

Grade 8 Math

St. Thomas High School

MIDTERM REVIEW PACKAGE

Name: _____

Teacher: _____

Exam Date & Time: _____

Remember to bring (IN A CLEAR ZIPLOCK):

- pencils, eraser, sharpener, ruler, highlighters
- calculator
- Memory aid (8 1/2 by 11" page single-sided/hand-written, **name in the top right hand corner**)

BREAKDOWN OF EXAM

The exam will consist of

- 6 multiple choice (4 marks each),
- 4 short answer (4 marks each), and
- 6 long answer questions (10 marks each)

TOPICS

1. Numeracy (Review)

- Order of Operations with Integers
- Order of Operations with Fractions

2. Algebra Basics

- Terminology: Constant, Variable, Coefficient, Degree
- Adding and Subtracting Monomials
- Multiplying and Dividing monomials
- The Distributive Property - Multiplying & Dividing a Polynomial by a Monomial
- Substitutions in Algebraic Expressions
- Translating Words into Algebraic Expressions
- Algebraic Expressions in Geometry Problems

3. Equations

- Translating Words into Equations with One Unknown
- Properties of Equations
- Solving Simple Equations (one or two step)
- Solving Simple Equations Using the Distributive Property
- Solving Equations with Variables on Both Sides
- Solving Equations with Fractions
- Solving Word Problems

4. Pattern Rules - Representing a Situation

- Identifying Variables and Constants
- Identifying Dependent and Independent Variables
- Identifying Points on the Cartesian Plane
- Using a Table of Values to Find a Rule
- Using a Graph to Find a Rule / Graph to Table of Values
- Graphing Linear Relations to Model Real Life Situations
- Linear Relation Word Problems

Note: Any material from previous years (i.e. integers, fractions, types of angles, ...) may also be involved.

Midyear Review Part I

Evaluate each expression.

1) $\frac{1}{2} \div \left(\frac{6}{5} + \frac{1}{4}\right)$

2) $2 - \left(2 - \frac{1}{3}\right)$

3) $2 + \frac{1}{4} + 2 \cdot \frac{3}{2}$

4) $\left(\frac{1}{4}\left(1 + \frac{1}{3}\right)\right) \div 2$

5) $5 \div \left(\frac{4}{3} + \frac{5}{6} - 1\right) - \frac{4}{3}$

6) $6 + \frac{1}{5} - \frac{5}{6} \div \left(\frac{3}{2} \cdot \frac{5}{3}\right)$

7) $\left(\frac{1}{2} + \frac{3}{4}\left(\frac{5}{3} + \frac{4}{3} - \frac{7}{5}\right)\right) \cdot 2$

8) $\frac{3}{4} \cdot 2 \cdot \left(\frac{3}{2} - \left(\frac{1}{2} - \frac{1}{3}\right)\right) \cdot \frac{3}{2}$

9) $\left(\frac{1}{6} - \frac{3}{4}\right) \cdot -6$

10) $\frac{-\frac{7}{5}}{\frac{5}{3}} \cdot \frac{9}{5}$

11) $\frac{1 - \frac{4}{3}}{-2} + 1$

12) $2 - -1 + -\frac{1}{4} + 2$

Evaluate each using the values given.

13) $m(q + m)(-6 + q)$; use $m = 2$, and $q = 2$

14) $y + x - x - (y - x)$; use $x = -6$, and $y = 6$

15) $p + 5 + n + n + n + n$; use $n = 6$, and $p = -2$

16) $(-1 + y + z)(x - y + y)$; use $x = 2$, $y = 5$, and $z = -2$

17) $(x - y)(-2 - (yx - x))$; use $x = \frac{2}{3}$, and $y = \frac{1}{2}$

18) $jh(3h - (h + h))$; use $h = -\frac{3}{2}$, and $j = -\frac{3}{2}$

19) $\frac{2}{(ac)^3} + c + a$; use $a = -\frac{3}{2}$, and $c = -\frac{1}{2}$

20) $(n)\left(\frac{n + m - m}{n^2}\right)$; use $m = 1$, and $n = -\frac{3}{2}$

Simplify each expression.

