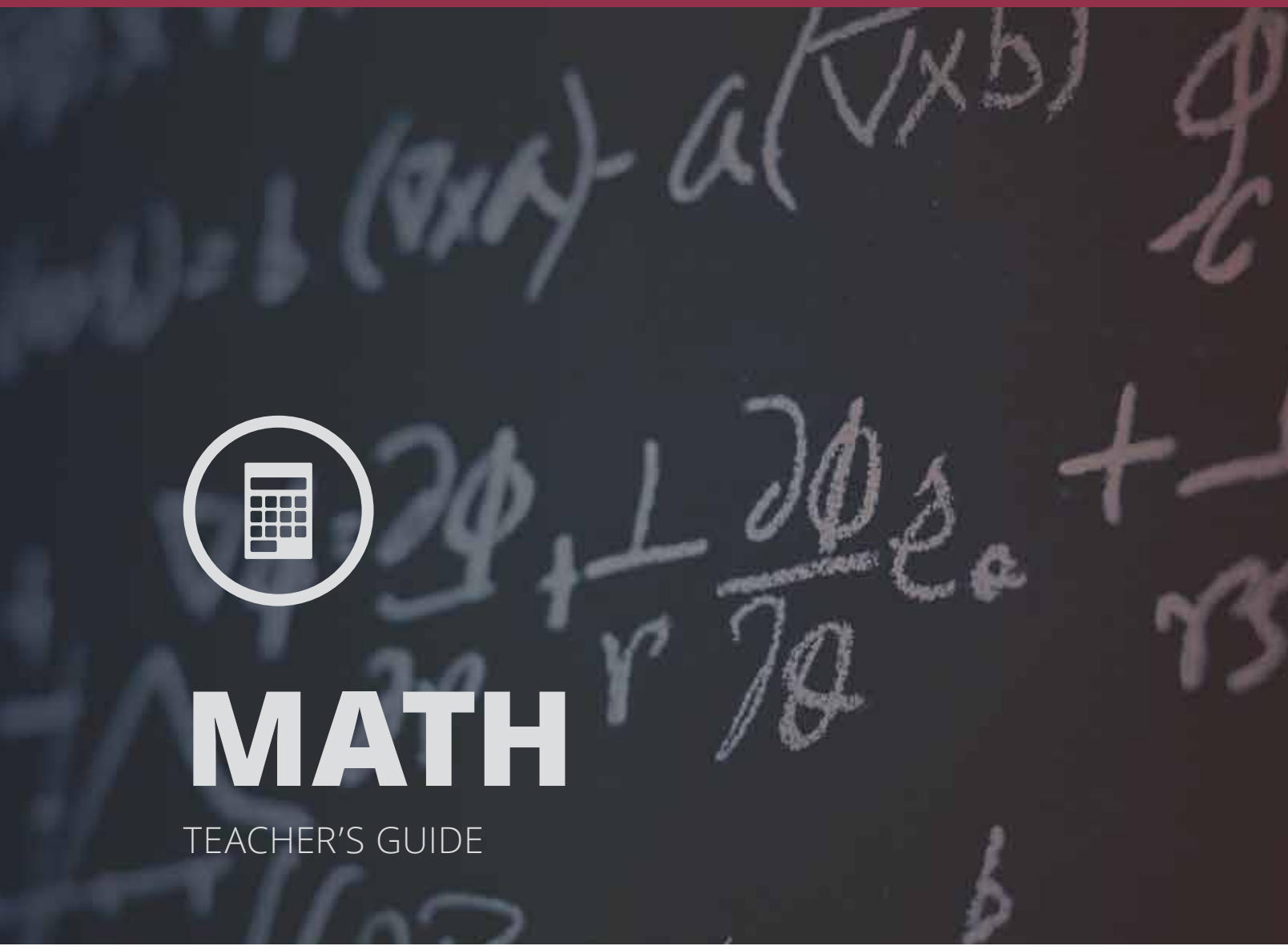
LIFEPAC®



MATH

TEACHER'S GUIDE

9th Grade

Alpha Omega
PUBLICATIONS

MATHEMATICS 900
Teacher's Guide

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Teacher Notes

INSTRUCTIONS FOR NINTH GRADE MATHEMATICS

The LIFEPAC curriculum from grades two through twelve is structured so that the daily instructional material is written directly into the LIFEPACs. The student is encouraged to read and follow this instructional material in order to develop independent study habits. The teacher should introduce the LIFEPAC to the student, set a required completion schedule, complete teacher checks, be available for questions regarding both content and procedures, administer and grade tests, and develop additional learning activities as desired. Teachers working with several students may schedule their time so that students are assigned to a quiet work activity when it is necessary to spend instructional time with one particular student.

Mathematics is a subject that requires skill mastery. But skill mastery needs to be applied toward active student involvement. Measurements require measuring cups, rulers, empty containers. Boxes and other similar items help the study of solid shapes. Construction paper, beads, buttons, beans are readily available and can be used for counting, base ten, fractions, sets, grouping, and sequencing. Students should be presented with problem situations and be given the opportunity to find their solutions.

Any workbook assignment that can be supported by a real world experience will enhance the student's ability for problem solving. There is an infinite challenge for the teacher to provide a meaningful environment for the study of mathematics. It is a subject that requires constant assessment of student progress. Do not leave the study of mathematics in the classroom.

The Teacher Notes section of the Teacher's Guide lists the required or suggested materials for the LIFEPACs and provides additional learning activities for the students. Additional learning activities provide opportunities for problem solving, encourage the student's interest in learning and may be used as a reward for good study habits.

I. MATERIALS NEEDED

Required:	Suggested:
none	none

II. ADDITIONAL LEARNING ACTIVITIES

Section I Expressions

1. Check at local educational supply houses for mathematics materials. Many good games and puzzles are on the market.
2. Make up a mathematics bingo game. Instead of calling a number and a letter, call out an algebraic expression or problem and have the students find the answer on their bingo card.
3. Make up several simple problems involving exponents. Give them to a classmate to solve. Grade your classmate's paper.
4. Make flash cards with algebraic expressions on them with a friend. On one side write an expression in numbers. On the other side write the expression in words. Practice using the flash cards with a friend.
5. Make up a mathematical game of your own. You can pattern it after Bingo, Concentration, or other games. Ask a classmate to use your game or play your game with a classmate.
6. Research the subject of algebra in the library. Write a one-page report on what you will learn.

