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MATH

TEACHER'S GUIDE

▶ **7th Grade**

Alpha Omega
PUBLICATIONS

MATH 700
Integers, Ratios, and Basic Geometry
Teacher's Guide

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Alpha Omega
PUBLICATIONS

Unit 701
Integers

Answer Keys
and
Alternate Test

1. Integers

INTEGERS ON THE NUMBER LINE

1.1   False

1.2   True

1.3   True

1.4   False

1.5   False

1.6   True

1.7   eight below zero

1.8   six above zero
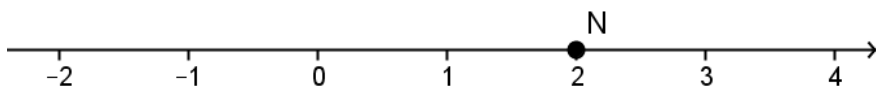
1.9   positive nine

1.10   Put a point 5 units to the left of zero.

1.11

1.12

1.13   B corresponds with -2.

1.14   F corresponds with 3.

1.15   Space A represents -3.

COMPARING AND ORDERING INTEGERS

1.16 True

1.17 True

1.18 False

Negative numbers are less than zero.

1.19 False

The negative number with the larger numeral is smaller.

1.20 False

The negative number with the larger numeral is smaller.

1.21 True

1.22

-84	1st
-80	2nd
-56	3rd
48	4th
59	5th
90	6th

1.23 -19, -14, 5, 11

1.24 82, 80, 13, -2

1.25 A negative number with a larger numeral is a larger number.

1.26 0 > -8

1.27 -3 > -10

1.28 -2 < 1

1.29 -6, -4, -2, 0, 1, 3, 5, 7

1.30 -12, -11, -8, -2, 5, 6, 10, 15

ABSOLUTE VALUE

1.31 opposite

1.32 absolute value

1.33 positive

1.34 negative

1.35

-11	11
8	-8
-31	31
1	-1
17	-17

1.36 14

1.37 27

1.38 54

1.39 12

1.40 -80

INEQUALITIES AND ABSOLUTE VALUE

1.41 True

$|1| = 1$
$1 = 1$

1.42 True

$|1| > 1$
$1 > -1$

1.43 False

$|-3| \leq 3$
$3 \leq 0$

1.44 False

$|-2| \geq |-3|$
$2 \geq 3$

1.45 False

$|-4| < |4|$
$4 < 4$

1.46

-2	1st
1	2nd
|-4|	3rd
|9|	4th
11	5th

1.47 $|-6| \geq 3$

$|-6| = 6$
$6 > 3$

1.48 $|-2| \leq |-5|$

$|-2| = 2$ and $|-5| = 5$
$2 < 5$

1.49 $|-8| \geq -1$

$|-8| = 8$
$8 > -1$

1.50 $|-5| \geq -5$

$|-5| = 5$
$5 > -5$

1.51 $|4| \leq |-9|$

$|4| = 4$ and $|-9| = 9$
$4 < 9$

SELF TEST 1: INTEGERS

1.01

☒ the opposite of -7

☒ the absolute value of 7

☒ seven above zero

☒ the absolute value of -7

☒ positive seven

1.02   eleven below zero

1.03

☒ >

☒ ≥

☒ ≠

1.04

☒ ≥

☒ ≤

☒ =

1.05   True

1.06   False

Positive numbers are greater than zero, or to the right of zero.

1.07   True

1.08   True

1.09   True

1.010   False

Negative numbers are always less than positive numbers.

1.011   False

1.012   -11, -1, 3, 9, 12

1.013   D

1.014   B

1.015   65

1.016 $|-13|$, $|5|$, 4, 0

1.017   Answers may vary but should be similar to the following:
Draw a number line. Starting at zero, move three places to the left and put a point. Label the point P.

1.018 $|-3| \leq |-10|$

$|-3| = 3$ and $|-10| = 10$

$3 < 10$

1.019 $|4| \geq |2|$

$|4| = 4$ and $|2| = 2$

$4 > 2$

1.020 $|5| \geq 1$

$|5| = 5$

$5 > 1$

1.021   -12, -11, -8, -4, 5, 6, $|-7|$, $|9|$, 10, 13

$|-7| = 7$ and $|9| = 9$

1.022   -11, -6, -4, $|-2|$, 3, $|10|$, $|-14|$, 18

$|-2| = 2$, $|10| = 10$ and $|-14| = 14$

2. Adding and Subtracting Integers

ADDING INTEGERS WITH THE SAME SIGN

2.1 False

This is only true if both numbers are positive.

