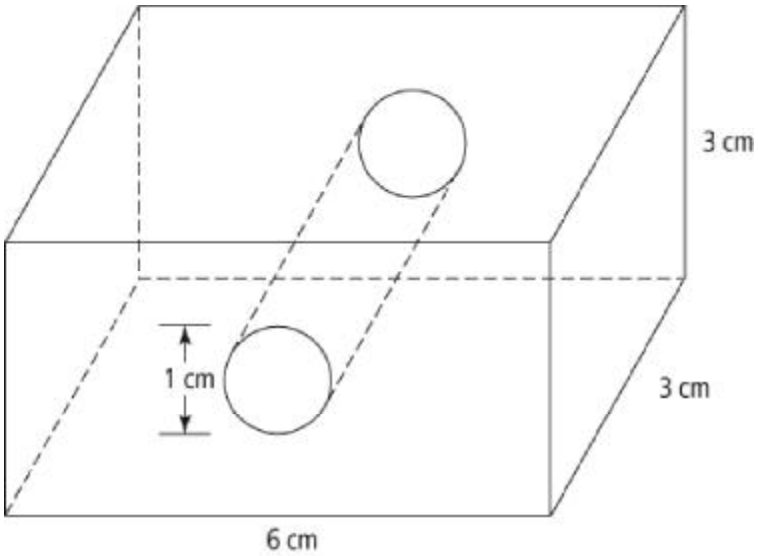
Name: _____ **Class:** _____ **Date:** _____ **ID: A**

Midterm Review Package

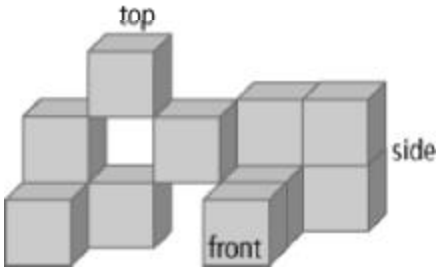
Multiple Choice
Identify the choice that best completes the statement or answers the question.

1. In the figure shown below, the hole in the front surface extends straight through the object. The total surface area of the figure is



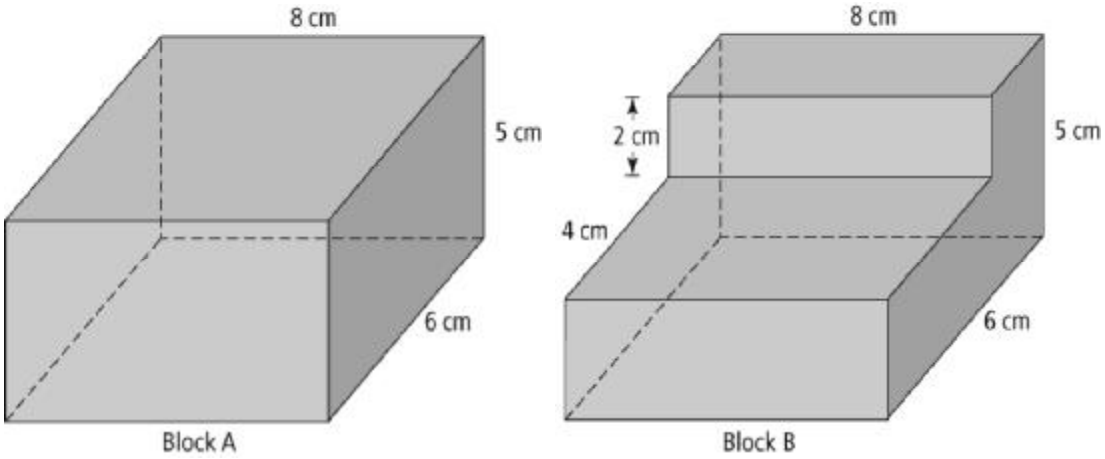
A) 82.15 cm^2 B) 88.43 cm^2 C) 97.85 cm^2 D) 99.42 cm^2

2. Each of the 12 identical cubes in the object has dimensions of 2 cm. What is the exposed surface area of the object, excluding the base?