21) $(7m^4 + 1) + (4 - 7m^4)$

22) $(r^2 + 6r^4) + (4r^4 + 2r^2)$

23) $(-3n^2 - n^3) + (-8 + 5n^3)$

24) $(8k^2 - 6k^3) - (-6k^2 + 6k^3)$

25) $-2x + 2x^4 + 5x - 4x^4 + 5x - 4x^4$

26) $8m^4 - 8m^3 + 3m^3 + 7m^2 - 8m^3 - 2m^2$

27) $(-3n + 2n^4) + (3n^2 + 3) + (8n^4 - 5n^2)$

28) $(6x^2 - 8) - (-2 - 3x^2) - (-5x^2 + 7)$

29) $(2y^4 + 7x^3y^2) + (8 - 4x^3y^2) + (-8 - 4y^4)$

30) $(-2n^3 + mn^2) - (-5n^4 - 2mn^2) - (-8mn^2 + 7n^4)$

Simplify. Your answer should contain only positive exponents.

31) $3x^3 \cdot 7x^4$

32) $6v^4 \cdot v^2$

33) $8x \cdot 3x^2$

34) $7m^2 \cdot 6m^3$

35) $\frac{7b^2}{6b^3}$

36) $\frac{4r^3}{3r^3}$

37) $\frac{2x}{3x^3}$

38) $\frac{3k^3}{k^3}$

39) $3y^2 \cdot 5x^3$

40) $y^3 \cdot 5yx^4 \cdot 7x^2y^3$

41) $3u^3 \cdot 3v^4$

42) $7x^4y^2 \cdot 6xy$

43) $\frac{8x^3}{5xy^2}$

44) $\frac{3x^4y^2}{6yx^4}$

45) $\frac{6yx^2}{4y^4}$

46) $\frac{5m^4n^2}{4m^3n^2}$

47) $\frac{7ba^4}{7a^2b^3 \cdot 7ab^3}$

48) $\frac{x^3y^4 \cdot 4x^4y^4}{5x^2y^2}$

49) $\frac{7v^4}{8u \cdot 3u^2}$

50) $\frac{8a^3b^4 \cdot 6a^4}{8ba^3}$

Find each product.

51) $-7(2x - 3)$

52) $8x^3(-5x - 3)$

53) $3k^2(3k - 6)$

54) $8(-6m + 2)$

55) $-4(8p^2 + 7p + 5)$

56) $8(-x^2 + 7x + 7)$

57) $-5p^2(2p^2 - 7p - 6)$

58) $4(-5p^2 + 3p + 3)$

59) $7(-4x + 5)$

60) $-4(2r + 2)$

61) $6(7x + 1)$

62) $-(5m - 3)$

63) $5x^4(6x^2 - 2x - 6)$

64) $6a(5a^2 + 8a - 6)$

65) $-6n^3(2n^2 + 7n - 4)$

66) $-7(-2k^2 - 6k + 2)$

Write each as an algebraic expression.

67) c divided by 4

68) 4 cubed

69) the sum of 10 and n

70) half of n

71) the sum of 7 and 5

72) 8 squared

73) u increased by 5

74) the product of 8 and 11

75) the sum of 12 and 7

76) twice 5

77) n minus 10

78) n squared

79) n divided by 8

80) the sum of 11 and 12

81) twice n

82) 11 plus t

83) 7 more than 11

84) 30 minus z

85) 8 increased by 10

86) 7 more than v

Write each as an algebraic equation.

