Conrad, Daniel Flegler, and *Adam Raichel,* contest authors

FIFTH GRADE MATHEMATICS CONTEST

Math League Press, P.O. Box 17, Tenafly, New Jersey 07670-0017

Sample 5th Grade Contest

5

Spring, 2013

Instructions

- **Time** Do *not* open this booklet until you are told by your teacher to begin. You will have only *30 minutes* working time for this contest. You might be *unable* to finish all 30 questions in the time allowed.
- **Scores** Please remember that *this is a contest, and not a test*—there is no "passing" or "failing" score. Few students score as high as 24 points (80% correct). Students with half that, 12 points, *should be commended!*
- **Format and Point Value** This is a multiple-choice contest. Each answer will be one of the *capital letters* A, B, C, or D. Write each answer in the *Answer Column* to the right of each question. We suggest (but do not require) that you use a pencil. Each question you answer correctly is worth 1 point. Unanswered questions receive no credit. You **may** use a calculator *unless* your school does *not* allow you to use one.

Please Print

Last Name _____ First Name _____

School _____ Teacher _____ Grade Level _____

Do Not Write In The Space Below

To the Teacher:
Please enter the student's score at the right before you return this paper to the student. ***Student's Score:*** _____

1. Sue hasn't struck out since 18 days before Saturday. That day was a

   A) Tuesday B) Wednesday
   C) Thursday D) Friday

2. $(1 + 2 + 3) \times 10 = 30 + 20 +$ _?_

   A) 10 B) 11 C) 33 D) 44

3. I listened to 6 songs before the one I'm listening to now, and I will listen to 6 more after this one. All together, that's _?_ songs.

   A) 11 B) 12 C) 13 D) 14

4. 100 hundreds ÷ 10 tens =

   A) 10 B) 100 C) 1000 D) 10 000

5. $9 + 99 + 999 = 9 \times$ _?_

   A) 111 B) 112 C) 122 D) 123

6. I created 30 characters, 3 for each video game I own. That means I own _?_ video games.

   A) 10 B) 33 C) 40 D) 90

7. If I add the number of sides that a hexagon has to the number of sides that a _?_ has, then the sum is odd.

   A) rhombus B) square C) pentagon D) quadrilateral

8. $40 + 30 \times 20 + 10 \times 0 =$

   A) 0 B) 150 C) 640 D) 1400

9. My older brother is 6 years older than I am, and the sum of our ages is 30. How old is my older brother?

   A) 12 B) 15 C) 18 D) 21

10. Don paid for 5 tropical punches with a $50 bill and got $16 in change. He paid _?_ per tropical punch.

    A) $5.20 B) $6.80
    C) $8.20 D) $8.80

11. The average of one dozen and two dozen is

    A) 13 B) 18 C) 24 D) 36

Go on to the next page ➡ 5

12. At normal speed, it takes Manuel exactly one hour and 46 minutes to play a trombone concerto. Playing at twice that speed, it would take Manuel _?_ minutes to play the concerto.

    A) 53 B) 73 C) 83 D) 212

13. If I triple _?_ and then subtract 60, I get 180.

    A) 40 B) 60 C) 70 D) 80

14. There are a total of 2013 students enrolled at 8 high schools. If there are 234 students at each of 4 of the schools, then there are a total of _?_ students at the other 4 schools.

    A) 1077 B) 1123 C) 1234 D) 1443

15. Three different books are arranged in a line on my bookshelf. In how many different orders can these books be arranged?

    A) 3 B) 4 C) 5 D) 6

16. A square piece of paper has a perimeter of 36 cm. What is the area of a square piece of paper with twice that perimeter?

    A) 72 cm^2 B) 108 cm^2 C) 144 cm^2 D) 324 cm^2

17. I have equal numbers of quarters, dimes, and nickels. These coins could have a total value of any of the following EXCEPT

    A) $2.40 B) $3.80 C) $4.40 D) $5.20

18. Of the following, _?_ has the greatest number of whole number factors.

    A) 6 B) 9 C) 12 D) 16

19. The least common multiple of 10 and 24 plus the greatest common factor of 10 and 24 equals

    A) 121 B) 122 C) 241 D) 242

20. There are 5 cars for every 3 trucks parked in a lot. If there is a total of 120 cars and trucks parked in the lot, there are _?_ cars there.

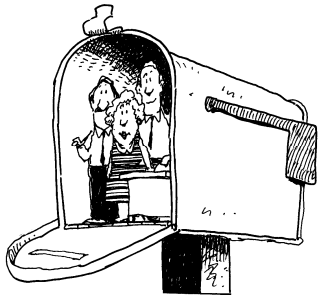
    A) 24 B) 45 C) 75 D) 80

21. Sven is skiing at a rate of 600 m/min. That equals a rate of _?_ cm/sec.

    A) 100 B) 600
    C) 1000 D) 60 000

Go on to the next page ➡ 5

	Answers
22. Maria had 28 dreams last month, 24 of which involved animals. Since 16 + 15 = 31 involved moneys or squirrels, then at least 31 − 24 = 7 dreams involved both monkeys and squirrels. A) 3 B) 7 C) 9 D) 11	22. B
23. A trapezoid may have consecutive sides of lengths 3, 3, 8, and 4. A) triangle B) square C) parallelogram D) trapezoid	23. D
24. My pennies can be divided into 500÷6 = 83 groups of 6 pennies, with 2 left over. At the end of the 82nd day, I will have 6 + 2 = 8 pennies left. A) 6 B) 8 C) 10 D) 12	24. B
25. A fair sells a "combo" ticket for \$30 entry and a "per ride" ticket for \$12.50 to enter plus \$5 per ride. A "per ride" ticket costs \$12.50 + \$15 = \$27.50 for 3 rides and \$12.50 + \$20 = \$32.50 for 4 rides. A) 3 B) 4 C) 6 D) 7	25. B
26. Since 5 × 4 = 20, the ones digit of the given product must be 0. A) 0 B) 4 C) 6 D) 9	26. A
27. A team scores an average of 31 points per game in its 1st 4 games for a total of 31 × 4 = 124 points, and an average of 30 points per game in its 1st 5 games for a total of 30 × 5 = 150 points. The difference is 150 − 124 = 26. A) 26 B) 27 C) 28 D) 29	27. A
28. The possibilities are 1) XOXOXOO, 2) XOXOOXO, 3) XOXOOOX, 4) XOOXOXO, 5) XOOXOOX, 6) XOOOXOX, 7) OXOXOXO, 8) OXOXOOX, 9) OXOOXOX, and 10) OOXOXOX. A) 4 B) 6 C) 8 D) 10	28. D
29. Mo and Jo with Bo and Ko have a total of 273 coins. If we subtract the 127 coins Mo and Bo have, Jo and Ko have 146. A) 106 B) 128 C) 135 D) 146	29. D
30. Place 100 2 x 2 squares in a line. The perimeter is 2 x (2 + 200) = 404. A) 88 B) 100 C) 400 D) 404	30. D



The end of the contest 5

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FIFTH GRADE MATHEMATICS CONTEST

Math League Press, P.O. Box 17, Tenafly, New Jersey 07670-0017

Information & Solutions

Spring, 2013

5

Directions for Grading

- **Date** You may give this contest any time after April 15. The *5th Grade Contest* is for use in your own school or district. We've enclosed a registration form for next year. Instructions for optionally submitting results are included on a separate sheet entitled "*Using the Score Report Center*."
- **Urgent questions?** Write to comments@mathleague.com, or call 1-201-568-6328 or 1-516-365-5656.
- **Scores** Remind students that *this is a contest, and not a test*—there is no "passing" or "failing" score. Few students score as high as 24 points (80% correct); students with half that, 12 points, *should be commended!*
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If needed, duplicate book awards may be ordered as described below.

Answers

1. Since 14 days before Saturday is Saturday, 4 more days before that would be Tuesday.
   A) Tuesday B) Wednesday C) Thursday D) Friday

Answer: 1. A

2. $(1 + 2 + 3) \times 10 = 60 = 30 + 20 + 10$.
   A) 10 B) 11 C) 33 D) 44

Answer: 2. A

3. I listened to 6 songs before the one I'm listening to now, and I will listen to 6 more after this one. That's $6 + 1 + 6 = 13$ songs.
   A) 11 B) 12 C) 13 D) 14

Answer: 3. C

4. 100 hundreds ÷ 10 tens = 10 000 ÷ 100 = 100.
   A) 10 B) 100 C) 1000 D) 10 000

Answer: 4. B

5. $9 + 99 + 999 = 9 \times (1 + 11 + 111) = 9 \times 123$.
   A) 111 B) 112 C) 122 D) 123

Answer: 5. D

6. I created 30 characters, 3 for each video game I own. That means I own $30 \div 3 = 10$ video games.
   A) 10 B) 33 C) 40 D) 90

Answer: 6. A

7. If I add the number of sides that a hexagon has (6) to the number of sides that a pentagon has (5), then the sum is $6 + 5 = 11$, which is odd.
   A) rhombus B) square C) pentagon D) quadrilateral

Answer: 7. C

8. $40 + 30 \times 20 + 10 \times 0 = 40 + 600 + 0 = 640$.
   A) 0 B) 150 C) 640 D) 1400

Answer: 8. C

9. Subtract 6 from 30 to get 24, which is twice my age. Therefore, I am 12 years old. My brother is 6 years older than I am, so he is 18.
   A) 12 B) 15 C) 18 D) 21

Answer: 9. C

10. Since $\$50 - \$16 = \$34$, Don paid $\$34 \div 5 = \$6.80$ per tropical punch.
    A) \$5.20 B) \$6.80 C) \$8.20 D) \$8.80

Answer: 10. B

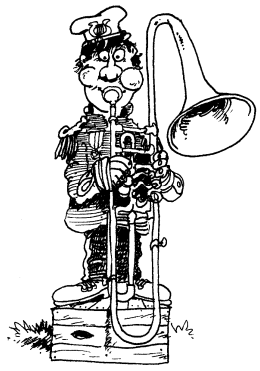
11. The average of 12 and 24 is $(12 + 24) \div 2 = 18$.
    A) 13 B) 18 C) 24 D) 36

Answer: 11. B

Go on to the next page ➡ 5

Answers

12. One hr. and 46 min. = (60 + 46) min. = 106 minutes. Playing at twice that speed, it would take Manuel $106 \div 2 = 53$ minutes to play the concerto.
    A) 53 B) 73 C) 83 D) 212