A) 47 cm^2 B) 94 cm^2 C) 414 cm^2 D) 188 cm^2

3. Compare the total surface area of Block A to Block B. Which statement is correct?



A) The surface area of Block A is equal to that of Block B B) The surface area of Block A is greater than that of Block B C) The surface area of Block B is greater than that of Block A D) The surface area of Block B cannot be determined

4. What is $\frac{20}{27} \div \frac{5}{9}$?

A) $\frac{3}{2}$ B) $\frac{4}{3}$ C) $\frac{3}{4}$ D) $\frac{2}{3}$

5. Evaluate $\frac{11}{21} + \frac{1}{3}$.

A) $\frac{13}{14}$ B) $\frac{6}{7}$ C) $\frac{3}{4}$ D) $\frac{2}{3}$

6. Julia had $\frac{5}{6}$ of a pizza left over from a party. She gave Brooke $\frac{2}{5}$ of the leftover pizza. How much of the original pizza did Julia give to Brooke?

A) $\frac{7}{30}$ B) $\frac{1}{3}$ C) $\frac{7}{11}$ D) $\frac{2}{3}$

7. What is the side length of a square with an area of 196 m^2?

A) 9 m B) 14 m C) 49 m D) 98 m

8. A square picture has an area of 110.25 cm^2. To create a border, the picture is centred on a square mat with an area of 331.24 cm^2. Determine the width of mat around the picture.

A) 1.28 cm B) 3.85 cm C) 14.87 cm D) 55.25 cm

9. A colony of 500 bacteria triples in size every 1.5 h. Determine the size of the colony after 6 h.

A) 2598 B) 3000 C) 20 250 D) 40 500

10. Which powers are equal in value? -32^2, 4^6, $(-5)^4$, 2^{10}

A) 4^6 and $(-5)^4$ B) $(-5)^4$ and 2^{10} C) -32^2 and 2^{10} D) -32^2 and 4^6

11. What is the degree of the term $9s^4t^3$?

A) 3 B) 4 C) 7 D) 9

12. The degree of the polynomial $5m^4 + 2m^3 - m^2 + 3m + 7$ is
A) 2 B) 3 C) 4 D) 10

13. The model shown below can be represented by the polynomial

A) $3z^2 + 7z + 2$ B) $2z^2 + 5z - 2$ C) $-z^2 - 3z - 2$ D) $z^2 + 3z - 2$

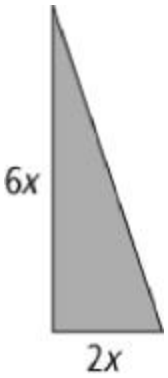
14. In the expression $2y^3 + 4y - 5$, the 2 is a(n)
A) coefficient B) exponent C) term D) variable

15. In the expression $3d^4 + 5d^2 - 15$, the d is a(n)
A) coefficient B) exponent C) term D) variable

16. Simplify the following expression by grouping like terms. $8q - 2q^2 + 3q - 6 + 5q^2 - 4q + 4 + 3q^2 - 2 - 2q$
A) $10q^2 - 15q - 8$ B) $3q^2 + 11q - 8$ C) $10q^2 + 17q - 12$ D) $6q^2 + 5q - 4$

17. Subtract the following polynomials. $(7j^2 - 2j) - (-4j + 5)$
A) $7j^2 + 4j - 5$ B) $7j^2 + 2j - 5$ C) $7j^2 - 2j - 5$ D) $7j^2 + 6j + 5$

18. What is the area of the triangle shown below?

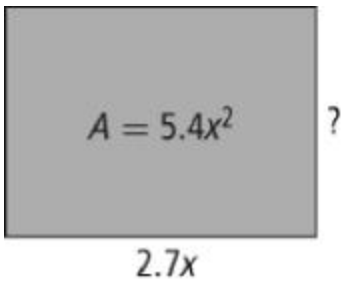


A) $3x$ B) $3x^2$ C) $6x^2$ D) $12x^2$

19. Which expression represents $\left(\frac{2}{3}\right)^2 (3x)$ in simplified form?
A) $\frac{4}{3}x$ B) $2x$ C) $4x$ D) $\frac{27}{2}x$