87) c increased by 6 is 21

88) twice n is 27

89) the product of a and 8 is 8

90) the product of n and 11 is 9

91) the quotient of m and 3 is 8

92) v decreased by 9 is 20

93) n divided by 5 is equal to 24

94) the n power of 12 is 18

95) n minus 25 is equal to 11

96) the quotient of x and 7 is 42

97) 4 to the x is equal to 27

98) v squared is equal to 15

99) 28 less than p is equal to 13

100) n increased by 10 is equal to 5

101) x minus 9 is 21

102) n divided by 3 is 7

103) the sum of n and 7 is equal to 17

104) c plus 11 is equal to 24

105) n times 6 is 39

106) q times 10 is 32

107) Rob had some candy to give to his three children. He first took ten pieces for himself and then evenly divided the rest among his children. Each child received five pieces. With how many pieces did he start?

108) How old am I if 400 reduced by 3 times my age is 181?

- 109) Ashley spent half of her weekly allowance on candy. To earn more money her parents let her wash the dog for \$9. What is her weekly allowance if she ended with \$15?
- 110) Julia had some paper with which to make note cards. On her way to her room she found five more pieces to use. In her room she cut each piece of paper in half. When she was done she had 26 half-pieces of paper. With how many sheets of paper did she start?
- 111) Eugene had some candy to give to his three children. He first took four pieces for himself and then evenly divided the rest among his children. Each child received five pieces. With how many pieces did he start?
- 112) Dan won 64 super bouncy balls playing the bean bag toss at the county fair. At school he gave two to every student in his math class. He only has 10 remaining. How many students are in his class?
- 113) The sum of three consecutive even numbers is 42. What is the smallest of these numbers?
- 114) Sarawong sold half of his comic books and then bought six more. He now has 32. With how many did he begin?
- 115) Elisa won 81 lollipops playing horseshoes at her school's game night. Later, she gave three to each of her friends. She only has 9 remaining. How many friends does she have?
- 116) The sum of three consecutive even numbers is 84. What is the smallest of these numbers?
- 117) How old am I if 400 reduced by 4 times my age is 128?
- 118) Natalie won 91 lollipops playing basketball at her school's game night. Later, she gave three to each of her friends. She only has 7 remaining. How many friends does she have?
- 119) How old am I if 500 reduced by 3 times my age is 278?
- 120) The Cooking Club made some pies to sell during lunch to raise money for an end-of-year banquet. The cafeteria contributed two pies to the club. Each pie was then cut into seven pieces and sold. There were a total of 77 pieces to sell. How many pies did the club make?
- 121) Alberto sold half of his comic books and then bought nineteen more. He now has 43. With how many did he begin?
- 122) The Cooking Club made some pies to sell during lunch to raise money for an end-of-year banquet. The cafeteria contributed four pies to the club. Each pie was then cut into eight pieces and sold. There were a total of 112 pieces to sell. How many pies did the club make?

123) James rented a bike from Jimmy's Bikes. It cost \$19 plus \$4 per hour. If James paid \$35, then he rented the bike for how many hours?

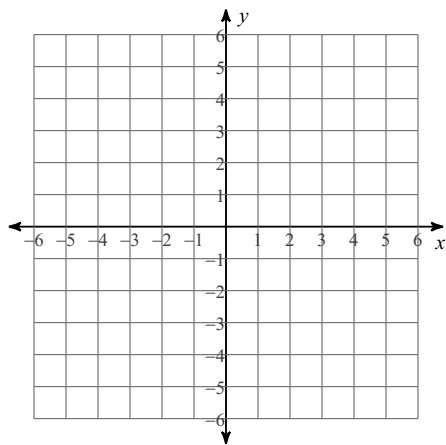
124) You bought a magazine for \$7 and four candy bars. You spent a total of \$23. How much did each candy bar cost?

125) Half of your baseball card collection got wet and was ruined. You bought 14 cards to replace some that were lost. How many did you begin with if you now have 36?