Answer: 12. A

13. Add 60 to 180 and divide by 3: $240 \div 3 = 80$.
    A) 40 B) 60 C) 70 D) 80

Answer: 13. D

14. There are a total of 2013 students enrolled at 8 high schools. There are 234 students at each of 4 of the schools, for a total of 936 students. That leaves $2013 - 936 = 1077$ students.
    A) 1077 B) 1123 C) 1234 D) 1443

Answer: 14. A

15. Three different books, *A*, *B*, *C*, are arranged on my bookshelf. They may be arranged as *ABC*, *ACB*, *BAC*, *BCA*, *CAB*, or *CBA*.
    A) 3 B) 4 C) 5 D) 6

Answer: 15. D

16. A square piece of paper has a perimeter of 36 cm. Twice the perimeter is 72 cm. Each side is $72 \div 4 = 18$ cm, and the area is 324 cm^2.
    A) 72 cm^2 B) 108 cm^2 C) 144 cm^2 D) 324 cm^2

Answer: 16. D

17. The value of 1 quarter, 1 dime, and 1 nickel is 40¢. My coins must have a total value divisible by 40, but \$3.80 is not divisible by 40.
    A) \$2.40 B) \$3.80 C) \$4.40 D) \$5.20

Answer: 17. B

18. The whole number factors of 12 are 1, 2, 3, 4, 6, and 12.
    A) 6 B) 9 C) 12 D) 16

Answer: 18. C

19. The least common multiple of 10 and 24 is 120; the greatest common factor of 10 and 24 is 2. Their sum is $120 + 2 = 122$.
    A) 121 B) 122 C) 241 D) 242

Answer: 19. B

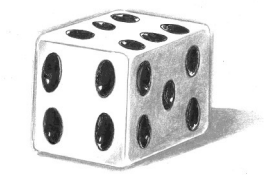
20. For every 8 vehicles in the lot, 5 are cars and 3 are trucks. If the lot has 120 vehicles, that's 15 groups of 8. Each group has 5 cars: $15 \times 5 = 75$.
    A) 24 B) 45 C) 75 D) 80

Answer: 20. C

21. A rate of 600 m/min. = 60 000 cm/min. = 60 000 cm/ 60 sec. = 1000 cm/sec.
    A) 100 B) 600 C) 1000 D) 60 000

Answer: 21. C

Go on to the next page ➡ 5

	Answers
23. A die is rolled 3 times. The 1st number rolled is the hundreds digits of a 3-digit number, the 2nd one rolled is the tens digit, and the 3rd one rolled is the ones digit. How many different 3-digit numbers formed this way have at least two identical digits?  A) 96 B) 120 C) 166 D) 216	23.
24. A number greater than 2019 is the sum of **at least** _?_ 2-digit numbers. A) 20 B) 21 C) 200 D) 201	24.
25. A teacher divides her students into groups so there are at most 2 more boys than girls in each group. If there are 7 more boys than girls, what is the lowest number of groups the teacher can create? A) 3 B) 4 C) 6 D) 7	25.
26. Of the following numbers, which has an odd number of even factors? A) 4 B) 80 C) 100 D) 128	26.
27. In the hurdle competition, Kaz finished 12 places ahead of last place and 4 places behind the top half of all competitors. How many competitors placed ahead of Kaz?  A) 18 B) 19 C) 20 D) 21	27.
28. What is the average of all factors of the product $2 \times 3 \times 5$? A) 6 B) 7 C) 8 D) 9	28.
29. I counted by ones, in increasing order, starting with a number greater than 1. If the average of the first 99 numbers I counted was 100, what is the sum of the digits of my first number? A) 5 B) 6 C) 7 D) 8	29.
30. If my favorite positive number multiplied by itself has the same value as the sum when this favorite number is written 24 times and the numbers are added together, what is half the value of that sum? A) 48 B) 144 C) 240 D) 288	30.

The end of the contest 5

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Steven R. Conrad, Daniel Flegler, Jeannine Kolbush, and Adam Raichel, contest authors

FIFTH GRADE MATHEMATICS CONTEST

Math League Press, P.O. Box 17, Tenafly, New Jersey 07670-0017

Sample 5th Grade Contest

Spring, 2019

5

Instructions

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- **Format and Point Value** This is a multiple-choice contest. Each answer will be one of the *capital letters* A, B, C, or D. Write each answer in the *Answer Column* to the right of each question. We suggest (but do not require) that you use a pencil. Each question you answer correctly is worth 1 point. Unanswered questions receive no credit. You **may** use a calculator *unless* your school does *not* allow you to use one.

Please Print

Last Name _____ First Name_____

School _____ Teacher _____ Grade Level_____

Do Not Write In The Space Below

To the Teacher:
Please enter the student's score at the right before you return this paper to the student. ***Student's Score:***_____

The school's top scorer will receive the book *Math Contests—Grades 4,5,6 (Vol. 4).* Other high scorers will receive Certificates of Merit. In any one school year, no student may win both a book and a certificate. The book and certificates were in the original contest package.

If needed, duplicate book awards may be ordered as described below.

Twenty-one books of past contests, *Grades 4, 5, & 6* (*Vols. 1, 2, 3, 4, 5, 6, 7*), *Grades 7 & 8* (*Vols. 1, 2, 3, 4, 5, 6, 7*), and *High School* (*Vols. 1, 2, 3, 4, 5, 6, 7*), are available, for $12.95 per volume, from Math League Press, P.O. Box 17, Tenafly, NJ 07670-0017.

Answers

1. $700 + 80 + 9 = \_?\_ + 89$

   A) 7 B) 70 C) 700 D) 780

2. I counted 1800 sheep and cows. If I counted 5 sheep for every cow I counted, I counted _?_ more sheep than cows.

   A) 400 B) 600 C) 1200 D) 1500

3. The product of 2018 and 2019 has _?_ more digits than their sum has.

   A) 3 B) 4 C) 5 D) 7

4. $250 \times 100 = (2 \times 50) \times (\_?\_ \times 10)$

   A) 10 B) 20 C) 25 D) 50

5. Adding 20 to my age now doubles it. How old was I two years ago?

   A) 8 B) 18 C) 22 D) 38

6. $2019 - (19 \times 6) = (2019 - 19) - (19 \times \_?\_)$

   A) 0 B) 5 C) 6 D) 7

7. A weed grew 1 cm every 6 days. It grew _?_ cm in $1 \times 2 \times 3 \times 4 \times 5$ days.

   A) 20 B) 40 C) 60 D) 120

8. $10 \times 10 \times 10 = 100 \times 100 \times 100 \div \_?\_$

   A) 10 B) $10 \times 10 \times 10$ C) $90 \times 90 \times 90$ D) $100 \times 100 \times 100$

9. The side-lengths of a triangle are even numbers. Its perimeter is *not*

   A) 9 B) 16 C) 36 D) 64

10. I wrote down every whole number less than 25 that is also 1 less than a prime. How many of these numbers are multiples of 4?

    A) 0 B) 1 C) 2 D) 3

11. My balloon rose 10 m every minute. How high did it rise in 8760 seconds?

    A) 146 m B) 365 m C) 1046 m D) 1460 m

12. If May has 5 Mondays, the first day of May could *not* be a

    A) Sunday B) Monday C) Tuesday D) Saturday

Go on to the next page ➡ 5

Answers

13. Twice my hat size is 3 times my shoe size. If my hat size is 18 more than my shoe size, then the sum of my hat size and shoe size together is

    A) 36 B) 54 C) 90 D) 108

14. What is the least 3-digit odd sum of two prime numbers?

    A) 101 B) 103 C) 105 D) 107

15. I ran each of the first two km of a 3-km race twice as fast as I ran the third km. If I ran the entire race in 36 minutes, how long did it take me to run the third km?

    A) 12 minutes B) 18 minutes C) 24 minutes D) 27 minutes

16. My favorite number is 2019. What is the sum of the smallest factor and the greatest factor of my favorite number?

    A) 674 B) 676 C) 2020 D) 2022

17. Each day, including weekend days, I play video games for half as much time as I spend doing homework that day. If I spent a total of 3 hours and 2 minutes playing video games last week, how much time on average did I spend doing homework each day last week?

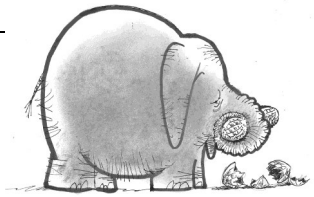
    A) 16 minutes B) 26 minutes C) 36 minutes D) 52 minutes

18. What is the greatest possible product of the ones digits of 4 numbers?

    A) 9 B) 105 C) 945 D) 6561

19. My average game score after 3 games was 5 points lower than it had been after 2 games. My third game score was _?_ points lower than the average of my first two game scores.

    A) 5 B) 10 C) 15 D) 25



20. Elle shelled twice as many nuts each day as she had the day before. If Elle shelled 360 nuts in 4 days, how many more nuts did she shell on day 4 than on day 1?

    A) 90 B) 168 C) 192 D) 270

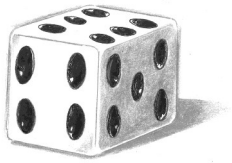
21. Which quotient has the greatest remainder?

    A) $10 \div 9$ B) $100 \div 99$ C) $1000 \div 99$ D) $10\,000 \div 99$

22. A certain number has exactly 3 different factors. If the second greatest factor is 7, what is the sum of the digits of the number?