Section II Signed Numbers

1. Draw a number line on the chalkboard. Ask the students to use the number line to solve addition problems. Include both positive and negative numbers in the problems.
2. Have each student write several problems including signed numbers. Construct a quiz or activity using the problems the students make up.
3. Let two students each make an addition square (examples are on page 34 in the LIFEPAC). Then let the students trade squares and see who can solve the squares first and *accurately.* Let the students check each other's work.
4. With a classmate write an additional Self Test 2 for Mathematics LIFEPAC 901. Ask your teacher if you can give the test to your class. Grade all of the papers carefully and return them to your classmates.
5. Ask your teacher if you can be a teacher's assistant for a week. During that time help your teacher by doing such things as checking all mathematics papers. Be sure to check each answer carefully.
6. Draw a large number line on poster board that can hang in your classroom.

III. ADDITIONAL ACTIVITY

This activity may be reproduced as a student worksheet. It will provide the students with more practice in evaluating expressions (Section I, Objective 3).

Evaluating Expressions

Evaluate for $a = 3$, $b = 2$, and $c = 5$.

1. $3a$ _____
2. $4b$ _____
3. bc _____
4. $a + b + c$ _____
5. $ac + b$ _____
6. a^2c _____
7. $3b - c$ _____
8. $2bc$ _____
9. $(a + b)^2$ _____
10. $a^2c^2 + b^2c^2$ _____
11. $(b + c)^2$ _____
12. $(c - b)^2$ _____
13. $3b^2 + 4c^3$ _____
14. $3c$ _____
15. c^3 _____
16. $ac - b$ _____
17. $2(a + b)^3$ _____
18. $(a + b + c)^2$ _____
19. $4a^3 + 3b^2$ _____
20. $2(a - b + c)^2$ _____

ADDITIONAL ACTIVITY, Solution Key

1. $3a = 3 \cdot 3 = 9$

2. $4b = 4 \cdot 2 = 8$

3. $bc = 2 \cdot 5 = 10$

4. $a + b + c$
$= 3 + 2 + 5$
$= 10$

5. $ac + b$
$= 3 \cdot 5 + 2$
$= 15 + 2$
$= 17$

6. $a^2c = 3^2 \cdot 5 = 3 \cdot 3 \cdot 5$
$= 9 \cdot 5 = 45$

7. $3b - c$
$= 3 \cdot 2 - 5$
$= 6 - 5$
$= 1$

8. $2bc = 2 \cdot 2 \cdot 5 = 4 \cdot 5 = 20$

9. $(a + b)^2$
$= (3 + 2)^2$
$= (5)^2$
$= (5)(5)$
$= 25$

10. $a^2c^2 + b^2c^2$
$= (3)^2 (5)^2 + (2)^2 (5)^2$
$= (3)(3)(5)(5) + (2)(2)(5)(5)$
$= (9)(25) + (4)(25)$
$= 225 + 100$
$= 325$

11. $(b + c)^2$
$= (2 + 5)^2$
$= (7)^2$
$= (7)(7)$
$= 49$

12. $(c - b)^2$
$= (5 - 2)^2$
$= (3)^2$
$= (3)(3)$
$= 9$

13. $3b^2 + 4c^3$
$= 3(2)^2 + 4(5)^3$
$= 3(2)(2) + 4(5)(5)(5)$
$= 3(4) + 4(125)$
$= 12 + 500$
$= 512$

14. $3c = 3 \cdot 5 = 15$

15. $c^3 = 5^3 = 5 \cdot 5 \cdot 5 = 125$

16. $ac - b$
$= 3 \cdot 5 - 2$
$= 15 - 2$
$= 13$

17. $2(a + b)^3$
$= 2(3 + 2)^3$
$= 2(5)^3$
$= 2(5)(5)(5)$
$= 2(125)$
$= 250$

18. $(a + b + c)^2$
$= (3 + 2 + 5)^2$
$= (10)^2$
$= (10)(10)$
$= 100$

19. $4a^3 + 3b^2$
$= 4(3)^3 + 3(2)^2$
$= 4(3)(3)(3) + 3(2)(2)$
$= 4(27) + 3(4)$
$= 108 + 12$
$= 120$

20. $2(a - b + c)^2$
$= 2(3 - 2 + 5)^2$
$= 2(1 + 5)^2$
$= 2(6)^2$
$= 2(6)(6)$
$= 2(36)$
$= 72$

Alternate Tests

Reproducible Tests
for use with the Mathematics
900 Teacher's Guide

Name _____

Perform the indicated operations (each answer, 3 points).

1. $6 + (-4) - 3$ _____
2. $7 - 8 + 2 - 10$ _____
3. $9(-8)$ _____
4. $9 - 12 + 3(-6)$ _____
5. $28 \div (-7) - 4$ _____
6. $(-63) \div (-9)$ _____

Evaluate each expression for $P = 8$, $Q = -4$, and $R = -2$ (each answer, 3 points).

7. PQR _____
8. $P^2 - Q^2 - R^2$ _____
9. $P + Q - R$ _____
10. $\frac{P^2}{Q^2} + \frac{Q^2}{R^2}$ _____

Complete each sentence (each answer, 2 points).

11. The constant term in $x^6 + 10$ is _____ .
12. The exponent in $25 + 7P^3$ is _____ .
13. The variable term in $P^2 + 5 + 7^3$ is _____ .
14. The numerical coefficient in $12(5) = 3Q^2$ is _____ .

Follow the directions (each answer, 3 points).

15. Change $7P - 10P$ to a product. _____
16. Change $(x + 15)5$ to a sum. _____

Follow the directions (each answer, 5 points).

17. Write in algebraic form "the sum of 5 times the cube of a number and 7 times that number." _____
18. Write in words the meaning of $P^2 - 7P$. _____

Simplify (each answer, 3 points).

19. $12P - 13 - 8P - 10$ _____
20. $15(x - 2) + 3(5 - 10x)$ _____

48/60

Date _____

Score _____

Answer Keys

I. SECTION ONE

1.1 15
1.2 21
1.3 27
1.4 33
1.5 75
1.6 18
1.7 15
1.8 29
1.9 40
1.10 34
1.11 12
1.12 12
1.13 10
1.14 15
1.15 22
1.16 7
1.17 11
1.18 20
1.19 7
1.20 44
1.21 the sum of some number n and 5
1.22 the difference of some number n and 5
1.23 the sum of some number x and 8
1.24 the difference of some number x and 8
1.25 the difference of 8 and some number x
1.26 the difference of 5 and some number y
1.27 the sum of some number x and the sum of 5 and 7
1.28 the difference of some number x and the sum of 8 and 2 or the difference of some number x and 10
1.29 the sum of some number x and the difference of 8 and 2 or the sum of some number x and 6
1.30 the sum of a number x and itself
1.31 a. y
b. 6
c. sum
1.32 a. N
b. 8
c. difference
1.33 a. A
b. 0
c. neither
1.34 a. B
b. 3
c. difference
1.35 *a*. C
b. 22 or 10 + 22
c. sum
1.36 $n + 6$
1.37 $8 - n$
1.38 $n - 10$
1.39 $n + n$
1.40 $n + (8 + 6)$
1.41 $x + 15$
1.42 $x + 10$
1.43 $n + 16$
1.44 $x + 11$
1.45 $r + 22$
1.46 $r + 4$