2.2 False

Being "in the red" represents having a negative bottom line.

2.3 True

2.4 105

Both addends are positive, so keep the sum positive. The sum of 86 and 19 is 105.

2.5 -22

Both addends are negative, so keep the sum negative. The sum of 18 and 4 is 22.

2.6 -44

Both addends are negative, so keep the sum negative. The sum of 12 and 32 is 44.

2.7 65

Both addends are positive, so keep the sum positive. The sum of 14 and 51 is 65.

2.8 -6

(-3) + (-3) = -6

2.9 14

7 + 7 = 14

2.10 40

Jonathan's mother is 32. Add this to Jonathan's age:
8 + 32 = 40

2.11 seven red tiles plus three red tiles

Red tiles represent negative numbers.

2.12 -13

(-8) + (-3) + (-2)
= (-11) + (-2)
= -13

2.13 -11

(-5) + (-6) = -11

2.14 165

Both addends are positive, so keep the sum positive. The sum of 137 and 28 is 165.

2.15 -104

Both addends are negative, so keep the sum negative. The sum of 65 and 39 is 104.

2.16 -5

(-3) + (-2) = -5

Kaleigh was 5 spaces farther from the finish. Moving back is a negative number. Both numbers are negative, so keep the same sign and add.

2.17   -43

(-29) + (-14) = -43

Selling candy bars means a negative number. Evan sold candy bars on both days, so the sign is the same. Add 29 and 14. Evan sold 43 candy bars in 2 days.

2.18   37

31 + 6 = 37

Throwing the ball and running the ball toward the end zone are both positive directions. Keep the same sign and add. 31 + 6 = 37.

ADDING INTEGERS WITH DIFFERENT SIGNS

2.19   True

2.20   False

Zero pairs are two numbers that add up to 0.

2.21   False

The sum has the same sign as the addend with the larger absolute value.

2.22   -8

The difference between |-13| and |5| is 8. Since |-13| has the larger absolute value, the result is negative.

2.23   -2

The difference between |7| and |-9| is 2. |-9| has the larger absolute value, so the result is negative.

2.24   -25

The addends are both negative, so keep the sum negative. The sum of 11 and 14 is 25.

2.25   -5°C

Add 5 to -10. The difference between |5| and |-10| is 5. Since |-10| has the larger absolute value, the difference is negative.

2.26   2

The expression is -5 + 7. The difference between |-5| and |7| is 2. Since |7| has the larger absolute value, the difference is positive.

2.27 $16

The expression is 28 + (-12). The difference between |28| and |-12| is 16. Since |28| has the larger absolute value, the difference is positive.

2.28 -3 + 6

Start at zero. Move three places to the left and then six places to the right.

Zero Pairs

2.29 0

Opposite numbers have a sum of zero.

2.30 -10

Both addends are negative, so keep the sum negative. The sum of 5 and 5 is 10.

2.31 8

Both addends are positive, so keep the sum positive. The sum of 4 and 4 is 8.

2.32 They have a sum of -14.

Opposite numbers have a sum of zero.

2.33 $(-8) + 15 = 7$

Add 15 to -8. The difference between |15| and |-8| is 7. Since |15| has the larger absolute value, the difference is positive.

2.34 $13 + (-6) = 7$

Add -6 to 13. The difference between |-6| and |13| is 7. Since |13| has the larger absolute value, the difference is positive.

2.35 $(-25) + (25) = 0$

Opposite numbers have a sum of zero.

2.36 $31 + (-43) = -12$

Add -43 to 31. The difference between |-43| and |31| is 12. Since |-43| has the larger absolute value, the difference is negative.

2.37 $(-15) + 4 = -11$

Add 4 to -15. The difference between |4| and |-15| is 11. Since |-15| has the larger absolute value, the difference is negative.

SUBTRACTING INTEGERS

2.38 -19

-7 + (-12) = -19

2.39 -6

3 + (-9) = -6

2.40 19

15 + 4 = 19

2.41 -5

-11 + 6 = -5

2.42 6

15 + (-9) = 6

2.43 -12

-10 + (-2) = -12

2.44 1 + 7

Subtracting -7 is the same as adding +7.