    A) 5 B) 7 C) 12 D) 13

Go on to the next page ➡ 5

	Answers
23. There are 6×6×6 such 3-digit numbers. Of those, 6×5×4 are numbers with 3 *different* digits, since for each hundreds digit chosen, there are 5 tens digits that differ from it and 4 ones digits that differ from the other 2 digits. So 216 – 120 = 96 3-digit numbers have at least 2 identical digits .  A) 96 B) 120 C) 166 D) 216	23. A
24. Since 20 < 2019÷99 < 21, 2019 is the sum of at least 21 2-digit numbers. A) 20 B) 21 C) 200 D) 201	24. B
25. A teacher divides her students into groups so there are at most 2 more boys than girls in each group. She must divide the 7 additional boys into groups of 2, 2, 2, and 1 to get the lowest number of groups. A) 3 B) 4 C) 6 D) 7	25. B
26. The even factors of each choice are: A) 2,4; B) 2,4,8,10,16,20,40,80; C) 2,4,10,20,50,100; D) 2,4,8,16,32,64,128. Choice D has 7 even factors. A) 4 B) 80 C) 100 D) 128	26. D
27. Kaz finished 12 places ahead of last and 4 places behind the top half. So, 3 + 1 + 12 places are the bottom half. Kaz finished 4 places after 16th, so he was 20th, with 19 ahead of him.  A) 18 B) 19 C) 20 D) 21	27. B
28. The average of 1, 2, 3, 5, 6, 10, 15, and 30 is 72 ÷ 8 = 9. A) 6 B) 7 C) 8 D) 9	28. D
29. If the average of the first 99 numbers I counted was 100, 100 must be the middle number. There are 49 numbers less than 100, so my first number was 51. The sum of the digits of my first number is 5 + 1 = 6. A) 5 B) 6 C) 7 D) 8	29. B
30. My favorite positive number multiplied by itself is a perfect square. Double each choice and find the perfect square. Since 576 is the square of 24, half of 576 (288) is the correct answer. A) 48 B) 144 C) 240 D) 288	30. D

The end of the contest **5**

Visit our Web site at http://www.mathleague.com

Steven R. Conrad, Daniel Flegler, Jeannine Kolbush, and Adam Raichel, contest authors

FIFTH GRADE MATHEMATICS CONTEST

Math League Press, P.O. Box 17, Tenafly, New Jersey 07670-0017

Information & Solutions

Spring, 2019

5

Directions for Grading

- **Date** You may give this contest any time after April 15. The *5th Grade Contest* is for use in your own school or district. We've enclosed a registration form for next year. Instructions for optionally submitting results are included on a separate sheet entitled "*Using the Score Report Center*."
- **Urgent questions?** Write to comments@mathleague.com, or call 1-201-568-6328 or 1-516-365-5656.
- **Scores** Remind students that *this is a contest, and not a test*—there is no "passing" or "failing" score. Few students score as high as 24 points (80% correct); students with half that, 12 points, *should be commended!*
- **Solutions** Detailed solutions appear in each question box, and letter answers are in the *Answers* columns on the right. You may copy this solution key and give a copy to every student who took this contest.
- **Awards** The original contest package contained 1 book award (and a bookplate you should affix to the book's inside front cover) for the 1st place student. We also enclosed 5 *Certificates of Merit*—1 for each runner-up, plus extras for ties.
- **Additional Book Awards & Additional Certificates** If you want to give more than 1 book award, you may purchase additional books as described below. Do you need more Certificates of Merit? If so, send your name, school, and school mailing address to our mailer at: ***Math Certificates, P.O. Box 17, Tenafly, NJ 07670***, and *include a self-addressed, stamped envelope (**2 stamps required**) large enough to hold certificates.*

The school's top scorer will receive the book *Math Contests—Grades 4,5,6 (Vol. 4).* Other high scorers will receive Certificates of Merit. In any one school year, no student may win both a book and a certificate. The book and certificates were in the original contest package.

If needed, duplicate book awards may be ordered as described below.

Answers

1. $700 + 80 + 9 = 700 + (80 + 9) = 700 + 89$.

   A) 7 B) 70 C) 700 D) 780

   1. C

2. Of every 6 animals I counted, 5 were sheep and 1 was a cow. Of 1800 animals, 1500 were sheep and 300 were cows.

   A) 400 B) 600 C) 1200 D) 1500

   2. C

3. The product of 2018 and 2019 has 7 digits, Their sum has 4 digits, 3 digits less.

   A) 3 B) 4 C) 5 D) 7

   3. A

4. $250 \times 100 = 100 \times 250 = (2 \times 50) \times (25 \times 10)$.

   A) 10 B) 20 C) 25 D) 50

   4. C

5. Adding 20 to my age doubles it. I must now be 20. I was 18 2 years ago.

   A) 8 B) 18 C) 22 D) 38

   5. B

6. $2019 - (19 \times 1 + 19 \times 5) = (2019 - 19) - (19 \times 5)$.

   A) 0 B) 5 C) 6 D) 7

   6. B

7. A weed grew 1 cm every 6 days. It grew 20 cm in 6×20 days.

   A) 20 B) 40 C) 60 D) 120

   7. A

8. $10 \times 10 \times 10 = 1000 = 100 \times 100 \times 100 \div 1000$.

   A) 10 B) 10×10×10 C) 90×90×90 D) 100×100×100

   8. B

9. A triangle with even side-lengths could *not* have an odd perimeter.

   A) 9 B) 16 C) 36 D) 64

   9. A

10. The whole numbers less than 25 that are 1 less than a prime are 1, 2, 4, 6, 10, 12, 16, 18, and 22. The multiples of 4 are 4, 12, and 16.

    A) 0 B) 1 C) 2 D) 3

    10. D

11. Since $8760 \div 60 = 146$, my balloon rose 146×10 m in 8760 seconds.

    A) 146 m B) 365 m C) 1046 m D) 1460 m

    11. D

12. If May 1st was a Tuesday, then the 7th, 14th, 21st, and 28th would be Mondays.

    A) Sunday B) Monday C) Tuesday D) Saturday

    12. C

Answers

13. My hat size is 1.5 times my shoe size. If my hat size is 18 more than my shoe size, then half my shoe size is 18. Their sizes are 36 and 54.

    A) 36 B) 54 C) 90 D) 108

    13. C

14. One summand must be 2. The least such sum is $2 + 101 = 103$.

    A) 101 B) 103 C) 105 D) 107

    14. B

15. I ran each of the first two km twice as fast as I ran the third km. If I ran the entire race in 36 minutes, it took me as long to run the 3rd km as the first two combined. So I took 18 minutes for the 3rd km.

    A) 12 minutes B) 18 minutes C) 24 minutes D) 27 minutes

    15. B

16. My favorite number is 2019. The sum of the smallest factor and the greatest factor of my favorite number is $1 + 2019 = 2020$.

    A) 674 B) 676 C) 2020 D) 2022

    16. C

17. Each day, including weekend days, I play video games for half as much time as I spend doing homework that day. If I spent a total of 182 minutes playing video games last week, I spent $182 \div 7 = 26$ minutes playing games each day and 52 minutes doing homework.

    A) 16 minutes B) 26 minutes C) 36 minutes D) 52 minutes

    17. D

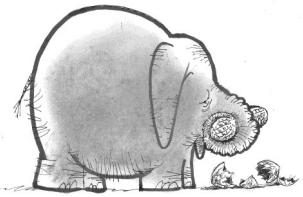
18. If each number has a ones digit of 9, the product is $9 \times 9 \times 9 \times 9 = 6561$.

    A) 9 B) 105 C) 945 D) 6561

    18. D

19. For my average to decrease 5 points, my third game score was 3×5 points lower than the average of my first two game scores.

    A) 5 B) 10 C) 15 D) 25



    19. C

20. If Elle shelled 1 nut the 1st day, she shelled $1+2+4+8 = 15$ nuts in 4 days. She actually shelled 24 times as many, so she shelled 24 the 1st day and 192 the 4th day.

    A) 90 B) 168 C) 192 D) 270

    20. B

21. The remainders for each choice in order are 1, 1, 10, and 1.

    A) $10 \div 9$ B) $100 \div 99$ C) $1000 \div 99$ D) $10\,000 \div 99$

    21. C

22. A certain number has exactly 3 different factors. If the second greatest factor is 7, the number is 49 and the sum of its digits is 13.

    A) 5 B) 7 C) 12 D) 13

    22. D

30. The *digit-sum* of a whole number is the sum of its digits. How many whole numbers between 9 and 100 have an even digit-sum?
A) 45 B) 48 C) 50 D) 52 — 30.

31. At a rate of 80 km/hr., I can run ? km in 18 minutes.
A) 20 B) 24 C) 28 D) 30 — 31.

32. $2^{2005} = 2^{2004} + ?$
A) 1 B) 2 C) 2004 D) 2^{2004} — 32.

33. The sum of the digits of all positive primes less than 20 is
A) 77 B) 76 C) 41 D) 40 — 33.

34. If 2 pears weigh as much as 3 peaches, and 2 peaches weigh as much as 30 grapes, then ? pears weigh as much as 90 grapes.
A) 4 B) 6 C) 8 D) 12 — 34.

35. A square with a perimeter of 32 is split into 8 identical triangles, as shown. What is the sum of the areas of the 4 shaded triangles?
A) 4 B) 8 C) 16 D) 32 — 35.

36. The sum of the 50 whole numbers 51, 52, . . . , 100 is ? greater than the sum of the 50 whole numbers 1, 2, . . . , 50.
A) 2000 B) 2500 C) 2550 D) 5000 — 36.

37. Service without a smile costs twice as much as service with a smile. I spent \$360 for 110 services, 100 with a smile, and 10 without a smile. Each service with a smile cost me
A) \$3.00 B) \$3.15 C) \$3.30 D) \$3.45 — 37.

38. What is the *total* number of times that the hour hand, minute hand, and second hand go around a circular clock in 1 day?
A) 144 B) 1440 C) 1466 D) 86 400 — 38.

39. The product of 3 different primes is always divisible by exactly ? different non-prime numbers greater than 1.
A) 1 B) 2 C) 3 D) 4 — 39.

40. Every birthday of my life, I put as many pennies in a jar as my age in years. I now have \$1.20 in the jar. How old am I?
A) 10 B) 12 C) 15 D) 20 — 40.