1.47 $x + 21$

1.48 $n + 5$

1.49 $n + 18$

1.50 5.32

1.51 21.15

1.52 33.65

1.53 4.545

1.54 81.056

1.55 106.321

1.56 17.40

1.57 49.860

1.58 10.633

1.59 $x + 14.7$

1.60 $n + 17.13$

1.61 $n + 79.01$

1.62 $4.09 + N$

1.63 $12.5 + x$

1.64 $63.29 + x$

1.65 30

1.66 32

1.67 42

1.68 72

1.69 40

1.70 50

1.71 180

1.72 150

1.73 200

1.74 1,400

1.75 90

1.76 154

1.77 120

1.78 480

1.79 230

1.80 280

1.81 480

1.82 60

1.83 60

1.84 240

1.85 6

1.86 5

1.87 22

1.88 16

1.89 13

1.90 16

1.91 6

1.92 7.2

1.93 126

1.94 36

1.95 $6 \cdot 7 \cdot x = 42x$

1.96 $5 \cdot 2 \cdot P = 10P$

1.97 $3RS$

1.98 $8 \cdot 2 \cdot x \cdot y = 16xy$

1.99 $2 \cdot 5 \cdot a \cdot c = 10ac$

1.100 $5 \cdot 2 \cdot A \cdot C = 10AC$

1.101 $4 \cdot 2 \cdot Q \cdot P = 8PQ$

1.102 $10 \cdot 2 \cdot K = 20K$

1.103 7 times some number n

1.104 6 times some number P

1.105 the sum of 8 times some number N and 5

1.106 the sum of 7 and twice a number x

1.107 the difference between 12 times a number and 10

1.108 the difference between 52 and 25 times a number x

	Base	Exponent
1.109	2	6
1.110	3	9
1.111	5	10
1.112	8	3
1.113	x	6
1.114	y	5
1.115	7	n
1.116	9	P
1.117	15	$x + 1$
1.118	10	$3x - 1$

1.119 $6 \cdot 6 \cdot 6$

1.120 $7 \cdot 7 \cdot 7 \cdot 7$

1.121 $x \cdot x$

1.122 $y \cdot y \cdot y \cdot y \cdot y$

1.123 $3 \cdot 3 \cdot 3$

1.124 $1 \cdot 1 \cdot 1 \cdot 1$

1.125 $2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$

1.126 $\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2}$

1.127 $(2.5)\ (2.5)$

1.128 $(0.01)\ (0.01)\ (0.01)\ (0.01)$

1.129 8

1.130 16

1.131 125

1.132 243

1.133 1,000

1.134 10,000

1.135 289

1.136 400

1.137 343

1.138 2^5

1.139 5^3

1.140 3^2

1.141 2^5

1.142 $(\frac{1}{2})^3$

1.143 $(0.3)^2$

1.144 x^4

1.145 B^5

1.146 P^2

1.147 N^3

1.148 A^2B^2

1.149 C^3d^2

1.150 x^2y^2

1.151 P^2Q^3

1.152 $a^3b^3c^3$

1.153 $x^2y^2z^2$

1.154 $a + 6 = 10 + 6 = 16$

1.155 $16 - B = 16 - 2 = 14$

1.156 $B^2 = (9)^2 = 9 \cdot 9 = 81$

1.157 $A^2 = (2.3)^2 = (2.3)\ (2.3) = 5.29$

1.158 $x^2 + 2 = (5.1)^2 + 2 = 26.01 + 2 = 28.01$

1.159 $5a = 5 \cdot 2 = 10$

1.160 $2b = 2 \cdot 3 = 6$

1.161 $4c = 4 \cdot 4 = 16$

1.162 $a^2 = 2 \cdot 2 = 4$

1.163 $ab = 2 \cdot 3 = 6$

1.164 $a + b = 2 + 3 = 5$

1.165 $a + b + c = 2 + 3 + 4 = 9$

1.166 $ab + c = 2 \cdot 3 + 4 = 6 + 4 = 10$

1.167 $a + bc = 2 + 3 \cdot 4 = 2 + 12 = 14$

1.168 $abc = 2 \cdot 3 \cdot 4 = 24$

1.169 $a^2 b = 2^2 \cdot 3 = 4 \cdot 3 = 12$

1.170 $a^2 b^2 c^2 = 2^2 \cdot 3^2 \cdot 4^2 = 4 \cdot 9 \cdot 16 = 576$

1.171 $2a - b = 2 \cdot 2 - 3 = 4 - 3 = 1$

1.172 $c - a = 4 - 2 = 2$

1.173 $b - a = 3 - 2 = 1$

1.174 $3a^2 = 3 \cdot 2^2 = 3 \cdot 4 = 12$

1.175 $3ab = 3 \cdot 2 \cdot 3 = 18$

1.176 $4ab^2 = 4 \cdot 2 \cdot 3^2 = 4 \cdot 2 \cdot 9 = 72$

1.177 $(a + b)^2 = (2 + 3)^2 = 5^2 = 25$

1.178 $(b + c)^3 = (3 + 4)^3 = (7)^3 = 343$

1.179 $a^2 b^2 + b^2 c^2 = 2^2 \cdot 3^2 + 3^2 \cdot 4^2 = 4 \cdot 9 + 9 \cdot 16 = 36 + 144 = 180$

1.180 $a + b^2 = 2 + 3^2 = 2 + 9 = 11$

1.181 $4(a + b) = 4(2 + 3) = 4(5) = 20$

1.182 $3(a + b)^2 = 3(2 + 3)^2 = 3(5)^2 = 3 \cdot 25 = 75$

1.183 $(b + c)^2 = (3 + 4)^2 + (7)^2 = 49$

1.184 $(a + b + c)^2 = (2 + 3 + 4)^2 = 9^2 = 9 \cdot 9 = 81$

1.185 $(b - a)^2 = (3 - 2)^2 = (1)^2 = 1$

1.186 $3a^2 + 4b^2 = 3 \cdot 2^2 + 4 \cdot 3^2 = 3 \cdot 4 + 4 \cdot 9 = 12 + 36 = 48$

1.187 $5a^3 + 2b = 5 \cdot 2^3 + 2 \cdot 3 = 5 \cdot 8 + 6 = 40 + 6 = 46$

1.188 $3(a + b + c)^2 = 3(2 + 3 + 4)^2 = 3 \cdot 9^2 = 3 \cdot 81 = 243$

1.189 $7 + N$ or $N + 7$

1.190 N^2

1.191 $2N^3$

1.192 $N^2 - 10$

1.193 $x^2 - y^2$

1.194-1.198 Answers will vary.