2.45 -5 + (-8)

The difference between -5 and 8 is -5 - 8, or -5 + (-8).

2.46 -22

This expression can be rewritten as -36 + 14. The difference between |-36| and |14| is 22. Since |-36| has the larger absolute value, the difference is negative.

2.47 -18

This expression can be rewritten as 27 + (-45). The difference between |27| and |-45| is 18. Since |-45| has the larger absolute value, the difference is negative.

2.48 -8 - 15

Owing money is considered negative. He has -$8 and subtracts an additional $15.

2.49 -15°F

new high - original high
72 - 87
= 72 + (-87)
= -15

2.50 30,370 feet

29,000 - (-1,370)
= 29,000 + 1,370
= 30,370

2.51 $68 - 75 = -7$

This expression can be rewritten as 68 + (-75). The difference between |68| and |-75| is 7. Since |-75| has the larger absolute value, the difference is negative.

2.52 $36 - (-12) = 48$

Subtracting -12 is the same as adding +12

36+12=48.

2.53 $17 - (-26) = 43$

Subtracting -26 is the same as adding +26.

17+26=43

2.54 $-41 - (-19) = -22$

This expression can be rewritten as -41 + (19). The difference between |-41| and |19| is 22. Since |-41| has the larger absolute value, the difference is negative.

2.55 14,776 ft

14,494 ft - (-282 ft)
= 14,494 ft + 282 ft
= 14,776 ft

SELF TEST 2: ADDING AND SUBTRACTING INTEGERS

2.01

    1   -1 + 2

    -1   1 + (-2)

    -3   -1 - 2

    3   1 - (-2)

    -1 + 2 = 1

    1 + (-2) = -1

    -1 - 2 = -1 + (-2) = -3

    1 - (-2) = 1 + 2 = 3

2.02

    2   7 - 5

    -2   -7 + 5

    -12   -7 - 5

    12   7 - (-5)

    7 - 5 = 7 + (-5) = 2

    -7 + 5 = -2

    -7 - 5 = -7 + (-5) = -12

    7 - (-5) = 7 + 5 = 12

2.03   same

2.04   6 - 9

    9 - 6 = 3c

    9 + (-6) = 3

    -6 - (-9)= -6 + 9 = 3

    6 - 9 = -3

2.05   6 + (-2)

    Start at zero. Move six places to the right and then two places to the left.

2.06   -15

    -3 + -12 = -15

2.07 9

    -3 - (-12)

    = -3 + 12

    = 9

2.08 -8 - 10

    -8 - 10

    = -8 + (-10)

2.09 -3

2.010 11

    4 + 7 = 11

2.011 $37

    65 - 28

    = 65 + (-28)

    = 37

2.012 18 - (-12)

    new temperature - original temperature

    18 - (-12)

2.013 30°

    18 - (-12)

    = 18 + 12

    = 30

2.014 The point moved four places to the right.

2.015 -7 + 4 = -3

    Movement to the right four places is the same as adding positive 4. The result is -3.

2.016 $4 + (-7) = -3$

    4 - 7 = -3

2.017 $-19 - (-23) = 4$

-19 + 23 = 4

2.018 $15 + (-20) = -5$

15 - 20 = -5

2.019 $8 - 11 = -3$

8 - 11 = -3

2.020 The receiver was 9 yards in front of the line of scrimmage.

= -8 + 17=9

3. Multiplying and Dividing Integers

MULTIPLYING INTEGERS

3.1   -33

3.2   42

3.3   28

3.4   -60

3.5   -72

3.6   56

3.7   120

3.8   0

3.9   4(-1)

Four groups of -1 is the same as
4 · (-1).

3.10   six groups of negative five

3.11   (-2)(-12)

(-2)(-12) = 24
The product of two negative factors
is positive.

3.12   (-6)(-6)

 (-6)(-6) = 36
Multiplying two negative factors
results in a positive product.

3.13   The factors had the same sign.

3.14   yes

A charge of $2 can be represented as
-2:
5(-2) = -10

Her balance is greater than -$12, so
she can still check out books.

3.15   (-4)(-7) = 28

(-4)(-7) = 28
Multiplying two negative factors
results in a positive product.

3.16   (8)(-3) = -24

(8)(-3) = -24
Multiplying a positive factor and a
negative factor results in a negative
product.