The end of the contest 6

Visit our Web site at http://www.mathleague.com

Steven R. Conrad, Daniel Flegler, and *Jeannine Kolbush,* contest authors

M A T H

SIXTH GRADE MATHEMATICS CONTEST

Math League Press, P.O. Box 17, Tenafly, New Jersey 07670-0017

Sample 6th Grade Contest

Tuesday, March 8 (alternate date: March 15), 2005

6

Instructions

- **Time** Do *not* open this booklet until you are told by your teacher to begin. You will have only *30 minutes* working time for this contest. You might be *unable* to finish all 40 questions in the time allowed.
- **Scores** Please remember that *this is a contest, not a test*—and there is no "passing" or "failing" score. Few students score as high as 30 points (75% correct). Students with half that, 15 points, *should be commended!*
- **Format, Point Value, & Eligibility** This is a multiple-choice contest. Every answer is an A, B, C, or D. You must write each answer in the *Answers* column to the right of each question. We suggest (but do not require) that you use a pencil. A correct answer is worth 1 point. Unanswered questions get no credit. You **may** use a calculator. You're eligible for this contest only if you're in grade 6 or below and only if you don't also take this year's *Annual 7th Grade* or *Annual 8th Grade Contest.*

Please Print ***(To the student: You must complete all items below)***

Last Name _____ First Name _____

School _____ Teacher _____ Grade Level ____

Time at Start of Contest _____ Today's Date _____

Do Not Write In The Space Below

To the Teacher:
Please enter the score at the right before you return this paper to the student. *Papers with scores of 30 or higher must be held until June 1.*

Student's Score: _____

1. Of the following, which is between $\frac{1}{2}$ and $\frac{3}{4}$?
   A) 0.2 B) 0.4 C) 0.6 D) 0.8 — 1.

2. A polygon *cannot* have ? sides.
   A) 2 B) 3 C) 4 D) 21 — 2.

3. The brochure said, "Watch your mail!" I watched for 5 days less than 5 weeks. For how many days did I watch my mail?
   A) 10 B) 25 C) 30 D) 35 — 3.

4. $1010 + 10\,100 = 10 \times$?
   A) 101 B) 1010 C) 1020 D) 1111 — 4.

5. A \$5 roll of dimes has ? more coins than a \$10 roll of quarters.
   A) 0 B) 2 C) 5 D) 10 — 5.

6. If 10% of a number is 100, then 100% of the same number is
   A) 10 B) 100 C) 110 D) 1000 — 6.

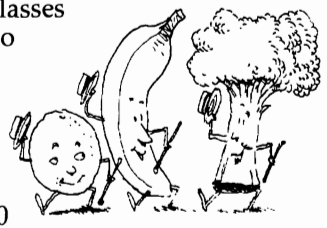
7. $(12+10+8+6+4+2) \div (6+5+4+3+2+1) =$
   A) 60 B) 45 C) 6 D) 2 — 7.

8. Which of the following numbers is *twice* a multiple of 6?
   A) 28 B) 30 C) 36 D) 42 — 8.

9. $54 \div 3 = 3 \times$? A) 6 B) 18 C) 54 D) 162 — 9.

10. A roll of wallpaper covers half the area of a square wall whose width is 4. The area of the part covered by this wallpaper is
    A) 4 B) 8 C) 16 D) 32 — 10.

11. I need 12 pieces of fruit to make 3 glasses of juice. How many pieces of fruit do I need to make 10 glasses of juice?
    A) 30 B) 36 C) 40 D) 120 — 11.



12. How many positive divisors of 100 are also multiples of 100?
    A) 1 B) 10 C) 25 D) 100 — 12.

13. A *hendecagon* is an 11-sided polygon. What is the product of the number of sides of a hendecagon and of a square?
    A) 44 B) 55 C) 66 D) 88 — 13.

14. (number of 0s in 1 thousand):(number of 0s in 1 million) =
    A) 1:1 B) 1:2 C) 2:3 D) 4:7 — 14.

15. Every ? number has at least one even prime factor.
    A) even B) odd C) prime D) whole — 15.

Go on to the next page ➡ 6

16. If my pet runs 300 *cm*/sec. and your rocket flies 300 **m**/sec., then your rocket travels ? times as fast as my pet.
    A) 30 000 B) 10 000 C) 300 D) 100 — 16.

17. I multiply 2 integers. Their product is 32. Their sum *cannot* be
    A) 12 B) 18 C) 32 D) 33 — 17.

18. The average of 11, 12, 13, 14, 15, 16, 17, 18, and 19 is
    A) 15 B) 16 C) 19 D) 135 — 18.

19. In a 3-act play, each act has 4 scenes. If 2 new characters are introduced in each scene, how many characters are in this play?
    A) 6 B) 8 C) 12 D) 24 — 19.

20. If $\frac{3}{4}$ of our letters are bills, then the ratio of the number of bills to the number of other letters is
    A) 7:1 B) 7:3 C) 3:1 D) 3:4 — 20.

21. $4 \times 4^4 =$
    A) 4^4 B) 4^5 C) 14^4 D) 16^5 — 21.

22. Ten coins, each a penny, a nickel, or a dime, *cannot* total
    A) 11¢ B) 19¢ C) 30¢ D) 31¢ — 22.

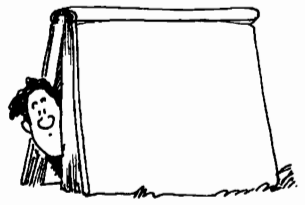
23. The area of a square with integer side-lengths *could* be
    A) 600 B) 700 C) 800 D) 900 — 23.

24. The total value of 75 nickels = the total value of ? quarters.
    A) 3 B) 15 C) 25 D) 375 — 24.

25. The following are all factors of $30 \times 40 \times 50$ *except*
    A) $1 \times 3 \times 5$ B) $2 \times 4 \times 6$ C) $5 \times 7 \times 9$ D) $6 \times 8 \times 10$ — 25.

26. Ten years ago, the sum of the ages of Ted and his twin brother Todd was 22. How old is Ted now?
    A) 16 B) 21 C) 32 D) 42 — 26.

27. We have 6 tents for 18 campers. Each tent holds either 2 or 4 campers. Exactly how many of our tents hold 2?
    A) 4 B) 3 C) 2 D) 1 — 27.



28. If 3 out of 5 dentists recommend sugarless gum, what percent *don't* recommend sugarless gum?
    A) 20% B) 30% C) 40% D) 60% — 28.

29. The time ? is 6 hours before 6 minutes after noon.
    A) 6:06 A.M. B) 6:06 P.M. C) 5:54 A.M. D) 5:54 P.M. — 29.

Go on to the next page ➡ 6

30. There are 90 2-digit numbers starting with 10 and ending with 99. Exactly half of them have an even digit-sum.
A) 45 B) 48 C) 50 D) 52 — **30. A**

31. 80 km in 60 min. = 8 km in 6 min. = 24 km in 18 min.
A) 20 B) 24 C) 28 D) 30 — **31. B**

32. $2^{2005} = 2^1 \times 2^{2004} = 2^{2004}+2^{2004}$.
A) 1 B) 2 C) 2004 D) 2^{2004} — **32. D**

33. The sum is $2+3+5+7+(1+1)+(1+3)+(1+7)+(1+9) = 41$.
A) 77 B) 76 C) 41 D) 40 — **33. C**

34. If 4 pears weigh as much as 6 peaches, and 6 peaches weigh as much as 90 grapes, then 4 pears weigh as much as 90 grapes.
A) 4 B) 6 C) 8 D) 12 — **34. A**

35. The perimeter of the square is 32. A side has length 8, and the area is 64. Half of the square is shaded, so the shaded area is 32.
A) 4 B) 8 C) 16 D) 32 — **35. D**

36. $(51 - 1) + (52 - 2) + \ldots + (99 - 49) + (100 - 50) = 50 + 50 + \ldots + 50 + 50 = 50 \times 50 = 2500$.
A) 2000 B) 2500 C) 2550 D) 5000 — **36. B**

37. I spent \$360 for 110 services, 100 with a smile, 10 without. The 10 without a smile cost as much as 20 with a smile. It costs \$360 for 120 services with a smile, or \$3 for one service with a smile.
A) \$3.00 B) \$3.15 C) \$3.30 D) \$3.45 — **37. A**

38. In 24 hours, the hour hand goes around the clock 2 times, the minute hand 24 times, and the second hand $60 \times 24 = 1440$ times.
A) 144 B) 1440 C) 1466 D) 86 400 — **38. C**

39. Try $2 \times 3 \times 5 = 60$, which is divisible by 2×3, 2×5, 3×5, & $2 \times 3 \times 5$. The product of 3 primes is *always* divisible by 4 non-primes > 1.
A) 1 B) 2 C) 3 D) 4 — **39. D**

40. Keep adding consecutive integers until you reach 120¢: $1¢ + 2¢ + 3¢ + \ldots + 14¢ + 15¢ = 120¢$, so I am 15 years old.
A) 10 B) 12 C) 15 D) 20 — **40. C**

The end of the contest **6**

Visit our Web site at http://www.mathleague.com

Steven R. Conrad, Daniel Flegler, and *Jeannine Kolbush,* contest authors

M A T H

SIXTH GRADE MATHEMATICS CONTEST

Math League Press, P.O. Box 17, Tenafly, New Jersey 07670-0017

Information & Solutions

Tuesday, March 8 (alternate date: March 15), 2005

6

Directions for Grading

- **Security and Solutions** *Do not look at these solutions until after the contest.* Detailed solutions appear in each question box, and letter answers are in the *Answers* columns on the right. You may copy this solution key and give a copy to every student who took this contest.

- **Urgent questions?** Call 1-201-568-6328.

- **Scores** Please remember that *this is a contest, not a test*—and there is no "passing" or "failing" score. Few students score as high as 30 points (75% correct). Students with half that, 15 points, *should be commended!*

- **Awards & Results** The original contest package contained 5 *Certificates of Merit*—1 each for the highest scoring student on each grade level, plus extras for ties. Do you need more Certificates of Merit? If so, include your name, school, and school mailing address in a letter to: ***Math Certificates, P.O. Box 17, Tenafly, NJ 07670-0017***, and *include a self-addressed, stamped envelope (**2 stamps required**) large enough to hold certificates.* Only score reports postmarked by Fri., Mar. 18, 2005, and received by Tues., Mar. 22, 2005 can be used in our *Summary of Contest Results* newsletter, which you'll receive no later than Tues., May 17, 2005.

- **Return of Student Papers** *Originals* of contest papers with scores of 30 or more *must* be held until June 1. *Copies* of these papers, and originals of all other papers, should be returned to students after grading. Students scoring 30 points or more must confirm an *understanding* of the contest rules by signing the *Selected Math League Rules* (on the colored sheet of information and rules that accompanied the contests). Keep this signed sheet with the original contests until June 1. Please do not mail these to the League unless we ask you to do so.