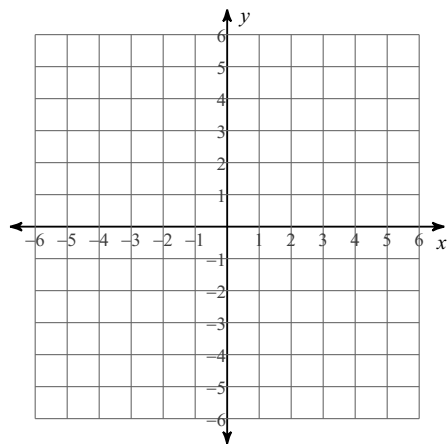
126) Jasmine had \$24 to spend on five pencils. After buying them she had \$14. How much did each pencil cost?

Graph of each line - begin by making a table of values.

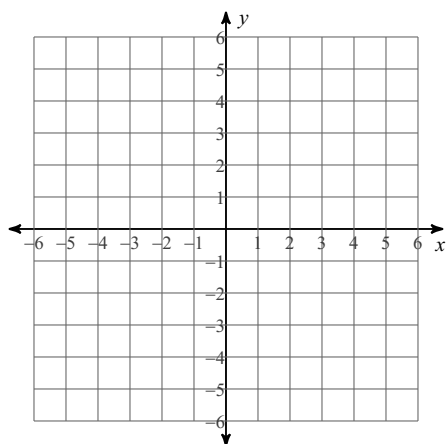
127) $y = \frac{3}{2}x + 5$



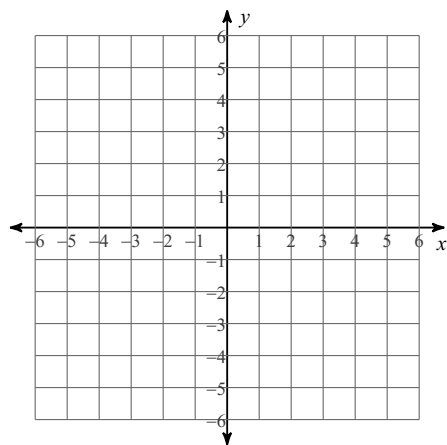
128) $y = \frac{2}{3}x - 1$



129) $y = x - 4$



130) $y = \frac{5}{4}x - 3$



Midyear Review Part II

Simplify each expression.

1) $5(1 + 5x) - 2$

2) $-9v + 5(v - 10)$

3) $-7 + 2(n + 4)$

4) $2(2r - 3) - 5r$

5) $-7 - 3(1 - 5k)$

6) $2 + 6(8r + 4)$

7) $3p^2 - 3p(4 - 6p)$

8) $-9k - 4k(-5k + 7)$

9) $-7p - 3(1 + 4p)$

10) $-10b - 10(5b - 9)$

11) $-10x - 3(9x - 7)$

12) $-4(-9p + 8) - 8p$

13) $-10(7x - 8) - 9(6 + 6x)$

14) $-(5 + 2r) - 4(1 - 10r)$

15) $-5(2x + 3) - 10(x - 8)$

16) $-4(r + 1) - 3(6r + 9)$

17) $-9(6m - 10) - 10(9 - 8m)$

18) $-2(-10 - 7p) - 2(-9p + 1)$

19) $-10(1 + 9x) - 2(2x + 1)$

20) $-(4 - 9a) - 9(4a + 9)$

21) $-(1 - 5x) - 4(x + 7)$

22) $-4(3 - 3n) - 9(n - 10)$

23) $-2(4x - 9) - 7(10 + 4x)$

24) $-6(1 - 4b) - 3(9b + 10)$

25) $-5(3 + 3n) - 9(10 - n)$

26) $-5(-2b + 6) - 9(b + 5)$

27) $-2(6 - 9r) - 3(6 + 3r)$

28) $-9(2n + 3) - 9(n + 10)$

29) $-(3 + 4p) - 6(1 - 6p)$

30) $-9(3 + 10p) - 4(3 - p)$

Grade 8 Math – Midterm Review Part III: Perimeter and Area Questions & Finding the Rule