3.17   (17)(+2) = 34

(17)(+2) = 34
Multiplying two positive factors
results in a positive product.

3.18   (24)(-1) = -24

(24)(-1) = -24
Multiplying a positive factor and a
negative factor results in a negative
product.

3.19   34 + (-24) = 10

DIVIDING INTEGERS

3.20 -19

3.21 6

3.22 -8

3.23 -7

3.24 2

3.25 7

3.26 0

3.27 11

3.28 undefined

Division by 0 is undefined.

3.29 0

3.30 -4 points

-12 ÷ 3 = -4

3.31 14 tickets

Owing money and cost are
represented using negative numbers:
-56 ÷ -4 = 14

3.32 $(-25) \div (-5) = 5$

3.33 $36 \div (-4) = -9$

3.34 $0 \div (-8) = 0$

3.35 $11 \div 0 = $ undefined

Division by 0 is undefined.

3.36 13 times

-26 ÷ (-2) = 13

USING INTEGERS

3.37 200 feet above sea level

Feet *above* sea level is represented
using a positive number.

3.38 7 more than a number

"More than" means to add.

3.39 -28 ÷ 2

Owing money is negative. "Half"
means to divide by 2.

3.40 -15 - (-238)

Time in B.C. is represented using
negative numbers:
15 B.C. - 238 B.C.
-15 - (-238)

3.41 40 years

A.D. 14 - 27 B.C.
14 - (-27)
= 14 + 27
= 41

Subtract off one year because there
is no A.D. 0:
41 - 1 = 40

3.42 -5,000 feet

new altitude - original altitude
= 27,000 - 32,000
= 27,000 + (-32,000)
= -5,000

3.43 45

"Product" means to multiply:
(-15)(-3) = 45

3.44 Multiply by 3.

"Triple" means to multiply by 3.

3.45 $43

Overdrawing money is negative.
Depositing money means to add:
-7 + 50 = 43

3.46 -5

"Quotient" means to divide:
-30 ÷ 6 = -5

3.47 $99 + 18 = 117$

3.48 $\$38 \div 2 = \$19$

3.49 $5 \text{ cents} \times 3 = 15 \text{ cents}$

3.50 $\$25 - \$4 = \$21$

3.51 $48 - 34 = 14 \text{ years}$

SELF TEST 3: MULTIPLYING AND DIVIDING INTEGERS

3.01 False

The product of two negative numbers is positive.

3.02 True

3.03 False

The result of a division problem is called a quotient.

3.04 True

3.05 -22

3.06 none of the above

3.07 -20

3.08 35

3.09 -2

3.010 0

"Product" means multiply:
(0)(8) = 0

3.011 2 · 3

The line shows two groups of positive three.

3.012 23°F

Find the difference between the new temperature and the original temperature:
new temperature - original temperature
7 - (-16)
= 7 + 16
= 23

3.013 Divide what she owed by 4.

"Quarter" means to divide by 4.

3.014 +2

"More than" means to add:
-2 + 4 = 2

3.015 -18

Julie received -3 points for each of the six questions:
(-3)(6) = -18

3.016 $(-9)(7) = -63$

3.017 $36 \div (-4) = -9$

3.018 $(-18) \div (-3) = 6$

3.019 $16 \div 0 = \text{undefined}$

3.020 $23° - (-2°) = 23° + 2° = 25°$

4. The Real Number System

THE REAL NUMBER SYSTEM

4.1   All

4.2   No

4.3   All

4.4   Some

4.5   Some

4.6   irrational

4.7   3

4.8   1.6490221...

Irrational numbers are decimal numbers that don't end or repeat.

4.9   irrational numbers

Natural numbers are rational, not irrational.

4.10   real numbers
rational numbers

4.11-4.15

		Natural	Whole	Integer	Rational	Irrational
4.11	-2			x	x	
4.12	0		x	x	x	
4.13	$\frac{5}{6}$				x	
4.14	π					x
4.15	6	x	x	x	x	