1. Since $\frac{1}{2} = 0.5$, $\frac{3}{4} = 0.75$, & $0.5 < 0.6 < 0.75$, choice C is correct.
   A) 0.2 B) 0.4 C) 0.6 D) 0.8 — **1. C**

2. A polygon must have 3 or more sides.
   A) 2 B) 3 C) 4 D) 21 — **2. A**

3. Since 5 weeks = (5×7) days = 35 days, I must have watched my mail for 35 days − 5 days = 30 days.
   A) 10 B) 25 C) 30 D) 35 — **3. C**

4. 1010 + 10 100 = 11 110 = 10×1111.
   A) 101 B) 1010 C) 1020 D) 1111 — **4. D**

5. 500¢÷10¢ = 50 and 1000¢÷25¢ = 40, and 50-40 = 10.
   A) 0 B) 2 C) 5 D) 10 — **5. D**

6. Since 10% of # = 100, 10×(10% of #) = 10×100 = 1000.
   A) 10 B) 100 C) 110 D) 1000 — **6. D**

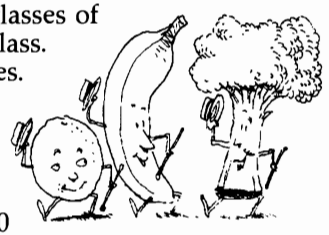
7. (12+10+8+6+4+2)÷(6+5+4+3+2+1) = 42÷21 = 2.
   A) 60 B) 45 C) 6 D) 2 — **7. D**

8. Divide each answer choice by 2, then check for a multiple of 6.
   A) 28 B) 30 C) 36 D) 42 — **8. C**

9. 54 ÷ 3 = 18 = 3×6. A) 6 B) 18 C) 54 D) 162 — **9. A**

10. The area of the wall is 4×4 = 16. Since the roll covers half the wall, the area of the part covered by this roll is 8.
    A) 4 B) 8 C) 16 D) 32 — **10. B**

11. I need 12 pieces of fruit to make 3 glasses of juice, so I need 4 pieces to make 1 glass. I need 4×10 = 40 pieces for 10 glasses.
    A) 30 B) 36 C) 40 D) 120 — **11. C**



12. The only positive divisor of 100 that is a multiple of 100 is 100.
    A) 1 B) 10 C) 25 D) 100 — **12. A**

13. A *hendecagon* is an 11-sided polygon. The product of the number of sides of a hendecagon and of a square is 11×4 = 44.
    A) 44 B) 55 C) 66 D) 88 — **13. A**

14. (number of 0s in 1000):(number of 0s in 1 000 000) = 3:6 = 1:2.
    A) 1:1 B) 1:2 C) 2:3 D) 4:7 — **14. B**

15. Every even number has a factor of 2, and 2 is an even prime.
    A) even B) odd C) prime D) whole — **15. A**

Go on to the next page ➡ 6

16. In 1 second, your rocket flies 300 *m* = 300×100 *cm* = 30 000 *cm* and my pet runs 300 *cm*. Speed ratio = 30 000:300 = 100:1 = 100.
    A) 30 000 B) 10 000 C) 300 D) 100 — **16. D**

17. As shown below, the sum can be any of the choices *except* C.
    A) 12 = 4+8 B) 18 = 2+16 C) 32 D) 33 = 1+32 — **17. C**

18. The avg. of any odd # of *consecutive* integers is the middle one.
    A) 15 B) 16 C) 19 D) 135 — **18. A**

19. Since each act has 4 scenes, there are 3×4 = 12 scenes in all. The total number of characters in the play is 2×12 = 24.
    A) 6 B) 8 C) 12 D) 24 — **19. D**

20. If 3/4 are bills, then 1/4 are not. The ratio of the # of bills to the # of other letters is (3/4):(1/4) = 3:1.
    A) 7:1 B) 7:3 C) 3:1 D) 3:4 — **20. C**

21. $4\times4^4 = 4^1\times4^4 = 4^{1+4} = 4^5$.
    A) 4^4 B) 4^5 C) 14^4 D) 16^5 — **21. B**

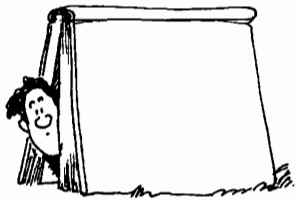
22. For choices B, C, D, (# pennies, # nickels, # dimes) is shown.
    A) 11¢ B) 19¢ (9,0,1) C) 30¢ (5,5,0) D) 31¢ (6,3,1) — **22. A**

23. Of the choices listed, only 900 is the square of an integer.
    A) 600 B) 700 C) 800 D) 900 — **23. D**

24. 75 nickels = 375¢ = (375÷25) quarters = 15 quarters.
    A) 3 B) 15 C) 25 D) 375 — **24. B**

25. There is no factor of 7 in 30×40×50, so choice C is correct.
    A) 1×3×5 B) 2×4×6 C) 5×7×9 D) 6×8×10 — **25. C**

26. Ten years ago, Ted's age was (22÷2) = 11. His age today is 11+10 = 21.
    A) 16 B) 21 C) 32 D) 42 — **26. B**



27. If all tents hold 2, we can hold only 12. But if 3 hold 2 and 3 hold 4, we can hold (3×2)+(3×4) = 18 campers.
    A) 4 B) 3 C) 2 D) 1 — **27. B**

28. If 3 out of 5 dentists recommend sugarless gum, then 2 out of 5 = 20 out of 50 = 40 out of 100 = 40% *don't*.
    A) 20% B) 30% C) 40% D) 60% — **28. C**

29. 6 mins. after noon is 12:06 P.M.; 6 hrs. before that is 6:06 A.M.
    A) 6:06 A.M. B) 6:06 P.M. C) 5:54 A.M. D) 5:54 P.M. — **29. A**

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26. If Marlon the mailman had sunny weather on exactly 12 of 30 days last month, on what percent of days was the weather *not* sunny?

A) 36% B) 40% C) 60% D) 64% — 26.

27. Last month I spent \$24 on magnets that cost 80¢ each, and this month I spent \$24 on magnets that cost \$1.20 each. The average cost per magnet was

A) \$0.92 B) \$0.96 C) \$1.00 D) \$1.04 — 27.

28. On a number line, _?_ is the same distance from 1.75 as it is from 7.25.

A) 2.75 B) 3.25 C) 3.75 D) 4.5 — 28.

29. $2^3 \times 3^4 \times 4^5 \times 6^7 \times 9^{10} =$

A) $2^{15} \times 3^{21}$ B) $2^{20} \times 3^{31}$ C) $2^{15} \times 3^{40}$ D) $2^{105} \times 3^{280}$ — 29.

30. In a garage, the ratio of red cars to black cars is 8:5, and the ratio of black cars to white cars is 3:4. The minimum number of cars in the garage is

A) 20 B) 59 C) 74 D) 91 — 30.

31. The sum of 6 consecutive integers, the largest of which is 30, is equal to the sum of 10 consecutive integers, the largest of which is

A) 17 B) 18 C) 21 D) 26 — 31.

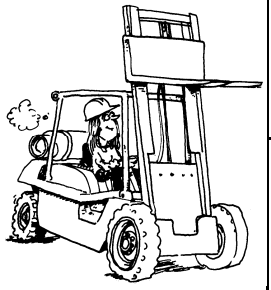
32. If a radius of a circle whose area is 36π cm^2 equals the width of a rectangle, and the diameter of the circle is half the length of the rectangle, then the perimeter of the rectangle is

A) 60 cm B) 90 cm C) 144 cm D) 172 cm — 32.

33. I wrote a list of consecutive positive integers beginning with 1. I then removed all multiples of 4, and I had 2345 integers left. What was the largest integer on my list after the numbers were removed?

A) 3126 B) 3127 C) 3129 D) 3130 — 33.

34. At the start of my temporary job, I needed to load an average of 120 boxes a day in order to finish my job on time. At first I loaded 90 boxes a day. I then had 6 days left to load the remaining 1200 boxes. How many days did I have in all for this temporary job?



A) 10 B) 16 C) 22 D) 26 — 34.

35. Each day last week I counted 50% more leaves than I had counted the day before. If I counted 2430 leaves last Friday, how many had I counted the Sunday before that Friday?

A) 160 B) 240 C) 280 D) 320 — 35.

The end of the contest 6

Visit our Web site at http://www.mathleague.com

Steven R. Conrad, Daniel Flegler, and *Adam Raichel,* contest authors

MATH

SIXTH GRADE MATHEMATICS CONTEST

Math League Press, P.O. Box 17, Tenafly, New Jersey 07670-0017

Sample 6th Grade Contest

Tuesday, February 26 (*alternate date: February 19*), *2013*

6

Instructions

- **Time** Do *not* open this booklet until told by your teacher to begin. You might be *unable* to finish all 35 questions in the 30 minutes allowed.
- **Scores** Remember that *this is a contest, not a test*—there is no "passing" or "failing" score. Few students score 28 points (80% correct). Students with 14 points, *should be commended!* High-scoring students may be invited to our "Math Camp," held last August at Stanford University.
- **Results Posted Online** Scores of high-scoring schools, both regional and overall, will be posted at *www.mathleague.com* no later than April 15.
- **Format, Point Value, & Eligibility** Every answer is an A, B, C, or D. Write answers in the *Answers* column. A correct answer is worth 1 point. Unanswered questions get no credit. You **may** use a calculator. You're eligible for this contest only if you are in grade 6 or below and only if you don't also take this year's Annual 7th or Annual 8th Grade Contest.

Please Print (*To the student: You must complete all items below*)

Last Name _____ First Name _____

School _____ Teacher _____ Grade Level _____

Time at Start of Contest _____ Today's Date _____

Do Not Write In The Space Below

To the Teacher:

Please enter the score at the right before you return this paper to the student. *Papers with scores of 30 or higher must be held until June 1.* ***Student's Score:*** _____

Eighteen books of past contests, *Grades 4, 5, & 6* (*Vols. 1, 2, 3, 4, 5, 6*), *Grades 7 & 8* (*Vols. 1, 2, 3, 4, 5, 6*), and *High School* (*Vols. 1, 2, 3, 4, 5, 6*), are available, for \$12.95 per volume, from Math League Press, P.O. Box 17, Tenafly, NJ 07670-0017.

Answers

1. Pete the pilot flew 28 times last month. If 21 of his flights were at night, how many of his flights were not at night?

A) 7 B) 21 C) 28 D) 49

2. The sum 12 + 34 + 56 equals each of the following *except*

A) 46+56 B) 12+90
C) 34+68 D) 46+68

3. If I double the number of pens in my backpack and add 5, I get 23. How many pens do I have in my backpack?

A) 9 B) 14 C) 36 D) 56

4. 65 − (43 + 21) = (65 − 43) − ?