1.194 the cube of x

1.195 the sum of the square of x and 2

1.196 the difference between 3 times the square of x and 4

1.197 the difference between the squares of two numbers

1.198 the sum of 3 times A and 4 times the square of B

1.199 149

1.200 131

1.201 223

1.202 164

1.203 275

1.204 1,636

1.205 2,266

1.206 75.37

1.207 18.685

1.208 68.687

1.209 14

1.210 31

1.211 25

1.212 13

1.213 424

1.214 6,083

1.215 2,018

1.216 2.87

1.217 49.371

1.218 0.2691

1.219 2,532

1.220 16,408

1.221 0.1446

1.222 81.0502

1.223 0.04088

1.224 26,941

1.225 1,321,013

1.226 118.9188

1.227 387.0752

1.228 10.653

1.229 $82\frac{3}{8}$ or 82.375

1.230 366

1.231 141

1.232 11

1.233 24

1.234 320 $\frac{3}{8}$ or 320.375

1.235 3.17 $\frac{1}{9}$ or 3.171

1.236 754 $\frac{2}{7}$

1.237 9 $\frac{29}{63}$

1.238 8.5 $\frac{8}{17}$ or 8.547

1.239 5.65902

1.240 $\frac{25}{24}$ or 1 $\frac{1}{24}$

1.241 $\frac{73}{36}$ or 2 $\frac{1}{36}$

1.242 $\frac{125}{42}$ or 2 $\frac{41}{42}$

1.243 $\frac{169}{24}$ or 7 $\frac{1}{24}$

1.244 $\frac{1{,}889}{63}$ or 29 $\frac{62}{63}$

1.245 $\frac{29}{4}$ or 7 $\frac{1}{4}$

1.246 $\frac{2}{11}$

1.247 $\frac{7}{32}$

1.248 $\frac{7}{16}$

1.249 $\frac{5}{2}$ or 2 $\frac{1}{2}$

1.250 $\frac{189}{80}$ or 2 $\frac{29}{80}$

1.251 $\frac{5}{4}$ or 1 $\frac{1}{4}$

1.252 $\frac{5}{12}$

1.253 $\frac{15}{136}$

1.254 $\frac{5}{11}$

1.255 $\frac{323}{8}$ or 40 $\frac{3}{8}$

1.256 $\frac{2{,}224}{45}$ or 49 $\frac{19}{45}$

1.257 $\frac{3}{2}$ or 1 $\frac{1}{2}$

1.258 $\frac{8}{9}$

1.259 $\frac{9}{11}$

1.260 $\frac{34}{9}$ or 3 $\frac{7}{9}$

1.261 0.16

1.262 0.22

1.263 0.005

1.264 3.02

1.265 0.016

1.266 15%

1.267 6%

1.268 105%

1.269 3,200%

1.270 0.75%

1.271 50%

1.272 37.5% or $37\frac{1}{2}\%$

1.273 25%

1.274 $33\frac{1}{3}\%$

1.275 30%

1.276 15% of 20 = (0.15) (20) = 3

1.277 13% of 50 = (0.13) (50) = 6.5

1.278 72% or 653 = (0.72) (653) = 470.16

1.279 35% of 70 = (0.35) (70) = 24.5

1.280 $30 = x\%$ of 60

$x\% = \frac{30}{60} = 0.5$

$x = 50\%$

1.281 $66 = x\%$ of 150

$x\% = \frac{66}{150} = 0.44$

$x = 44\%$

1.282 $70 = 30\%$ of x

$x = \frac{70}{0.30} = \frac{700}{3} = 233\frac{1}{3}$

1.283 $90 = 50\%$ of x

$x = \frac{90}{0.50} = \frac{900}{5} = 180$

1.284 $8(4 + 3) = 32 + 24 = 56$

1.285 $9(8 + 2) = 72 + 18 = 90$

1.286 $15(5 + 2) = 75 + 30 = 105$

1.287 $17(4 + 1) = 68 + 17 = 85$

1.288 $13(5 + 4) = 65 + 52 = 117$

1.289 $20(2 + 3) = 40 + 60 = 100$

1.290 $6.5(5 + 1) = 32.5 + 6.5 = 39.0$

1.291 $8.6(3.2 + 4.6) =$

$27.52 + 39.56 = 67.08$

1.292 $7(2 + 3 + 4) = 14 + 21 + 28 = 63$

1.293 $5(5 + 4 + 1) = 25 + 20 + 5 = 50$

1.294 $6(3 + 2 + 5) = 18 + 12 + 30 = 60$

1.295 $10(1 + 3 + 5) = 10 + 30 + 50 = 90$

1.296 $5 \cdot 20 + 5 \cdot 3 = 5(20 + 3)$

1.297 $8 \cdot 16 + 8 \cdot 4 = 8\ (16 + 4)$

1.298 $9 \cdot 7 + 9 \cdot 8 = 9(7 + 8)$

1.299 $6 \cdot 5 + 6 \cdot 8 = 6(5 + 8)$

1.300 $15 \cdot 4 + 15 \cdot 10 = 15(4 + 10)$

1.301 $9 \cdot 10 + 9 \cdot 5 = 9(10 + 5)$

1.302 $5 \cdot 8 + 9 \cdot 5 = 5(8 + 9)$

1.303 $4 \cdot 7 + 8 \cdot 7 = 7(4 + 8)$

1.304 $3 \cdot 10 + 20 \cdot 3 = 3(10 + 20)$

1.305 $5(20 + 3) = 100 + 15 = 115$

1.306 $4(20 + 1) = 80 + 4 = 84$

1.307 $7(10 + 5) = 70 + 35 = 105$

1.308 $6(10 + 7) = 60 + 42 = 102$

1.309 $8(10 + 4) = 80 + 32 = 112$

1.310 $8(10 + 5) = 80 + 40 = 120$

1.311 $6(10 + 2) = 60 + 12 = 72$

1.312 $9(100 - 2) = 900 - 18 = 882$

1.313 $9(10 - 1) = 90 - 9 = 81$

1.314 $8(100 - 3) = 800 - 24 = 776$

1.315 $9(100 + 2) = 900 + 18 = 918$

1.316 $7(20 - 1) = 140 - 7 = 133$

1.317 $5(30 - 1) = 150 - 5 = 145$

1.318 $12(100 + 2) = 1,200 + 24 = 1,224$

1.319 $6(x + 4) = 6x + 6 \cdot 4 = 6x + 24$

1.320 $7(A - 6) = 7A - 7 \cdot 6 = 7A - 42$

1.321 $12(A - B) = 12A - 12B$

1.322 $20(A + B) = 20A + 20B$

1.323 $10(N + 3) = 10N + 10 \cdot 3 = 10N + 30$

1.324 $(x + 2)3 = 3x + 3 \cdot 2 = 3x + 6$

1.325 $(x - 6)5 = 5x - 5 \cdot 6 = 5x - 30$

1.326 $N(N - 7) = N^2 - 7N$

1.327 $p(3 + p) = 3p + p^2$

1.328 $p(5 - p) = 5p - p^2$

1.329 $x(4 - x) = 4x - x^2$

1.330 $5(x^2 + 6) = 5x^2 + 5 \cdot 6 = 5x^2 + 30$

1.331 $7(x^2 + 6x) = 7x^2 + 7 \cdot 6x = 7x^2 + 42x$

1.332 $12(2x + 1) = 12 \cdot 2x + 12 \cdot 1 = 24x + 12$

1.333 $3(5x - 4) = 3 \cdot 5x - 3 \cdot 4 = 15x - 12$

1.334 $4(x^2 + x + 1) = 4x^2 + 4x + 4$

1.335 $5(N^2 + 2N - 1) = 5 \cdot N^2 + 5 \cdot 2N - 5 \cdot 1$
$= 5N^2 + 10N - 5$