Real Number Properties

4.16 commutative property of addition

4.17 associative property of addition

4.18 identity property of multiplication

4.19 4 + 0 = 4

4.20 a · b = b · a

4.21 associative property of multiplication

4.22 Her answer is incorrect because she tried to use the associative property with subtraction.

4.23 commutative property

4.24 c · 1 = c

4.25 division

4.26 Identity property of multiplication

4.27 Commutative property of addition

4.28 Commutative property of multiplication

4.29 Identity property of addition

4.30 Associative property of addition

The Distributive Property

4.31 72

3(20) + 3(4)
= 60 + 12
= 72

4.32 162

6(30) - 6(3)
= 180 - 18
= 162

4.33 -60

-4(9) + (-4)(6)
= -36 + (-24)
= -60

4.34 -14

-2(8) - (-2)(1)
= -16 - (-2)
= -16 + 2
= -14

4.35 85

5(12) + 5(5)
= 60 + 25
= 85

4.36 Multiply 8 by 200 and add 8 times 7.

8(207) = 8(200) + 8(7)

4.37 6(100) + 6(5)

6(105) = 6(100) + 6(5)

4.38 7(30) - 7(7)

7(30) - 7(7)
= 7(30 - 7)
= 7(23)

4.39   207

9(23)
= 9(20 + 3)
= 9(20) + 9(3)
= 180 + 27
= 207

4.40   -114

-3(40) - (-3)(2)
= -120 - (-6)
= -120 + 6
= -114

4.41 $7(10 + 3) = 70 + 21 = 91$

4.42 $-9(10 + 8) = -90 - 72 = -162$

4.43 $6(20 - 4) = 120 - 24 = 96$

4.44 $-3(30 - 3) = -90 - (-9) = -90 + 9 = -81$

4.45 $8(70 - 4) = 560 - 32 = 528$

ORDER OF OPERATIONS

4.46

subtraction
1st

division
2nd

multiplication
3rd

addition
4th

4.47   8

|-4 + 3| · 8
= |-1| · 8
= 1 · 8
= 8

4.48   3

5 - 2 · 3 + 4
= 5 - 6 + 4
= -1 + 4
= 3

4.49   subtraction

Divide:
-2 + 5 + 4(3 - 6)

Subtract:
-2 + 5 + 4(-3)

4.50   division

Subtract:
$$\frac{8(6)}{-6}$$

Multiply:
$$\frac{48}{-6}$$

Divide:
-8

4.51 -21

$3 \cdot -8 + 5 - 4 \div 2$
$= -24 + 5 - 4 \div 2$
$= -24 + 5 - 2$
$= -19 - 2$
$= -21$

4.52 1

$|8 - 7| \cdot 4 + 3(-1)$
$= |1| \cdot 4 + 3(-1)$
$= 1 \cdot 4 + 3(-1)$
$= 4 + 3(-1)$
$= 4 + (-3)$
$= 1$

4.53 $6 - 5 \cdot 3$

$6 - 5 \cdot 3$
$= 6 - 15$
$= -9$

4.54 $14 + 3 \cdot 2 = 14 + 6 = 20$

4.55 $26 - 16 \div 4 = 26 - 4 = 22$

4.56 $31 - (9 + 4) = 31 - 13 = 18$

4.57 $15 + (10 \div 2) - 6 = 15 + 5 - 6 = 20 - 6 = 14$

4.58 $(18 - 4) + (9 - 7)(3) = 14 + 2(3) = 14 + 6 = 20$

Exponents and the Order of Operations

4.59 False

A negative integer taken to an even power is positive.

4.60 True

4.61 True

4.62 False

Exponents come before multiplication and division in the order of operations.

4.63 5^3, $5 \cdot 5 \cdot 5$, 125

4.64 4^6

4.65 $(-8)^4$

4.66 -36

4.67 -4

$4 + (-2)^3$
$= 4 + (-8)$
$= -4$

4.68 -23

$|5| - 4(3^2 - 2)$
$= 5 - 4(9 - 2)$
$= 5 - 4(7)$
$= 5 - 28$
$= -23$

4.69   -55

$8 \div -2 \cdot 4^2 + 9$
$= 8 \div -2 \cdot 16 + 9$
$= -4 \cdot 16 + 9$
$= -64 + 9$
$= -55$

4.70   -20

$-5^2 + 8\,|{-1}| + (-3)$
$= -5^2 + 8(1) + (-3)$
$= -25 + 8(1) + (-3)$
$= -25 + 8 + (-3)$
$= -17 + (-3)$
$= -20$

4.71 $2^5 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 = 32$

4.72 $5^2 = 5 \cdot 5 = 25$

4.73 $(-2)^4 = (-2)(-2)(-2)(-2) = 16$

A negative integer taken to an even power is positive.