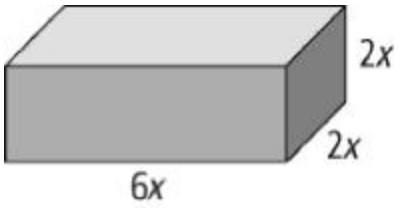
20. Determine the simplified form of the expression $(3xy)(2x)$.
A) $6xy$ B) $5x^2y$ C) $6x^2y$ D) $1.5xy^2$

21. Determine the missing dimension of the rectangle below.



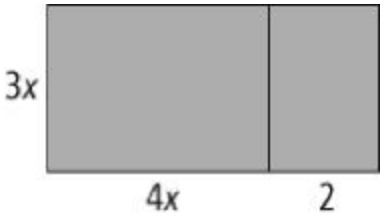
A) $0.5x$ B) $2x$ C) $2.7x^2$ D) $14.58x^3$

22. What is the volume of this rectangular prism?



A) 24 B) $-24x$ C) $-24x^2$ D) $24x^3$

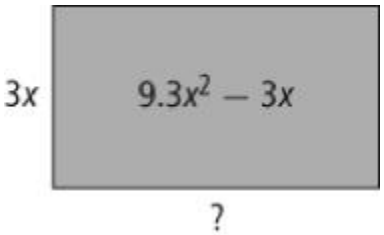
23. Which multiplication statement is represented by the area model below?



A) $(3x)(4x+2) = 12x^2 + 6x$ B) $(3x)(4x-2) = 12x^2 - 6x$ C) $(3x)(4x+2) = 7x+2$ D) $(3x)(4x-2) = 7x-2$

24. Use the distributive property to expand $(5.2x)(-3x+2)$.
A) $15.6x^2 - 10.4x$ B) $15.6x^2 + 10.4x$ C) $-15.6x^2 + 10.4x$ D) $-15.6x + 10.4$

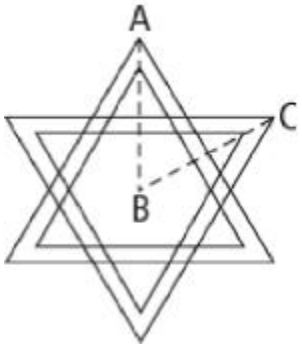
25. What is the unknown dimension of the rectangle shown below?



A) $3.1x + 1$ B) $3.1x - 1$ C) $3.1x$ D) 3.1

Completion
Complete each statement.

26. The dashed lines show the angle formed at the centre and between adjacent vertices. ∠ABC is called _____.



27. The measurement of the angle of rotation for the figure is _____.

28. Rational numbers are numbers that can be written in the form $\frac{a}{b}$, where a and b are _____.

29. Written as a mixed number, $-\frac{17}{5}$ is _____.

30. A perfect square can be expressed as the _____ of two equal rational factors.

31. Simplify the following by combining like terms.
$-5d + 4 + 7d - 2$

32. Simplify the following by combining like terms.
$2w^2 - 2w + 4 + 3w^2 + 3w - 9$

33. Subtract and simplify by combining like terms.
$(3q^2 - 2q - 2) - (-2q^2 - 5q - 6)$

34. The product of $3.6x$ and $-2x$ is _____.

35. The quotient of $\frac{4.8t^2 - 7.2t + 24}{2.4}$ is _____.

Matching

Match the correct term to each of the following descriptions. A term may be used more than once or not at all.