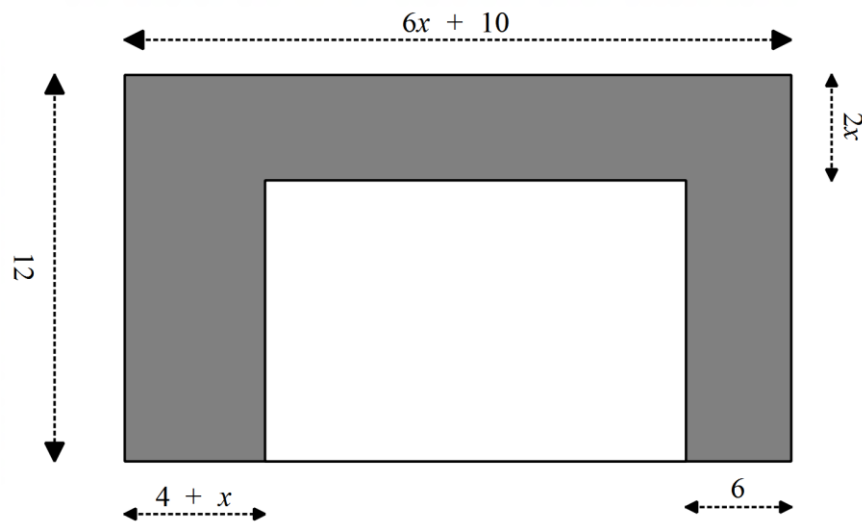
Name: _____

1. For each of the following determine a simplified algebraic expression for the perimeter AND the area:

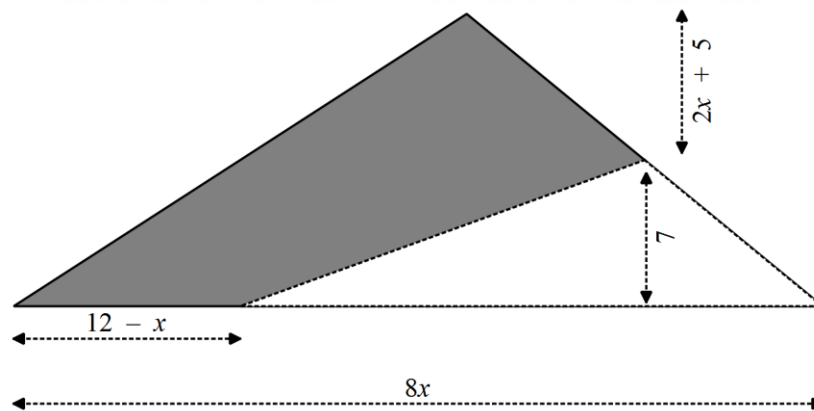
- a) A rectangle whose length is 3 less than twice its width. Let the width = x .
- b) A rectangle whose width is 30 less than its length. Let the length = x .
- c) An equilateral triangle whose side length is 4 more than its height. Let the height = x .

2. Determine the simplified algebraic expression for the area of each shaded region:

a)



b)



3. Determine the dimensions of each of the following shapes:
- a) A rectangle whose width measures 5 less than its length and whose perimeter is 12 cm.
- b) An isosceles triangle whose sides each measure 3 more than twice its base and whose perimeter is 14 cm.
- c) A rectangle whose length is 24 more than 6 times its width and whose perimeter is 83 cm.

4. Find the rule

a)

x	y
2	6
3	3
4	0
5	-3
6	-6
7	-9

b)

x	y
2	12
3	8
4	4
5	0
6	-4
7	-8

c)

x	y
2	50
4	25
5	20
10	10
20	5
50	2

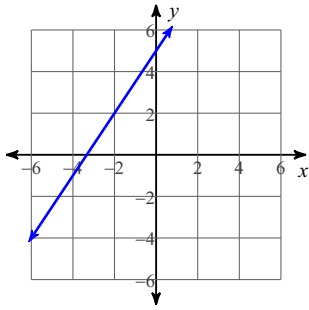
d)

x	y
-2	12
-1	3
0	0
1	3
2	12
3	27

Answers to Midyear Review Part I (ID: 1)