4.74 $(-1)^9 = -1$

A negative integer taken to an odd power is negative.

4.75 $(10 - 6)^2 - 3^2 + 2 = 4^2 - 3^2 + 2 = 16 - 9 + 2 = 7 + 2 = 9$

SELF TEST 4: THE REAL NUMBER SYSTEM

4.01 True

4.02 False

The commutative property works only for addition and multiplication.

4.03 True

4.04 all of the above

4.05 integers

4.06 (-8)(1) = -8

4.07 grouping

4.08 distributive property

4.09 -115

-5(20) + (-5)(3)
= -100 + (-15)
= -115

4.010 252

9(30 - 2)
= 9(30) - 9(2)
= 270 - 18
= 252

4.011 -14

-8 + 9 · 2 ÷ -3
= -8 + 18 ÷ -3
= -8 + (-6)
= -14

4.012 -62

-7(5 + 3) - |-6|
= -7(8) - |-6|
= -7(8) - 6
= -56 - 6
= -62

4.013 -216

(-6)(-6)(-6)
= (36)(-6)
= -216

4.014 -81

-(3)(3)(3)(3)
= -(9)(3)(3)
= -(27)(3)
= -(81)
= -81

4.015 -10

$6 - 2^3 + (-9 + 5) \cdot 2$
$= 6 - 2^3 + (-4) \cdot 2$
$= 6 - 8 + (-4) \cdot 2$
$= 6 - 8 + (-8)$
$= -2 + (-8)$
$= -10$

4.016 $7(40+3) = 7(40) + 7(3) = 280 + 21 = 301$

4.017 $35 + 18 \div 6 - 20 = 35 + 3 - 20 = 38 - 20 = 18$

4.018 $-(3)^2 + 2^3 = -9 + 8 = -1$

4.019 $(-4)^2 - (6+1) = (-4)^2 - 7 = 16 - 7 = 9$

4.020 $(7+2)^2 - (5-2)^3 = 9^2 - 3^3 = 81 - 27 = 54$

5. Review

5.1 True

5.2 True

5.3 False

The absolute value of both 8 and -8 is 8, so they are equal to each other.

5.4 False

The product of two negative numbers is positive.

5.5 True

5.6 False

A negative base to an even power is positive.

5.7 D

5.8 -4

-3 + (-1) = -4

5.9 11

9 - (-2)
= 9 + 2
= 11

5.10 -13 + (-7)

Subtracting is the same as adding the opposite.

5.11 -5°F

new temperature - original temperature
-11 - (-6)
= -11 + 6
= -5

5.12 -9

5.13 A.D. 54

5.14 -112

-8(5) + (-8)(9)
= -40 + (-72)
= -112

5.15 -16

|-4| - 5 · 2(-1 + 3)
= 4 - 5 · 2(-1 + 3)
= 4 - 5 · 2(2)
= 4 - 10(2)
= 4 - 20
= -16

5.16

identity property of addition	-9 + 0 = -9
commutative property of multiplication	(-9)(0) = (0)(-9)
identity property of multiplication	(-9)(1) = -9
associative property of multiplication	-1(4 · 9) = (-1 · 4)9
commutative property of addition	-9 + 1 = 1 + (-9)
associative property of addition	-1 + (4 + 9) = (-1 + 4) + 9

5.17 $25 \text{ feet} - (-8 \text{ feet}) = 25 \text{ feet} + 8 \text{ feet} = 33 \text{ feet}$

5.18 $|5 - 8| + 6 = |-3| + 6 = 3 + 6 = 9$

5.19 $(5 + 3) - 2 \cdot 7 + 6 = 8 - 2 \cdot 7 + 6 = 8 - 14 + 6 = -6 + 6 = 0$

5.20 $7^2 - 9 \cdot 5 = 49 - 9 \cdot 5 = 49 - 45 = 4$

5.21 $(5 + 1)^2 - |8 - 12| + (-2)^3 = 6^2 - |-4| + (-2)^3 = 6^2 - 4 + (-2)^3 = 36 - 4 + (-8) = 32 + (-8) = 24$

MATH 701 LIFEPAC TEST: INTEGERS

1. two places to the right of zero

   -3 + 5 = 2

   Positive numbers are located to the right of zero on the number line.