1.336 $6(A^2 - A - 4) = 6 \cdot A^2 - 6 \cdot A - 6 \cdot 4$
$= 6A^2 - 6A - 24$

1.337 $8(p^2 + 3p - 4) = 8 \cdot p^2 + 8 \cdot 3p - 8 \cdot 4$
$= 8p^2 + 24p - 32$

1.338 $16(4 - 2K + K^2) = 16 \cdot 4 - 16 \cdot 2K +$
$16 \cdot K^2 = 64 - 32K + 16K^2$

1.339 $9(y^2 + 5y + 6) = 9 \cdot y^2 + 9 \cdot 5y + 9 \cdot 6 =$
$9y^2 + 45y + 54$

1.340 $x(x^2 + 2x) = x^3 + 2x^2$

1.341 $p(p^2 - 3p) = p^3 - 3p^2$

1.342 $N(N^2 + 2N + 1) = N^3 + 2N^2 + N$

1.343 $R(3R^2 - 2R - 1) = 3R^3 - 2R^2 - R$

1.344 $2x(x^2 + 3x + 5) = 2x^3 + 6x^2 + 10x$

1.345 $6x(2x^2 + 3x) = 12x^3 + 18x^2$

1.346 $15x(5x^2 + 6x + 3) = 15x \cdot 5x^2 + 15x \cdot 6x$
$+ 15x \cdot 3 = 75x^3 + 90x^2 + 45x$