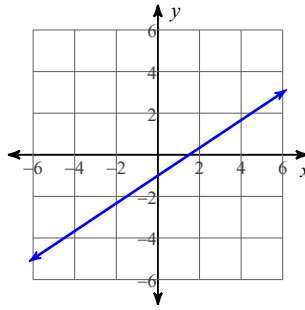
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|------------------------------|-----------------------------|------------------------------|-----------------------|
| 1) $\frac{10}{29}$ | 2) $\frac{1}{3}$ | 3) $\frac{21}{4}$ | 4) $\frac{1}{6}$ |
| 5) $\frac{62}{21}$ | 6) $\frac{88}{15}$ | 7) $\frac{17}{5}$ | 8) 3 |
| 9) $\frac{7}{2}$ | 10) $-\frac{189}{125}$ | 11) $\frac{7}{6}$ | 12) $\frac{19}{4}$ |
| 13) -32 | 14) -6 | 15) 27 | 16) 4 |
| 17) $-\frac{5}{18}$ | 18) $-\frac{27}{8}$ | 19) $\frac{74}{27}$ | 20) 1 |
| 21) 5 | 22) $10r^4 + 3r^2$ | 23) $4n^3 - 3n^2 - 8$ | 24) $-12k^3 + 14k^2$ |
| 25) $-6x^4 + 8x$ | 26) $8m^4 - 13m^3 + 5m^2$ | 27) $10n^4 - 2n^2 - 3n + 3$ | |
| 28) $14x^2 - 13$ | 29) $3x^3y^2 - 2y^4$ | 30) $-2n^4 + 11mn^2 - 2n^3$ | |
| 31) $21x^7$ | 32) $6v^6$ | 33) $24x^3$ | 34) $42m^5$ |
| 35) $\frac{7}{6b}$ | 36) $\frac{4}{3}$ | 37) $\frac{2}{3x^2}$ | 38) 3 |
| 39) $15y^2x^3$ | 40) $35y^7x^6$ | 41) $9u^3v^4$ | 42) $42x^5y^3$ |
| 43) $\frac{8x^2}{5y^2}$ | 44) $\frac{y}{2}$ | 45) $\frac{3x^2}{2y^3}$ | 46) $\frac{5m}{4}$ |
| 47) $\frac{a}{7b^5}$ | 48) $\frac{4x^5y^6}{5}$ | 49) $\frac{7v^4}{24u^3}$ | 50) $6a^4b^3$ |
| 51) $-14x + 21$ | 52) $-40x^4 - 24x^3$ | 53) $9k^3 - 18k^2$ | 54) $-48m + 16$ |
| 55) $-32p^2 - 28p - 20$ | 56) $-8x^2 + 56x + 56$ | 57) $-10p^4 + 35p^3 + 30p^2$ | |
| 58) $-20p^2 + 12p + 12$ | 59) $-28x + 35$ | 60) $-8r - 8$ | 61) $42x + 6$ |
| 62) $-5m + 3$ | 63) $30x^6 - 10x^5 - 30x^4$ | 64) $30a^3 + 48a^2 - 36a$ | |
| 65) $-12n^5 - 42n^4 + 24n^3$ | 66) $14k^2 + 42k - 14$ | 67) $\frac{c}{4}$ | |
| 68) 4^3 | 69) $10 + n$ | 70) $\frac{n}{2}$ | 71) $7 + 5$ |
| 72) 8^2 | 73) $u + 5$ | 74) $8 \cdot 11$ | 75) $12 + 7$ |
| 76) $2 \cdot 5$ | 77) $n - 10$ | 78) n^2 | 79) $\frac{n}{8}$ |
| 80) $11 + 12$ | 81) $2n$ | 82) $11 + t$ | 83) $11 + 7$ |
| 84) $30 - z$ | 85) $8 + 10$ | 86) $v + 7$ | 87) $c + 6 = 21$ |
| 88) $2n = 27$ | 89) $a \cdot 8 = 8$ | 90) $n \cdot 11 = 9$ | 91) $\frac{m}{3} = 8$ |
| 92) $v - 9 = 20$ | 93) $\frac{n}{5} = 24$ | 94) $12^n = 18$ | 95) $n - 25 = 11$ |
| 96) $\frac{x}{7} = 42$ | 97) $4^x = 27$ | 98) $v^2 = 15$ | 99) $p - 28 = 13$ |
| 100) $n + 10 = 5$ | 101) $x - 9 = 21$ | 102) $\frac{n}{3} = 7$ | 103) $n + 7 = 17$ |
| 104) $c + 11 = 24$ | 105) $n \cdot 6 = 39$ | 106) $q \cdot 10 = 32$ | 107) 25 |
| 108) 73 | 109) \$12 | 110) 8 | 111) 19 |
| 112) 27 | 113) 12 | 114) 52 | 115) 24 |
| 116) 26 | 117) 68 | 118) 28 | 119) 74 |