2. the absolute value of six

3. $|{-9}| \neq |9|$

4. The absolute values of Q and R are the same.

   Q and R lie the same distance from zero, so they have the same absolute value.

5. -3, 0, $|3|$, $(-3)^2$

   $|3| = 3$
   $(-3)^2 = 9$

6. -19

7. -5

8. -16

9. -17 - (-8)

10. 27

    (-9)(-3) = 27

11. The product of two negative numbers is positive.

12. -4

13. -18 ÷ 3

    Owing money is negative. They are dividing by a positive number of people.

14. The number -5 is a real number.

15. Every whole number is a natural number.

16. $4 \cdot (3 \cdot 6) = (4 \cdot 3) \cdot 6$

17. commutative property of addition

18. 9(-7 + 6) = 9(-7) + 9(6)

19. 16

    $|{-8}| + 4(-5 + 9) \div 2$
    $= 8 + 4(-5 + 9) \div 2$
    $= 8 + 4(4) \div 2$
    $= 8 + 16 \div 2$
    $= 8 + 8$
    $= 16$

20. 11

    $-6^2 \div 12 - 2(-7)$
    $= -36 \div 12 - 2(-7)$
    $= -3 - 2(-7)$
    $= -3 - (-14)$
    $= -3 + 14$
    $= 11$

21.

$$-21 - (-6) = -21 + 6$$
$$|-21| = 21 \text{ and } |6| = 6$$
$$21 - 6 - 15$$
$$-21 + 6 = -15$$

22. $|6-11|+4=|-5|+4=5+4=9$

23. $(5+12)-|-9|+3=17-9+3=8+3=11$

24. $2^3+(3-6)^2=2^3+(-3)^2=8+9=17$

25. $6(60-3)=6(60)-6(3)=360-18=342$

MATH 701

ALTERNATE LIFEPAC TEST

80
100
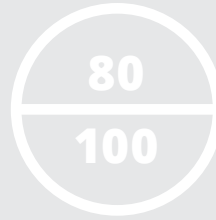
Score _____

NAME _____   **DATE** _____

Complete the following activities (4 points, each numbered activity).

1. How would you graph the result of 4 + (-7) as a point on the number line?
    ☐ eleven places to the right of zero   ☐ three places to the right of zero
    ☐ eleven places to the left of zero   ☐ three places to the left of zero

2. Which of the following statements has a value of -8?
    ☐ the opposite of eight   ☐ eight above zero
    ☐ the absolute value of eight   ☐ the opposite of negative eight

3. Which of the following inequalities is *not* true?
    ☐ $|-3| \geq |3|$ ☐ $-5 < -8$ ☐ $(-4)^2 \neq -16$ ☐ $|-6| \leq |-7|$

4. Use the number line to determine which of the following statements is true. Each tick is 1 unit.
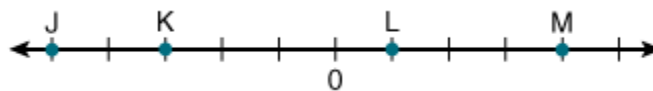
    ☐ The sum of J and K is positive.   ☐ The product of K and L is negative.
    ☐ The absolute values of K and M   ☐ The quotient of M and L is
       are the same.   negative.

5. Determine which of the following lists is in order from smallest to largest.
    ☐ $|-4|, 1, |3|, -2^2$ ☐ $1, |3|, -2^2, |-4|$
    ☐ $-2^2, |3|, 1, |-4|$ ☐ $-2^2, 1, |3|, |-4|$

6. Add (-11) + (-9).
    ☐ 2   ☐ -2   ☐ -20   ☐ 20

7.   Find the sum of -4 and 14.
☐ 10 ☐ -10 ☐ -18 ☐ 18

8.   Subtract 8 - (-6).
☐ -2 ☐ 2 ☐ -14 ☐ 14

9.   Which of the following expressions could be used to represent "the difference between -12 and 10"?
☐ -12 - (-10) ☐ -12 - 10 ☐ 12 - (-10) ☐ -12 + 10

10. Multiply (-6)(12).
☐ -72 ☐ 72 ☐ -2 ☐ 6

11. Which of the following statements is *not* true?
☐ The quotient of two positive numbers is positive.   ☐ The product of two negative numbers is negative.
☐ The product of two numbers with different signs is negative.   ☐ The quotient of two numbers with different signs is negative.