1.347 $x^2(x^2 + 2x + 1) = x^4 + 2x^3 + x^2$

1.348 $6x + 12 = 6(x + 2)$

1.349 $7x + 14 = 7(x + 2)$

1.350 $8x - 16 = 8(x - 2)$

1.351 $12x + 36 = 12(x + 3)$

1.352 $13x - 26 = 13(x - 2)$

1.353 $10A - 20 = 10(A - 2)$

1.354 $A^2 + 5A = A(A + 5)$

1.355 $P^2 - 10P = P(P - 10)$

1.356 $B^2 + 6B = B(B + 6)$

1.357 $x^3 + x^2 = x^2(x + 1)$

1.358 $6x^2 + 6y^2 = 6(x^2 + y^2)$

1.359 $6A + 6B + 6C = 6(A + B + C)$

1.360 $7(x + 2) + 12 = 7x + 14 + 12 = 7x + 26$

1.361 $8(x + 6) - 10 = 8x + 48 - 10 = 8x + 38$

1.362 $13(x + 2) + 13 = 13x + 26 + 13 = 13x +$
39

1.363 $10(2x + 3) - 20 = 20x + 30 - 20 =$
$20x + 10$

1.364 $15(x + 1) + 5 = 15x + 15 + 5 = 15x +$
20

1.365 $4(x + 1) - 4 = 4x + 4 - 4 = 4x$

1.366 $12 + 3(4 + x) = 12 + 12 + 3x =$
$24 + 3x$

1.367 $15 + 6(x + 1) = 15 + 6x + 6 = 15 + 6 +$
$6x = 21 + 6x$

1.368 $18(x + 1) - 9 = 18x + 18 - 9 = 18x + 9$

1.369 $7(2x + 1) - 7 = 14x + 7 - 7 = 14x$

1.370 $4(3x + 3) - 10 = 12x + 12 - 10 = 12x + 2$

1.371 $(2x + 3)5 + 6 = 10x + 15 + 6 = 10x + 21$

1.372 $10 + 4(x + 1) + 5 = 10 + 4x + 4 + 5 =$
$10 + 4x + 9 = 4x + 19$

1.373 $12 + 3(2x - 3) + 4 = 12 + 6x - 9 + 4 = 6x + 7$

1.374 $18 + 5(2x - 1) + 3 = 18 + 10x - 5 + 3 = 16 + 10x$

1.375 $14 + 2(3x + 8) - 22 = 14 + 6x + 16 - 22 = 6x + 8$

1.376 $8x + 3x = (8 + 3)x = 11x$

1.377 $2x + 1x = (2 + 1)x = 3x$

1.378 $5x + 8x = (5 + 8)x = 13x$

1.379 $12x + 3x = (12 + 3)x = 15x$

1.380 $15x + 2x = (15 + 2)x = 17x$

1.381 $7x - 5x = (7 - 5)x = 2x$

1.382 $4x - x = (4 - 1)x = 3x$

1.383 $10x - 3x = (10 - 3)x = 7x$

1.384 $18x - 6x = (18 - 6)x = 12x$

1.385 $22x - 10x\ (22 - 10)x = 12x$

1.386 $7.8x - 2.1x = (7.8 - 2.1)x = 5.7x$

1.387 $9.6x - 4.3x - (9.6 - 4.3)x = 5.3x$

1.388 $0.2x + 1.5x = (0.2 + 1.5)x = 1.7x$

1.389 $0.05x + 1.02x = (0.05 + 1.02)x = 1.07x$

1.390 $8x + 2x + 3x =$
$(8 + 2 + 3)x =$
$13x$

1.391 $5x + 2x + 7x =$
$(5 + 2 + 7)x =$
$14x$

1.392 $10x - 2x + 3x =$
$(10 - 2 + 3)x =$
$11x$

1.393 $15x - 4x + 11x - 2x =$
$(15 - 4 + 11 - 2)x =$
$20x$

1.394 $12A + 2 + A - 1 =$
$12A + A + 2 - 1 =$
$(12 + 1)A + 1 =$
$13A + 1$

1.395 $2A + 3A + B + 4B =$
$(2 + 3)A + (1 + 4)B =$
$5A + 5B$

1.396 $7N - 2N + 3P + 2P =$
$(7 - 2)N + (3 + 2)P =$
$5N + 5P$

1.397 $6(A + 2) + 5A =$
$6A + 12 + 5A =$
$6A + 5A + 12 =$
$11A + 12$

1.398 $7(B + 3) + 2B =$
$7B + 21 + 2B =$
$7B + 2B + 21 =$
$9B + 21$

1.399 $8(C + 10) + 20 =$
$8C + 80 + 20 =$
$8C + 100$

1.400 $5(R + 2) - 6 =$
$5R + 10 - 6 =$
$5R + 4$

1.401 $8(R + 6) - 2R =$
$8R + 48 - 2R =$
$8R - 2R + 48 =$
$6R + 48$

1.402 $15(x + 3) + 2x =$
$15x + 45 + 2x =$
$15x + 2x + 45 =$
$17x + 45$

1.403 $8(x^2 + 2) + 20 =$
$8x^2 + 16 + 20 =$
$8x^2 + 36$

1.404 $7(p^2 + 5) - 20 =$
$7p^2 + 35 - 20 =$
$7p^2 + 15$

1.405 $13(y^2 + 2) - 13 =$
$13y^2 + 26 - 13 =$
$13y^2 + 13$

1.406 $3(y^2 + y) + y =$
$3y^2 + 3y + y =$
$3y^2 + (3 + 1)y =$
$3y^2 + 4y$

1.407 $4(x^2+ 2x) + 3x =$
$4x^2 + 8x + 3x =$
$4x^2 + 11x$

1.408 $12(R^2 + 7R) – 20R =$
$12R^2 + 84R – 20R =$
$12R^2 + 64R$

1.409 $8(xy + 8) + 1 =$
$8xy + 64 + 1 =$
$8xy + 65$

1.410 $7(PQ + 2)\ PQ =$
$7PQ + 14 + PQ =$
$7PQ + PQ + 14 =$
$8PQ + 14$

1.411 $5(MN + 1) – 5 =$
$5MN + 5 – 5 =$
$5MN$

1.412 $2(x + y) + 3(x + y) =$
$2x + 2y + 3x + 3y =$
$2x + 3x + 2y + 3y =$
$5x + 5y$

1.413 $8(A + 2B) + 6(2A + B) =$
$8A + 16B + 12A + 6B =$
$8A + 12A + 16B + 6B =$
$20A + 22B$

1.414 $9(x + y) + 2(x – y) =$
$9x + 9y + 2x – 2y =$
$9x + 2x + 9y – 2y =$
$11x + 7y$

1.415 $15(\ x + y) + 12\ (x – y) =$
$15x + 15y + 12x – 12y =$
$15x + 12x + 15y – 12y =$
$27x + 3y$

II. SECTION TWO

2.1 –6
2.2 -5
2.3 -10
2.4 -3
2.5 -4
2.6 2
2.7 5
2.8 6
2.9 8
2.10 4
2.11 -$10
2.12 $50
2.13 8°
2.14 -15°
2.15 22 ft.
2.16 2
2.17 -5
2.18 -8
2.19 -1
2.20 -5
2.21 -9
2.22 2
2.23 -12
2.24 <
2.25 =
2.26 <
2.27 >
2.28 <
2.29 >
2.30 >
2.31 =
2.32 >
2.33 <
2.34 >

2.35 >

2.36 <

2.37 >

2.38 >

2.39 false

2.40 true

2.41 true

2.42 false

2.43 -1

2.44 -2, -4, -6

2.45 0, 1, 2

2.46 0, -5, -10

2.47 -8, -4, 0, 4

2.48 10

2.49 25

2.50 15

2.51 37

2.52 21

2.53 -4

2.54 5

2.55 11

2.56 12

2.57 -16

2.58 -12

2.59 -50

2.60 0

2.61 0

2.62 0

2.63 14

2.64 12

2.65 4

2.66 -4

2.67 $12x$

2.68 $5x$

2.69 $-3x$

2.70 $2x$

2.71 $2x$

2.72 across: a. -1, b. -5, c. 3
down: d. 8, e. -11, f. 0
total: g. -3

2.73 across: a. -3, b. 0, c. -9, d. -8
down: e. 7, f. -14, g. 2, h. -15
total: i. -20