A) 1 B) 12 C) 21 D) 34

5. The dime and quarter in my hand combined with the coins in my pocket total one dime less than $1. In my pocket is

A) 45¢ B) 55¢ C) 65¢ D) 75¢

6. Wednesday is five days after my party. On what day is my party?

A) Friday B) Sunday C) Monday D) Tuesday

7. Which of the following is the sum of two prime numbers?

A) 11 B) 17 C) 23 D) 31

8. Each of my shoes weighs the same. If 2 of my shoes weigh 12 kg together, then the total weight of 12 of my shoes is

A) 2 kg B) 24 kg C) 36 kg D) 72 kg

9. 25 × 25 = 5 × 5 × ?

A) 2 B) 5 C) 10 D) 25

10. (Six dozen) + (one dozen pairs) = ? sets of three

A) 48 B) 32 C) 24 D) 12

11. When Giggles the Clown correctly counts the dots on his costume in groups of 4, there are 3 left over. There could be ? dots all together.

A) 31 B) 32 C) 33 D) 34

12. What time is 420 minutes before 4 P.M.?

A) 4:00 A.M. B) 7:00 A.M.
C) 9:00 A.M. D) 11:40 A.M.

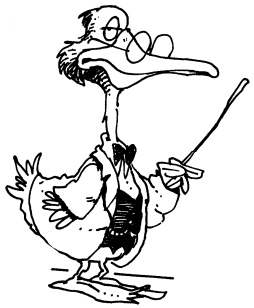
13. 10 hundreds + 10 tens + 10 ones =

A) 111 B) 1101 C) 1110 D) 101010

Go on to the next page ➡ 6

Answers

14. Professor Quack had 7 more students this year than he had last year. If he had a total of 43 students in both years combined, how many students did he have this year?



A) 18 B) 25 C) 32 D) 36

15. All together, 27 trapezoids have the same number of sides as ? triangles.

A) 16 B) 18 C) 27 D) 36

16. In my garden, I have 6 roses for every 5 daisies, and those are the only flowers I have. If I have 66 flowers, how many of them are roses?

A) 11 B) 22 C) 30 D) 36

17. The sum of two different odd numbers and an even number could be

A) 52 B) 61 C) 65 D) 77

18. On a Sunday I put two rabbits in a cage. If the number of rabbits in the cage doubled every day, on what day did the cage first have more than 100 rabbits in it?

A) Thursday B) Friday C) Saturday D) Sunday

19. A pomegranate costs 4 times as much as a pawpaw. If one pomegranate costs 50¢ more than 2 pawpaws, then the pomegranate costs

A) 50¢ B) 75¢ C) $1 D) $1.50

20. If I triple ? and divide the result by 6, the quotient is 18.

A) 9 B) 36 C) 72 D) 108

21. 11 + 12 + 13 + 14 + 15 + 16 = 11 + 22 + 33 + 44 + 55 + 66 − ?

A) 50 B) 100 C) 150 D) 200

22. If Bob jumps 15 additional times, the total number of his jumps will be 3 times what it was 3 jumps ago. Bob has jumped ? times all together.

A) 12 B) 18 C) 21 D) 24

23. The total value of 10 nickels and 9 dimes equals the total value of 5 quarters and ? pennies.

A) 4 B) 5 C) 14 D) 15

24. How many numbers between 1 and 100 are equal to 5 times an odd number?

A) 9 B) 10 C) 11 D) 19

25. The sum of the remainders of 123 ÷ 4, 234 ÷ 5, and 345 ÷ 2 is

A) 3 B) 6 C) 8 D) 12

Go on to the next page ➡ 6

Answers

26. There was sunny weather on 12 of 30 days last month; then on 18 days the weather was not sunny. Since $18 \div 30 = 0.6$, that's 60%.

A) 36% B) 40% C) 60% D) 64%

26. C

27. Since $\$24 \div \$0.80 = 30$ and $\$24 \div \$1.20 = 20$, I bought 50 magnets for \$48. Thus, the average cost per magnet was $\$48 \div 50 = \$0.96$.

A) \$0.92 B) \$0.96 C) \$1.00 D) \$1.04

27. B

28. The average of 1.75 and 7.25 is equidistant from them. The average is $(1.75 + 7.25) \div 2 = 4.5$.

A) 2.75 B) 3.25 C) 3.75 D) 4.5

28. D

29. $2^3 \times 3^4 \times 4^5 \times 6^7 \times 9^{10} = 2^3 \times 3^4 \times 2^{10} \times (2^7 \times 3^7) \times 3^{20} = 2^{3+10+7} \times 3^{4+7+20}$.

A) $2^{15} \times 3^{21}$ B) $2^{20} \times 3^{31}$ C) $2^{15} \times 3^{40}$ D) $2^{105} \times 3^{280}$

29. B

30. The ratio of red cars to black cars is 8:5 = 24:15; the ratio of black cars to white cars is 3:4 = 15:20. The minimum number of cars is 24 + 15 + 20 = 59.

A) 20 B) 59 C) 74 D) 91

30. B

31. The sum is $25 + 26 + \ldots + 30 = 165$. Since $165 \div 10 = 16.5$, the middle numbers are 16 and 17. The sum is $12 + 13 + \ldots + 16 + 17 + \ldots + 20 + 21$.

A) 17 B) 18 C) 21 D) 26

31. C

32. A radius of a circle with area 36π cm^2 is 6 cm. The width of the rectangle is 6 cm. A diameter of the circle is 12 cm, so the length of the rectangle is 24 cm. The perimeter of the rectangle is $2 \times (6 + 24) = 60$ cm.

A) 60 cm B) 90 cm C) 144 cm D) 172 cm

32. A

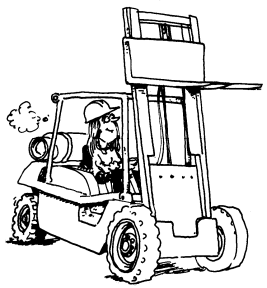
33. For every 3 numbers left, one multiple of 4 was removed. Since $2345 \div 3 = 781$ R2, 781 multiples of 4 were removed. Since there is a remainder of 2, the last number in the list was $4 \times 781 + 2 = 3126$.

A) 3126 B) 3127 C) 3129 D) 3130

33. A

34. Each day I loaded 90 boxes instead of 120, I was 30 boxes short. If I were on schedule, I would need to load 720 boxes the last 6 days. I had to load 480 extra boxes. Since $480 \div 30 = 16$, I had $16 + 6 = 22$ days to finish this temporary job.

A) 10 B) 16 C) 22 D) 26



34. C

35. Working backwards, I counted 2/3 the number of leaves on each previous day. So on Sunday, I counted $(2/3)^5 \times 2430 = 320$ leaves.

A) 160 B) 240 C) 280 D) 320

35. D

The end of the contest **6**

Visit our Web site at http://www.mathleague.com

Steven R. Conrad, Daniel Flegler, and *Adam Raichel,* contest authors

Information & Solutions

2012-2013 Annual 6th Grade Contest

6

Tuesday, February 26 (*alternate date: February 19*), *2013*

Directions for Grading

- **Security and Solutions** *Do not look at these solutions until after the contest*. Detailed solutions appear in each question box, and letter answers are in the *Answers* columns on the right. You may copy this solution key and give a copy to every student who took this contest.
- **Urgent Questions?** For appeals or answers to urgent questions, write to comments@mathleague.com or call 1-201-568-6328.
- **Scores** Please remember that *this is a contest, and not a test*— there is no "passing" or "failing" score. Few students score as high as 28 points (80% correct). Students with half that, 14 points, should be commended.
- **Awards & Results** The original contest package contained 5 *Certificates of Merit*—1 each for the 3 highest scoring students on the contest, plus extras for ties. **Do you need more Certificates of Merit?** If so, include your name, school, and school mailing address in a letter to: ***Math Certificates, P.O. Box 17, Tenafly, NJ 07670-0017***, and *include a self-addressed, stamped envelope (**three 1st Class stamps req'd.**) large enough to hold certificates.* Only scores submitted to our Internet Score Report Center by Tues., March 5, 2013 can be used in our *Summary of Contest Results newsletter,* which will be posted online no later than Fri., April 12, 2013.
- **Return of Student Papers** *Originals* of contest papers with scores of 30 or more *must* be held until June 1. *Copies* of these papers, and originals of all other papers, should be returned to students after grading. Students scoring 30 points or more must confirm an *understanding* of the contest rules by signing the *Selected Math League Rules* (on the colored sheet of information and rules that accompanied the contests). Keep this signed sheet with the original contests until June 1. Please do not mail these to the League unless we ask you to do so.

Answers

1. Pete the pilot flew 28 times last month. If 21 of his flights were at night, then $28 - 21 = 7$ flights were not at night.

A) 7 B) 21 C) 28 D) 49 — **A**

2. The sum $12 + 34 + 56$ equals each of the following *except* choice D.
A) $46+56$ B) $12+90$ C) $34+68$ D) $46+68$ — **D**

3. If I double the number of pens in my backpack and add 5, I get 23. Subtract 5 and divide by 2 to get $(23 - 5) \div 2 = 9$.
A) 9 B) 14 C) 36 D) 56 — **A**

4. Distribute subtraction over addition: $65 - (43 + 21) = (65 - 43) - 21$.
A) 1 B) 12 C) 21 D) 34 — **C**

5. One dime and quarter are worth 35¢. One dime less than \$1 is 90¢. Since $90¢ - 35¢ = 55¢$, the coins in my pocket are worth 55¢.
A) 45¢ B) 55¢ C) 65¢ D) 75¢ — **B**

6. Five days before Wednesday is Friday.
A) Friday B) Sunday C) Monday D) Tuesday — **A**

7. Since each choice is odd, 2 must be one of the addends.
A) $11 = 2 + 9$ B) $17 = 2 + 15$ C) $23 = 2 + 21$ D) $31 = 2 + 29$ — **D**

8. Each of my shoes weighs the same. If 2 of my shoes weigh 12 kg together, then the total weight of 12 of my shoes is 6×12 kg = 72 kg.
A) 2 kg B) 24 kg C) 36 kg D) 72 kg — **D**

9. $25 \times 25 = 5 \times 5 \times 25$.
A) 2 B) 5 C) 10 D) 25 — **D**

10. $(6 \times 12) + (12 \times 2) = 96 = 32 \times 3$.
A) 48 B) 32 C) 24 D) 12 — **B**

11. Since 31 divided by 4 has a remainder of 3, Giggles the Clown could have a total of 31 dots on his costume.

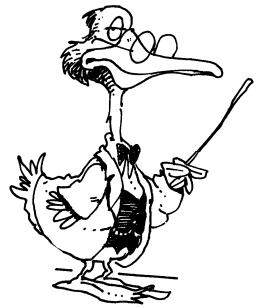
A) 31 B) 32 C) 33 D) 34 — **A**

12. 420 minutes = 7 hrs.; 7 hrs. before 4 P.M. is 9 A.M.
A) 4:00 A.M. B) 7:00 A.M. C) 9:00 A.M. D) 11:40 A.M. — **C**

13. $(10 \times 100) + (10 \times 10) + 10 = 1110$.
A) 111 B) 1101 C) 1110 D) 101010 — **C**

Go on to the next page ➠ 6

Answers

14. Professor Quack had 7 more students this year than he had last year. Subtract 7 from each choice and then add the result to that choice to see if you get 43: $(25 - 7) + 25 = 43$.