12. Simplify $\dfrac{-20}{-5}$.
☐ 4 ☐ -4 ☐ -25 ☐ 100

13. Daniel owed his mom $5 yesterday. That amount tripled today after he borrowed money to buy a CD. Which of the following expressions could be used to find out how much Daniel now owes his mom?
☐ -5 ÷ 3 ☐ 5 ÷ 3 ☐ 5 · 3 ☐ -5 · 3

14. Which of the following statements is *not* true?
☐ The value of π is an irrational number.   ☐ The number -2 is an integer.
☐ The number $\frac{2}{3}$ is a natural number.   ☐ The number 0 is a rational number.

15. Which of the following statements is true?

☐ Some rational numbers are also irrational.

☐ Every natural number is a whole number.

☐ Every integer is a natural number.

☐ Every real number is a rational number.

16. Which of the following statements demonstrates the identity property of multiplication?

☐ $9 \cdot (2 \cdot 7) = (9 \cdot 2) \cdot 7$

☐ $7 \cdot \text{-}8 = \text{-}8 \cdot 7$

☐ $(\text{-}4)(1) = \text{-}4$

☐ $\text{-}5(18) = \text{-}5(20 - 2)$

17. Which of the following properties states that the way in which addends are grouped may be changed without affecting the sum?

☐ distributive property

☐ identity property of addition

☐ associative property of addition

☐ commutative property of addition

18. All of the following statements correctly use the distributive property *except* _____.

☐ $5(12 - 6) = 5(12) + 5(6)$

☐ $\text{-}3(9 - 2) = \text{-}3(9) - (\text{-}3)(2)$

☐ $\text{-}4(17 + 6) = \text{-}4(17) + (\text{-}4)(6)$

☐ $7(13 + 2) = 7(13) + 7(2)$

19. Evaluate $\text{-}5(2 + 7) - |3| \div \text{-}3$.

☐ 16　　　　☐ 14　　　　☐ -46　　　　☐ -44

20. Find the value of $6 + (\text{-}2)^3 \cdot (\text{-}4 + 1)$.

☐ 6　　　　☐ -18　　　　☐ 30　　　　☐ 0

21. Find the value. $-23 - (-9) =$

22. Find the value. $|5 - 14| + 7 =$

23. Find the value. $(6 + 13) - |-5| + 13 =$

24. Find the value. $3^3 + (2 - 7)^2 =$

25. Find the value. $3(90 - 2) =$

MATH 701 ALTERNATE LIFEPAC TEST: INTEGERS ANSWER KEY

1. three places to the left of zero

   4 + (-7) = -3

   Negative numbers are located to the left of zero on the number line.

2. the opposite of eight

3. -5 < -8

   On the number line, -5 is farther to the right than -8, so it is larger.

4. The product of K and L is negative.

   The product of two numbers with different signs is negative.

5. -2^2, 1, |3|, |-4|

   $-2^2 = -4$

   |3| = 3

   |-4| = 4

6. -20

7. 10

   -4 + 14 = 10

8. 14

9. -12 - 10

10. -72

11. The product of two negative numbers is negative.

12. 4

13. -5 · 3

    Owing money is negative. To triple is to multiply by 3.

14. The number $\frac{2}{3}$ is a natural number.

15. Every natural number is a whole number.

16. (-4)(1) = -4

17. associative property of addition

18. 5(12 - 6) = 5(12) + 5(6)

19. -44

    $-5(2 + 7) - |3| \div -3$

    $= -5(9) - |3| \div -3$

    $= -5(9) - 3 \div -3$

    $= -45 - 3 \div -3$

    $= -45 - (-1)$

    $= -45 + 1$

    $= -44$

20. 30

    $6 + (-2)^3 \cdot (-4 + 1)$

    $= 6 + (-2)^3 \cdot (-3)$

    $= 6 + (-8) \cdot (-3)$

    $= 6 + 24$

    $= 30$

21. $-23 - (-9) = -23 + 9 = -14$

22. $|5 - 14| + 7 = |-9| + 7 = 9 + 7 = 16$

23.
$(6 + 13) - |-5| + 13 = 19 - 5 + 13 = 14 + 13 = 27$

24.
$3^3 + (2 - 7)^2 = 3^3 + (-5)^2 = 27 + 25 = 52$

25.
$3(90 - 2) = 3(90) - 3(2) = 270 - 6 = 264$

Alpha Omega
PUBLICATIONS