2.74 Answers will vary.

2.75 Answers will vary.

2.76 $x + y + z = 2 + (-3) + (-4) = -5$

2.77 $x - y - z = 2 - (-3) - (-4) = 2 + 3 + 4 = 9$

2.78 $2x + 2y + 2z = 2(2) + 2(-3)$
$+ 2(-4) = 4 + (-6) + (-8) = -10$

2.79 $y + y + y = 3y = 3(-3) = -9$

2.80 $z + z + z = 3z = 3(-4) = -12$

2.81 $10 - 6 = 4$

2.82 $15 - (-4) = 15 + 4 = 19$

2.83 $-12 - 8 = -20$

2.84 $6 - (-6) = 6 + 6 = 12$

2.85 $15 - 12 = 3$

2.86 $13 - (-4) = 13 + 4 = 17$

2.87 $15 - (-9) = 15 + 9 = 24$

2.88 $20 - (-22) = 20 + 22 = 42$

2.89 $2 - 8 = -6$

2.90 $5 - (-4) = 5 + 4 = 9$

2.91 $12 - (-13) = 12 + 13 = 25$

2.92 $1 - (-1) = 1 + 1 = 2$

2.93 $-18 - 4 = -22$

2.94 $-20 - 10 = -30$

2.95 $-60 - 30 = -90$

2.96 $-25 - 25 = -50$

2.97 $-10 - (-5) = -10 + 5 = -5$

2.98 $-16 - (-4) = -16 + 4 = -12$

2.99 $-22 - (-4) = -22 + 4 = -18$

2.100 $-33 - (11) = -33 + 11 = -22$

2.101 $6 - 5 = 1$

2.102 $7 - 8 = -1$

2.103 $-10 - 4 = -14$

2.104 $-15 - (-3) = -15 + 3 = -12$

2.105 $15 - (-15) = 15 + 15 = 30$

2.106 $12 - (-10) = 12 + 10 = 22$

2.107 $-6 - (-4) = -6 + 4 = -2$

2.108 $1 - (-3) = 1 + 3 = 4$

2.109 $3P - 4P = -1P = -P$

2.110 $7x - (-2x) = 7x + 2x = 9x$

2.111 $5x - (-8x) = 5x + 8x = 13x$

2.112 $-4x - (-8x) = -4x + 8x = 4x$

2.113 $6 - 5 = 1$

2.114 $10 - 12 = -2$

2.115 $13 - 20 = -7$

2.116 $6 - (-1) = 6 + 1 = 7$

2.117 $-8 - 4 = -12$

2.118 $-6 - 5 = -11$

2.119 $6x - 2x = 4x$

2.120 $8a - 4a = 4a$

2.121 $20 - (-12) = 20 + 12 = 32°$

2.122 $6 \cdot 5 = 30$

2.123 $8 \cdot 4 = 32$

2.124 $9 \cdot 6 = 54$

2.125 $4 \cdot 20 = 80$

2.126 $7 \cdot 32 = 224$

2.127 $8(-4) = -32$

2.128 $10(-2) = -20$

2.129 $3(-8) = -24$

2.130 $4(-7) = -28$

2.131 $5(-4) = -20$

2.132 $(-22)5 = -110$

2.133 $(-33)(4) = -132$

2.134 $(-8)(7) = -56$

2.135 $(-9)(7) = -63$

2.136 $(-11)(4) = -44$

2.137 $(-3)(-4) = 12$

2.138 $(-8)(-5) = 40$

2.139 $(-6)(-8) = 48$

2.140 $(-10)(-10) = 100$

2.141 $(-5)(-6) = 30$

2.142 $(6)(5)(4) = 120$

2.143 $(-7)(2)(3) = (-14)(3) = -42$

2.144 $(-9)(-8)(2) = 72 \cdot 2 = 144$

2.145 $(-3)(-4)(-5) = 12(-5) = -60$

2.146 $(-8)(-4)(-3) = 32(-3) = -96$

2.147 $(-5)(-6)(-2)(-1) = 30 \cdot 2 = 60$

2.148 $6(-3)(-4) = 6 \cdot 12 = 72$

2.149 $3.2(-5.6) = -17.92$

2.150 $8.34(-5.7) = -47.538$

2.151 $(-7.2)(3) = -21.6$

2.152 $\frac{1}{2} \cdot \frac{3}{4} = \frac{3}{8}$

2.153 $\frac{6}{5} \cdot \frac{5}{8} = \frac{6}{\cancel{5}_{1}} \cdot \frac{\cancel{5}^{1}}{8} = \frac{6}{8} = \frac{3}{4}$

2.154 $(-\frac{7}{8})(-\frac{3}{4}) = \frac{21}{32}$

2.155 $(-\frac{3}{10})(-\frac{5}{9}) = (-\frac{\cancel{3}^{1}}{\cancel{10}_{2}})(-\frac{\cancel{5}^{1}}{\cancel{9}_{3}}) = \frac{1}{6}$

2.156 $A^2 = 5^2 = 25$

2.157 $B^2 = (-4)^2 = 16$

2.158 $C^2 = 2^2 = 4$

2.159 $AB = (5)(-4) = -20$

2.160 $BC = (-4)(2) = -8$

2.161 $AC = 5 \cdot 2 = 10$

2.162 $3AB = 3(5)(-4) = 15(-4) = -60$

2.163 $A + B = 5 + (-4) = 1$

2.164 $2A - B = 2 \cdot 5 - (-4) = 10 + 4 = 14$

2.165 $C - 3B = 2 - 3(-4) = 2 + 12 = 14$

2.166 $B - C = -4 - 2 = -6$

2.167 $2B - 3C = 2(-4) - 3(2) =$
$-8 - 6 = -14$

2.168 $A^2 - B^2 = 5^2 - (-4)^2 =$
$25 - 16 = 9$

2.169 $A^2 + B^2 = 5^2 + (-4)^2 =$
$25 + 16 = 41$

2.170 $B^2 - C^2 = (-4)^2 - (2)^2 =$
$16 - 4 = 12$

2.171 $C^2 - B^2 = 2^2 - (-4)^2 =$
$4 - 16 = -12$

2.172 $(-A)^2 = (-5)^2 = 25$

2.173 $(-B)^2 = [-(-4)]^2 = 4^2 = 16$

2.174 $(-C)^2 = (-2)^2 = 4$

2.175 $B^3 = (-4)^3 = (-4)(-4)(-4) = -64$

2.176 $6 \div 3 = 2$

2.177 $8 \div 4 = 2$

2.178 $10 \div 5 = 2$

2.179 $12 \div 3 = 4$

2.180 $6 \div (-3) = -2$

2.181 $8 \div (-4) = -2$

2.182 $10 \div (-5) = -2$

2.183 $12 \div (-3) = -4$

2.184 $(-6) \div 3 = -2$

2.185 $(-8) \div 4 = -2$

2.186 $(-10) \div 5 = -2$

2.187 $(-12) \div (3) = -4$

2.188 $(-6) \div (-3) = 2$

2.189 $(-8) \div (-4) = 2$

2.190 $(-10) \div (-5) = 2$

2.191 $(-12) \div (-3) = 4$

2.192 $\frac{72}{-9} = -8$

2.193 $\frac{-93}{3} = -31$

2.194 $\frac{-80}{-20} = 4$

2.195 $\frac{-100}{-5} = 20$

2.196 $\frac{4x}{-2} = -2x$

2.197 $\frac{-8x}{4} = -2x$

2.198 $\frac{12x^2}{-4} = -3x^2$

2.199 $\frac{-18y}{-3} = 6y$

2.200 $\frac{M}{N} = \frac{10}{-5} = -2$

2.201 $M \cdot N = 10(-5) = -50$

2.202 $\frac{M}{P} = \frac{10}{-2} = -5$

2.203 $M \cdot P = 10(-2) = -20$

2.204 $M \cdot N \cdot P = 10(-5)(-2) =$

$10(10) = 100$

2.205 $\frac{M}{N \cdot P} = \frac{10}{(-5)(-2)} = \frac{10}{10} = 1$

2.206 $\frac{N}{M} = \frac{-5}{10} = -\frac{1}{2}$

2.207 $\frac{P}{M} = \frac{-2}{10} = -\frac{1}{5}$

2.208 $\frac{M^2}{P^2} = \frac{10^2}{(-2)^2} = \frac{100}{4} = 25$

2.209 $\frac{N^2}{P} = \frac{(-5)^2}{-2} = \frac{25}{-2} = \frac{-25}{2}$ or $-12\frac{1}{2}$

2.210 $\frac{P^3}{M} = \frac{(-2)^3}{10} = \frac{-8}{10} = -\frac{4}{5}$

2.211 $\frac{M \cdot N}{N} = \frac{10\ (-\cancel{5})^1}{-\cancel{5}_1} = 10$

Self Test Keys

SELF TEST 1

1.01 $22x + 33$

1.02 $60x - 48$

1.03 $24 - 16x$

1.04 $3x + 5$

1.05 $9x + 1$

1.06 $6(x + 2) + 7 =$
$6x + 12 + 7 =$
$6x + 19$

	Coefficient	Constant
1.07	a. 6	b. 5
1.08	a. 7	b. 2

	Base	Exponent
1.09	a. 5	b. 2
1.010	a. 8	b. 3
1.011	a. x	b. 2

1.012 $5^3 = 5 \cdot 5 \cdot 5 = 125$

1.013 $(3 + 4)^2 = 7^2 = 49$

1.014 $2^3 = 2 \cdot 2 \cdot 2 = 8$

1.015 $A^2 + B^2 =$
$2^2 + 3^2 = 4 + 9 = 13$

1.016 $N^2 + 2N + 1 =$
$5^2 + 2 \cdot 5 + 1 =$
$25 + 10 + 1 =$
36

1.017 $8x^2$

1.018 $3^2 - 5x$

1.019 the sum of the cube of x and 4

1.020 the difference between 5 times a number and 2

1.021 15% of 63 =
(0.15) (63) = 9.45

1.022 $\frac{5}{8} + \frac{7}{12} = \frac{15}{24} + \frac{14}{24} = \frac{29}{24}$ or $1\frac{5}{24}$