A) angle of rotation
B) centre of rotation
C) line of symmetry
D) mirror line
E) order of rotation
F) rotation symmetry

36. a figure may have one or more of these, or it may have none at all
37. occurs when a shape or design can be turned about its centre of rotation so that it fits onto its outline more than once in a complete turn
38. the minimum number of degrees or fractions of a turn needed to turn a shape or design onto itself
39. the number of times a shape or design fits onto itself in one turn
40. the point about which the rotation of an object or design turns

Match the correct term to each of the following descriptions. A term may be used more than once or not at all..

A) square root
B) rational number
C) perfect square
D) non-perfect square
E) mixed number
F) improper fraction

41. a number of the form $\frac{a}{b}$, where a and b are integers and $b \neq 0$
42. a rational number that cannot be expressed as the product of two equal rational factors
43. a fraction such as $\frac{11}{3}$
44. a factor that multiplies by itself to give that number
45. a fraction such as $3\frac{2}{3}$

Match the correct answer to the expression in each question. An answer may be used more than once or not at all.

A) 7^6
B) 4^3
C) 3^4
D) 140
E) 134
F) 9

46. $\left(2^2\right)^3$
47. $3^6 \div 3^2$
48. $6 + (4^3 \times 2)$
49. $3^3 \div \left(3^3 \div 9\right)$

50. $\frac{7^7}{7}$

Match the correct term to each of the following descriptions.A term may be used more than once or not at all.

A) base
B) exponent
C) exponential form
D) power
E) standard form
F) scientific notation

51. represents the number of times you multiply a number by itself
52. used to represent $2 \times 2 \times 2 \times 2$ as 2^4
53. refers to an expression such as 5^2 or 2^4
54. the number 5 in the expression 5^1
55. the number 2 in the expression 5^2

Match the correct term to each of the following descriptions. A term may be used more than once or not at all.

A) algebra
B) degree of a term
C) expression
D) term
E) variable

56. the sum of the exponents on the variables in a single term
57. a symbol that represents an unknown number
58. a branch of mathematics that uses symbols to represent unknown numbers or quantities
59. in $10p + 7$, $10p$ is an example of this, so is 7

Identify the letter of the term that best matches the description, definition, or example given below. Each term may be used more than once or not at all.

A) algebraic expression
B) distributive property
C) like terms
D) polynomial
E) term
F) variable

60. terms that have identical variables
61. a mathematical phrase made up of numbers and variables, connected by addition or subtraction operators
62. $a(x + y) = ax + ay$
63. a number or a variable, or the product of numbers and variables
64. a quantity whose value can change or vary

Identify the letter of the term that is equivalent to the expression below. Each term may be used more than once or not at all.