120) 9
124) \$4
127)



121) 48
125) 44

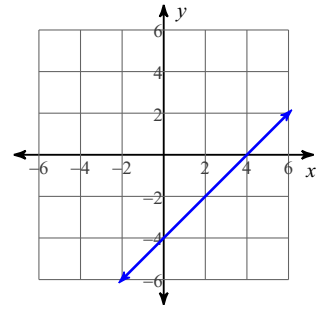
128)



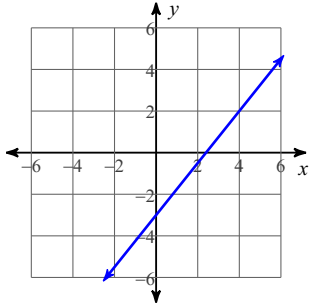
122) 10
126) \$2

123) 4

129)



130)



Answers to Midyear Review Part II (ID: 1)

- | | | | |
|------------------|-----------------|------------------|-------------------|
| 1) $3 + 25x$ | 2) $-4v - 50$ | 3) $1 + 2n$ | 4) $-r - 6$ |
| 5) $-10 + 15k$ | 6) $26 + 48r$ | 7) $21p^2 - 12p$ | 8) $-37k + 20k^2$ |
| 9) $-19p - 3$ | 10) $-60b + 90$ | 11) $-37x + 21$ | 12) $28p - 32$ |
| 13) $-124x + 26$ | 14) $-9 + 38r$ | 15) $-20x + 65$ | 16) $-22r - 31$ |
| 17) $26m$ | 18) $18 + 32p$ | 19) $-12 - 94x$ | 20) $-85 - 27a$ |
| 21) $-29 + x$ | 22) $78 + 3n$ | 23) $-36x - 52$ | 24) $-36 - 3b$ |
| 25) $-105 - 6n$ | 26) $b - 75$ | 27) $-30 + 9r$ | 28) $-27n - 117$ |
| 29) $-9 + 32p$ | 30) $-39 - 86p$ | | |

ANSWERS TO MIDTERM REVIEW PART III:

1. a)

$$P: 6x - 6$$

$$A: 4x^2 - 6x$$

b)

$$P: 4x - 60$$

$$A: 2x^2 - 60x$$

c)

$$P: 3x + 12$$

$$A: \frac{x^2 + 4x}{2}$$

2. a) $A: 10x^2 + 12x + 120$

b) $A: 16x^2 + 33x + 84$

3. a) $\frac{1}{2}$ by $11\frac{1}{2}$ cm b) base is $\frac{8}{5}$ and sides measure $31\frac{1}{5}$ cm c) $\frac{5}{2}$ by 39 cm

4. a) $y = -3x + 12$

b) $y = -4x + 20$

c) $y = 100/x$

d) $y = 3x^2$