1.023 (0.56) (2.36) = 1.3216

1.024 $\frac{19}{8} \cdot \frac{23}{4} = \frac{437}{32}$ or $13\ \frac{21}{32}$

SELF TEST 2

2.01 3 + (-4) = -1

2.02 5 – (-8) = 5 + 8 = 13

2.03 -4 + (-10) = -4 – 10 = -14

2.04 (-1) + 1 = 0

2.05 (-6)(4) = -24

2.06 (-4)(-5) = 20

2.07 (23)(5) = 115

2.08 (-43)(-3) = 129

2.09 27 ÷ (-3) = -9

2.010 (-50) ÷ (-2) = 25

2.011 (-10) ÷ (-20) = $\frac{1}{2}$

2.012 $15N \div (-3) = -5N$

2.013 (-8) + (-2) + 5 = -10 + 5 = -5

2.014 (-2) + (-2) + (-2) = 3(-2) = -6

2.015 5 – 3 + 3 – 5 = 2 + (-2) = 0

2.016 8 – (-2) = 8 + 2 = 10

2.017 -10 – (-4) = -10 + 4 = -6

2.018 15 – 11 = 4

2.019 27 – (-9) = 27 + 9 = 36

2.020 $A^2 = 5^2 = 25$

2.021 $5B^2 = 5(-2)^2 = 5(4) = 20$

2.022 $C^3 = 4^3 = 64$

2.023 $AB = 5(-2) = -10$

2.024 $DC = (-6)(4) = -24$

2.025 $A + B + C = 5 + (-2) + 4 =$

$3 + 4 = 7$

2.026 $C + D - B = 4 + (-6) - (-2) =$

$-2 + 2 = 0$

2.027 $\frac{ACD}{B} = \frac{5(4)(-6)}{-2} = \frac{20(-6)}{-2} = \frac{-120}{-2} = 60$

2.028 $A^2 - B^2 = 5^2 - (-2)^2 = 25 - 4 = 21$

2.029 $A^3 = 5^3 = 125$

2.030 $6DC = 6(-6)(4) = (-36)(4) = -144$

2.031 $C^2 + 2C + 1 = 4^2 + 2(4) + 1$

$= 16 + 8 + 1 = 25$

2.032 $\frac{AB}{CD} = \frac{5(-2)}{4(-6)} = \frac{-10}{-24} = \frac{5}{12}$

2.033 $B^C = (-2)^4 = 16$

	Base	Exponent
2.034	a. 6	b. 4
2.035	a. P	b. 2
2.036	a. x	b. 5
2.037	a. x	b. t
	Coefficient	Constant
2.038	a. 3	b. 6
2.039	a. 5	b. -8
2.040	a. 5	b. 0
2.041	a. 6	b. 10

2.042 $6(x + 8) = 6x + 48$

2.043 $3(x^2 - 1) = 3x^2 - 3$

2.044 $-4(N + 9) = -4N - 36$

2.045 $5(-8 + P) = -40 + 5P$

2.046 $x + x = 2x$

2.047 $3N + 4N = 7N$

2.048 $5R - 2R = 3R$

2.049 $3P + 5P = 8P$

2.050 the sum of the cube of N and 6

2.051 the sum of 2 times p and 3 times q

2.052 $2N^3$

2.053 $5^2 + 7P$ or $25 + 7P$

2.054 $x^2 - x^3$

Test Keys

1. $(-5) + (-4) + (7) = -9 + 7 = -2$

2. $6 - 2 + 5 - 8 - 10 = -9$

3. $6(-5) = -30$

4. $7 - (-4) + 3(-6) = 7 + 4 - 18 = -7$

5. $18 \div (-6) = -3$

6. $-72 \div (-4) = 18$

7. $xyz = 10(-5)(-2) = 10(10) = 100$

8. $x^2 + 2yz = 10^2 + 2(-5)(-2) =$
   $100 + 20 = 120$

9. $x^2 + y^2 + z^2 = 10^2 + (-5)^2 +$
   $(-2)^2 = 100 + 25 + 4 = 129$

10. $\frac{x^2}{y} + \frac{x^2}{z} = \frac{10^2}{-5} + \frac{10^2}{-2} = \frac{100}{-5} +$
    $\frac{100}{-2} = -20 + (-50) = -70$

11. 4

12. -3

13. $5x^3$

14. 5

15. $7(x + 3) = 7x + 21$

16. $10q - 20 = 10(q - 2)$

17. the difference between 5 times a number x and 7

18. $5x^2 - 2x$

19. $6x + 6 + 5x - 8 =$
    $6x + 5x + 6 - 8 =$
    $11x - 2$

20. $3(x - 4) + 8(x + 2) =$
    $3x - 12 + 8x + 16 =$
    $3x + 8x - 12 + 16 =$
    $11x + 4$

1. $6 + (-4) - 3$
$= 6 - 4 - 3$
$= 6 - 7$
$= -1$

2. -9

3. -72

4. $9 - 12 + 3(-6)$
$= -3 - 18$
$= -21$

5. $28 \div (-7) - 4$
$= -4 - 4$
$= -8$

6. 7

7. $(8)(-4)(-2) = 64$

8. $8^2 - (-4)^2 - (-2)^2$
$= 64 - 16 - 4$
$= 64 - 20$
$= 44$

9. $8 + (-4) - (-2)$
$= 8 - 4 + 2$
$= 4 + 2$
$= 6$

10. $\frac{8^2}{(-4)^2} + \frac{(-4)^2}{(-2)^2}$
$= \frac{64}{16} + \frac{16}{4}$
$= 4 + 4$
$= 8$

11. 10

12. 3

13. p^2

14. 3

15. $-3P$

16. $(x + 15)5$
$= 5(x) + 5(15)$
$= 5x + 75$

17. $5n^3 + 7n$

18. The difference between the square of a number and 7 times that number.

19. $12P - 13 - 8P - 10$
$= 12P - 8P - 13 - 10$
$= 4P - 23$

20. $15(x - 2) + 3(5 - 10x)$
$= 15x - 30 + 15 - 30x$
$= 15x - 30x - 30 + 15$
$= -15x - 15$

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