A) 18 B) 25 C) 32 D) 36 — **B**

15. In all, 27 trapezoids have 4×27 sides = 108 sides = 3×36 sides, the same number as in 36 triangles.
A) 16 B) 18 C) 27 D) 36 — **D**

16. There are 6 roses for every 5 daisies in my garden, so $6/(6 + 5) = 6/11$ of the 66 flowers I have are roses. Thus, $6/11 \times 66 = 36$ are roses.
A) 11 B) 22 C) 30 D) 36 — **D**

17. The sum of two different odd numbers and an even number must be even.
A) 52 B) 61 C) 65 D) 77 — **A**

18. On a Sunday I put two rabbits in a cage. If the number of rabbits in the cage doubled every day, then I had 4 rabbits, 8 rabbits, 16 rabbits, 32 rabbits, 64 rabbits, 128 rabbits, ….
A) Thursday B) Friday C) Saturday D) Sunday — **C**

19. A pomegranate costs as much as 4 pawpaws. If 1 pomegranate costs 50¢ more than 2 pawpaws, then 2 pawpaws cost 50¢ and 4 cost \$1.
A) 50¢ B) 75¢ C) \$1 D) \$1.50 — **C**

20. Work backwards: $6 \times 18 = 108$; $108 \div 3 = 36$.
A) 9 B) 36 C) 72 D) 108 — **B**

21. The given sum = $11+(12+10)+(13+20)+(14+30)+(15+40)+(16+50) - 150$.
A) 50 B) 100 C) 150 D) 200 — **C**

22. Add 15 to each choice, divide by 3, and add 3 jumps. If the result is the same as the choice, then it's correct. Since $(12 + 15) \div 3 + 3 = 12$, choice A is correct.

A) 12 B) 18 C) 21 D) 24 — **A**

23. The value of 10 nickels and 9 dimes is \$1.40. The value of 5 quarters is \$1.25, and $1.40 - $1.25 = 15¢.
A) 4 B) 5 C) 14 D) 15 — **D**

24. Any odd multiple of 5 has a ones digit of 5. The numbers are 5, 15, 25, . . . , 85, 95. There are 10.
A) 9 B) 10 C) 11 D) 19 — **B**

25. The remainders are 3, 4, and 1; their sum is 8.
A) 3 B) 6 C) 8 D) 12 — **C**

Go on to the next page ➠ 6

26. On a number line, two different integers are each the same distance from my favorite integer and have a sum of 144. What is my favorite integer? — 26.

A) 31 B) 36 C) 48 D) 72

27. Last year I spent \$180 for 80 pairs of shades. This year I spent \$180 for 5 fewer pairs of the same shades. How much did the price per pair increase since I bought them last year? — 27.

A) 15¢ B) 72¢ C) 96¢ D) 120¢

28. I drove at a constant speed of 60 km/hr. without stopping. At exactly 5:00 p.m. I had traveled 318 km. At what time did I start driving? — 28.

A) 10:42 a.m. B) 11:42 a.m. C) 12:42 p.m. D) 1:42 p.m.

29. I added 3 of the numbers 11111, 22222, 33333, 44444, 55555, 66666, 77777, 88888, and 99999. My sum was one of these 9 numbers. When my sum was divided by 11, the remainder **could not** have been — 29.

A) 5 B) 6 C) 7 D) 8

30. I wrote the 101 integers from 1 to 101 in order on paper. If I wrote 101 digits per line, what was the sum of the last 4 digits on the first line? — 30.

A) 11 B) 17 C) 19 D) 21

31. The product of all the factors of an integer greater than 1 equals the cube of that integer. What is the least integer for which this is true? — 31.

A) 24 B) 18 C) 12 D) 8

32. On our last history test, at least one student scored each of the grades A, B, C, D, and F. If 8 got an A, 15 got a C or higher, 10 got a B or lower, and only one student got a D, how many students got an F? — 32.

A) 1 B) 2 C) 3 D) 5

33. $(2^2 \times 2^4 \times 2^6 \times \ldots \times 2^{98} \times 2^{100}) \div (2^1 \times 2^3 \times 2^5 \times \ldots \times 2^{97} \times 2^{99}) =$ — 33.

A) 2 B) 2^{49} C) 2^{50} D) 2^{100}

34. Starting at 1:00 p.m., a ball was rolled in each of two lanes. A ball was rolled once every 15 seconds in one lane and once every 18 seconds in the other. By 1:44 p.m., how many times had balls been rolled at the same time in both lanes? — 34.

A) 29 B) 30 C) 40 D) 44

35. I counted backwards out loud from 2018 by ones. When I said my 50th multiple of 8, how many numbers had I counted? — 35.

A) 252 B) 395 C) 400 D) 1618

The end of the contest **6**

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Steven R. Conrad, Daniel Flegler, Adam Raichel, and *Jeannine Kolbush,* contest authors

M A T H

SIXTH GRADE MATHEMATICS CONTEST

Math League Press, P.O. Box 17, Tenafly, New Jersey 07670-0017

Sample 6th Grade Contest

Tuesday, February 19 (*alternate date: February 26*), *2019*

6

Instructions

- **Time** Do *not* open this booklet until told by your teacher to begin. You might be *unable* to finish all 35 questions in the 30 minutes allowed.
- **Scores** Remember that *this is a contest, not a test*—there is no "passing" or "failing" score. Few students score 28 points (80% correct). Students with half that, 14 points, *should be commended!* High-scoring students may be invited to our "Math Camp" in July.
- **Results Posted Online** High-scoring contest results, both overall and regional, will be posted at *www.mathleague.com* no later than April 15.
- **Format, Point Value, & Eligibility** Every answer is an A, B, C, or D. Write answers in the *Answers* column. A correct answer is worth 1 point. Unanswered questions get no credit. You **may** use a calculator. You're eligible for this contest only if you are in grade 6 or below and only if you don't also take this year's Annual 7th or Annual 8th Grade Contest.

Please Print (*To the student: You must complete all items below*)

Last Name _____ First Name _____

School _____ Teacher _____ Grade Level _____

Time at Start of Contest _____ Today's Date _____

Do Not Write In The Space Below

To the Teacher:
Please enter the score at the right before you return this paper to the student. *Papers with scores of 30 or higher must be held until June 1.* ***Student's Score*:** _____

Answers

1. $2018 + 2019 = 20 + 18 + 20 + 19 +$ _?_

   A) 0 B) 2000 C) 3960 D) 4000

2. If 1/3 of my hats are red, and 36 are not red, I have _?_ hats.

   A) 18 B) 54 C) 72 D) 108

3. The sum of the measures of the 2 smallest angles of a triangle *could be*

   A) 151 degrees B) 135 degrees C) 121 degrees D) 61 degrees

4. $2018 = 20 \times$ _?_ $+ 18 \times 1$

   A) 1 B) 10 C) 18 D) 100

5. Every English letter appears in my 2018-letter password at least once. The letter A appears *at most* _?_ times.

   A) 77 B) 78 C) 1992 D) 1993

6. Which of the following is the product of 2 consecutive integers?

   A) 182 B) 195 C) 208 D) 221

7. The least integer with a prime number of different prime factors is

   A) 6 B) 8 C) 12 D) 15

8. I have 5 coins consisting of pennies, nickels, and dimes. If I have at least 1 of each type of coin, the least possible value of my 5 coins is

   A) 5¢ B) 15¢ C) 16¢ D) 18¢

9. Exactly _?_ different 3-digit area codes can be made using only 2s and 3s, with at least one 2 and one 3 in each area code.

   A) 4 B) 6 C) 9 D) 12

10. How many multiples of 10 are factors of 10^2?

    A) 1 B) 2 C) 3 D) 4

11. My team had to win a certain number of games to make it to the finals, and we won every 6th game we played. If my team qualified for the finals after our 96th game, how many wins did we need?

    A) 12 B) 16 C) 18 D) 90

12. What is the greatest common factor of $1\times3\times5\times7\times9$ and $2\times4\times6\times8\times10$?

    A) 1 B) 3 C) 5 D) 15

13. The expression 2^{400} is the product of exactly _?_ sixteens.

    A) 25 B) 50 C) 100 D) 200

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Answers

14. The 2nd act of a 3-act play is 1/3 the length of the entire play. If the 1st act is twice as long as the 3rd, what fraction of the play is the 3rd act?

    A) 1/9 B) 2/9 C) 3/9 D) 4/9

15. If I double my speed of 12000 m/hr., my new speed will be

    A) 200 m/min. B) 400 m/min. C) 600 m/min. D) 2400 m/min.

16. Which of the following could be the perimeter of an equilateral triangle with integral side-lengths?

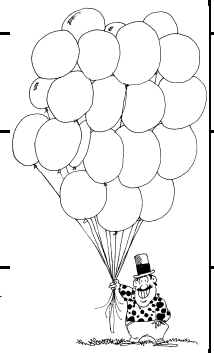
    A) 2017 B) 2018 C) 2019 D) 2020

17. The greatest of 10 consecutive positive integers is a prime number. What is the least possible sum of these integers?

    A) 65 B) 77 C) 127 D) 129

18. One-fourth of Ed's balloons popped, with 2 balloons popping every 3 minutes for an hour. How many balloons did not pop?

    A) 40 B) 80 C) 120 D) 160



19. What is the greatest common factor of 6^8 and 8^6?

    A) 2^2 B) 4^4 C) 6^6 D) 8^8

20. The expression 100^{2018} can be written as the product of exactly _?_ prime numbers.

    A) 5×2018 B) 4×2018 C) 2×2018 D) 2018

21. How many integers have a square root greater than 15 and less than 16?

    A) 0 B) 1 C) 29 D) 30

22. $\sqrt{9} + \sqrt{81} = \sqrt{9 + 81 +$ _?_ $}$

    A) 0 B) 54 C) 90 D) 144

23. Each day for a month, Sully wakes up 5 minutes earlier than he did the day before. If Sully woke up at 6:50 a.m. on a Monday, on what day did he wake up at 6:20 a.m.?

    A) Sunday B) Monday C) Tuesday D) Wednesday

24. The product of all factors of 21 equals $21 \times$ _?_.

    A) 1 B) 2 C) 3 D) 21

25. $(1234 + 0 + 1234 + 1 + 1234 + 2 + 1234 + 3 + 1234 + 4) \div 5 =$

    A) 1234 B) 1234 + 1 C) 1234 + 2 D) 1234 + 3

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	Answers
26. The average of any two integers whose sum is 144 is 72. Any two integers equidistant from 72 add up to 144. My favorite integer is 72. A) 31 B) 36 C) 48 D) 72	26. D
27. Last year I spent \$180 for 80 pairs of shades. That is \$2.25 per pair. This year I spent \$180 for 75 pairs. That is \$2.40 per pair or a price increase of 15¢ per pair. A) 15¢ B) 72¢ C) 96¢ D) 120¢	27. A
28. It took 318/60 = 5 hrs. 18 mins. to drive. Working backwards, 5 hrs. before 5 p.m. was 12 p.m.; 18 mins. before 12 p.m. was 11:42 a.m. A) 10:42 a.m. B) 11:42 a.m. C) 12:42 p.m. D) 1:42 p.m.	28. B
29. I added three of the numbers 11111, 22222, 33333, 44444, 55555, 66666, 77777, 88888, and 99999. My sum was 66666, 77777, 88888, or 99999. Possible remainders when dividing by 11 are 6, 7, 8, or 9. A) 5 B) 6 C) 7 D) 8	29. A
30. I wrote numbers 1 to 9 using 9 digits. I wrote 10 through 53 (44 numbers) using 88 more digits, for a total of 97. I then wrote 54 and 55. A) 11 B) 17 C) 19 D) 21	30. C
31. The product of all the factors of 12 is $(1\times12)\times(2\times6)\times(3\times4) = 12\times12\times12 = 12^3$. A) 24 B) 18 C) 12 D) 8	31. C
32. Since 8 students got an A and 15 got a C or higher, the number getting Bs and Cs is 7. Since 10 got a B or lower, and 7 got Bs and Cs, and one got a D, there are 2 students who got an F. A) 1 B) 2 C) 3 D) 5	32. B
33. Since $2^2\div2^1 = 2$, $2^4\div2^3 = 2$, . . . , $2^{100}\div2^{99} = 2$, the quotient is 2^{50}. A) 2 B) 2^{49} C) 2^{50} D) 2^{100}	33. C
34. The l.c.m. of 15 and 18 is 90, so every 90 seconds balls were rolled at the same time. There are 2640 seconds in 44 minutes, and 2640 ÷ 90 = 29R30. Counting the balls rolled at 1:00 p.m., there were 30 times balls were rolled at the same time. A) 29 B) 30 C) 40 D) 44	34. B
35. The largest multiple of 8 less than 2018 is 2016. Subtract 8 49 times from 2016 to get 1624. From 2018 to 1624 is 395 numbers counted. A) 252 B) 395 C) 400 D) 1618	35. B

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SIXTH GRADE MATHEMATICS CONTEST

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Information & Solutions

6

Tuesday, February 19 (*alternate date: February 26*), *2019*

Directions for Grading

- **Security and Solutions** *Do not look at these solutions until after the contest*. Detailed solutions appear in each question box, and letter answers are in the *Answers* columns on the right. You may copy this solution key and give a copy to every student who took this contest.
- **Urgent Questions?** For appeals or answers to urgent questions, write to comments@mathleague.com or call 1-201-568-6328.
- **Scores** Please remember that *this is a contest, and not a test*— there is no "passing" or "failing" score. Few students score as high as 28 points (80% correct). Students with half that, 14 points, should be commended.
- **Awards & Results** The original contest package contained 5 *Certificates of Merit*—1 each for the 3 highest scoring students on the contest, plus extras for ties. **Do you need more Certificates of Merit?** If so, include your name, school, and school mailing address in a letter to: ***Math Certificates, P.O. Box 17, Tenafly, NJ 07670-0017***, and *include a self-addressed, stamped envelope* (***three 1st Class stamps req'd.***) *large enough to hold certificates.* Only scores submitted to our Internet Score Report Center by Fri., March 8, 2019 can be used in our *Summary of Contest Results newsletter,* which will be posted online no later than Fri., April 12, 2019.
- **Return of Student Papers** *Originals* of contest papers with scores of 30 or more *must* be held until June 1. *Copies* of these papers, and originals of all other papers, should be returned to students after grading. Students scoring 30 points or more must confirm an *understanding* of the contest rules by signing the *Selected Math League Rules* (on the colored sheet of information and rules that accompanied the contests). Keep this signed sheet with the original contests until June 1. Please do not mail these to the League unless we ask you to do so.

Answers

1. $(2018 - 20 - 18) + 2019 - 20 - 19 = 1980 + 1980 = 3960$.

A) 0 B) 2000 C) 3960 D) 4000

Answer: 1. C

2. The number of red hats is half the number that are not red.

A) 18 B) 54 C) 72 D) 108

Answer: 2. B

3. If the measures of the 2 smallest angles of a triangle were 30 and 31 degrees, the largest angle would be 119 degrees.

A) 151 degrees B) 135 degrees C) 121 degrees D) 61 degrees

Answer: 3. D

4. $2000 + 18 = 20 \times 100 + 18 \times 1$.

A) 1 B) 10 C) 18 D) 100

Answer: 4. D

5. If every English letter except A appeared exactly once, then A would appear $2018 - 25 = 1993$ times.

A) 77 B) 78 C) 1992 D) 1993

Answer: 5. D

6. The product of 2 consecutive integers is even, and $182 = 13 \times 14$.

A) 182 B) 195 C) 208 D) 221

Answer: 6. A

7. The number 6 has two prime factors, 2 and 3.

A) 6 B) 8 C) 12 D) 15

Answer: 7. A

8. I have 5 coins consisting of pennies, nickels, and dimes. The least possible value is formed with 3 pennies, 1 nickel, and 1 dime.

A) 5¢ B) 15¢ C) 16¢ D) 18¢

Answer: 8. D

9. The 3-digit area codes that can be made are 223, 232, 233, 322, 323, and 332. There are 6 in all.

A) 4 B) 6 C) 9 D) 12

Answer: 9. B

10. The multiples of 10 that are factors of 100 are 10, 20, 50, and 100.

A) 1 B) 2 C) 3 D) 4

Answer: 10. D

11. My team had to win a certain number of games to make it to the finals, and we won every 6th game we played. If my team qualified for the finals after our 96th game, we needed to win $96 \div 6 = 16$ games.

A) 12 B) 16 C) 18 D) 90

Answer: 11. B

12. The common factors are 1, 3, 5, and 15. The greatest is 15.

A) 1 B) 3 C) 5 D) 15

Answer: 12. D

13. Since $2^{400} = 16^{100}$, it is the product of exactly 100 sixteens.

A) 25 B) 50 C) 100 D) 200

Answer: 13. C

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Answers

14. If the play is 90 mins., the 2nd act is 30 mins. That leaves 60 mins. for the 1st and 3rd acts. The 1st act would be 40 mins. and the 3rd act 20 mins. or 20/90 of the play.

A) 1/9 B) 2/9 C) 3/9 D) 4/9

Answer: 14. B

15. If I double my speed of 12000 m/hr., my new speed will be 24000 m/hr. Divide by 60 to get 400 m/min.

A) 200 m/min. B) 400 m/min. C) 600 m/min. D) 2400 m/min.

Answer: 15. B

16. The perimeter of an equilateral triangle with integral side-lengths must be divisible by 3. Only choice C is divisible by 3.

A) 2017 B) 2018 C) 2019 D) 2020

Answer: 16. C

17. The greatest of 10 consecutive positive integers is a prime number, so it could be 11. The sum of $2 + 3 + 4 + \ldots + 10 + 11$ is 65.

A) 65 B) 77 C) 127 D) 129

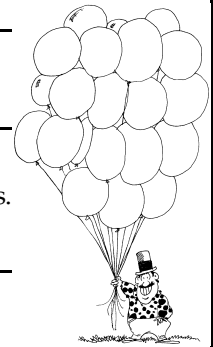
Answer: 17. A

18. If 2 balloons popped every 3 minutes, then 40 balloons popped in an hour. Since one-fourth is 40, three-fourths is 120.

A) 40 B) 80 C) 120 D) 160

Answer: 18. C

19. The g.c.f. of $2^8 \times 3^8$ and 2^{18} is $2^8 = 4^4$.



A) 2^2 B) 4^4 C) 6^6 D) 8^8

Answer: 19. B

20. The expression 100^{2018} can be written as the product $2^{2018} \times 5^{2018} \times 2^{2018} \times 5^{2018}$, a product of 4×2018 primes.

A) 5×2018 B) 4×2018 C) 2×2018 D) 2018

Answer: 20. B

21. This is the number of integers between 15^2 and 16^2. The number of integers between 225 and 256 is 30.

A) 0 B) 1 C) 29 D) 30

Answer: 21. D

22. $\sqrt{9} + \sqrt{81} = 3 + 9 = 12 = \sqrt{144} = \sqrt{9 + 81 + 54}$.

A) 0 B) 54 C) 90 D) 144

Answer: 22. B

23. Sully woke up at 6:50 a.m. on a Monday. For Sully to wake up 30 minutes earlier, it must be 6 days after Monday. The day 6 days after Monday is Sunday.

A) Sunday B) Monday C) Tuesday D) Wednesday

Answer: 23. A

24. The product of all such factors of 21 is $(1 \times 21) \times (3 \times 7) = 21 \times 21$.

A) 1 B) 2 C) 3 D) 21

Answer: 24. D

25. $(1234 \times 5 + 10) \div 5 = 1234 + 2$.

A) 1234 B) 1234 + 1 C) 1234 + 2 D) 1234 + 3

Answer: 25. C

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