A) $-4x$
B) $-4x - 8$
C) $-6.2x^2$
D) $4x^2$
E) $5x^2 - 4x$
F) $8x^2 + 12x$

65. $(3.1x)(-2x)$

66. $\dfrac{-8x^2}{2x}$

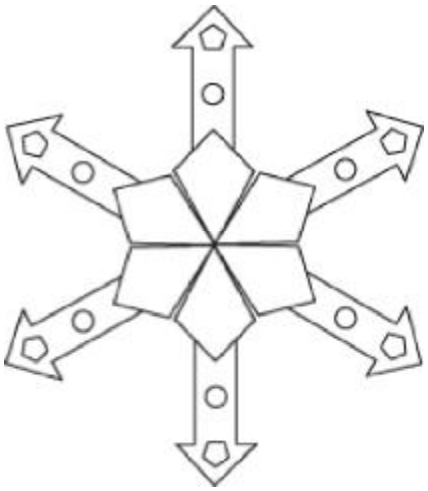
67. $(4x)(2x+3)$

68. $\dfrac{15x^2-12x}{3}$

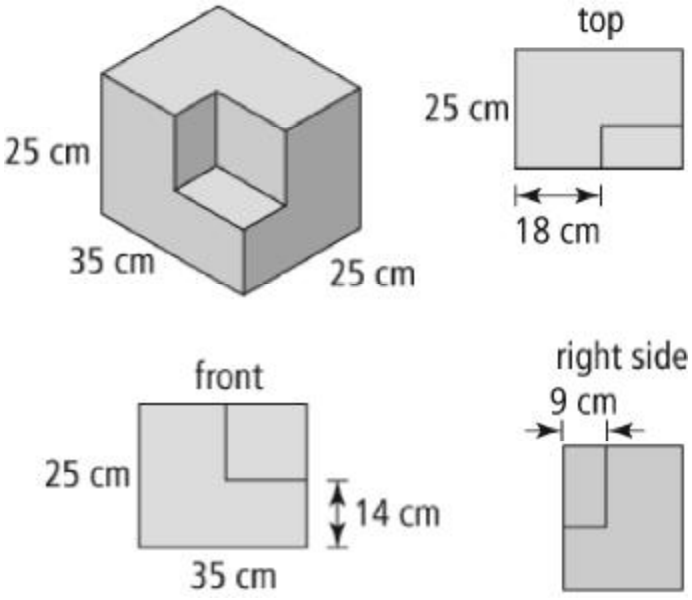
69. $\dfrac{(x+2)(-4x)}{x}$

Short Answer

70. For the following figure, draw and label all lines of symmetry.



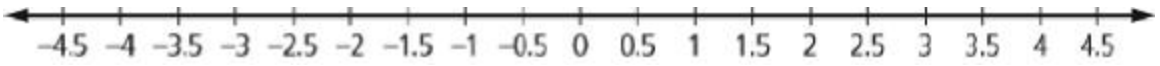
71. What is the surface area of the object?



Write your answer in the space provided.

72. Indicate where each number falls on the number line.

a) 0.75 **b)** $-\frac{1}{3}$ **c)** $2\frac{4}{5}$ **d)** –3.5



73. Jerry's bedroom is square. He has a square desk in his bedroom which has an area of 10 000 cm^2. The area of the bedroom is sixteen times the area of the desk. What is the side length of the bedroom?

74. Denise evaluated the following expression as shown:

$(4.5 - 7.8) \times (8.4 \div 2) = 3.3 \times 4.2$

$= 13.86$

Did she evaluate the expression correctly? If not, show all the steps to correctly evaluate the expression and show the correct solution. Explain where Denise went wrong.

75. Write each expression as a power.

a) $9 \times 9 \times 9 \times 9$ **c)** $-1 \times -1 \times -1$

b) $4 \times 4 \times 4 \times 4 \times 4$ **d)** $6 \times 6 \times 6 \times 6 \times 6 \times 6$

76. Evaluate each expression.

a) 64 as a power of 2 **c)** 1296 as a power of 6

b) 243 as a power of 3 **d)** 4096 as a power of 8

77. Given the side lengths below, calculate the volume of each cube.

a) 8 cm **c)** 50 mm

b) 14 m **d)** 0.6 km

78. Evaluate.

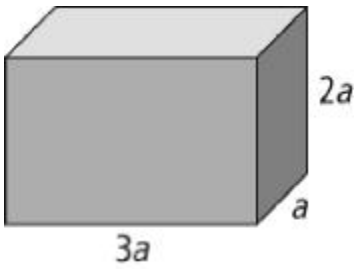
a) $10 \times 4 + 6^3$ **c)** $8^2 \div 4 + 2^2$

b) $5 \times 2^5 - 6^2 \times 2$ **d)** $2 \times 5^3 \div (35 - 5^2)$

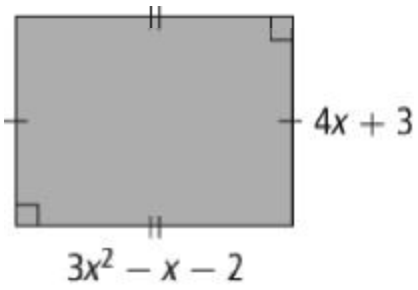
79. Use an algebra tile model to represent the polynomial $4x^2 - 2x - 3$.

80. Simplify. Show the answer as an expression.

81. What is the total surface area of this rectangular prism?

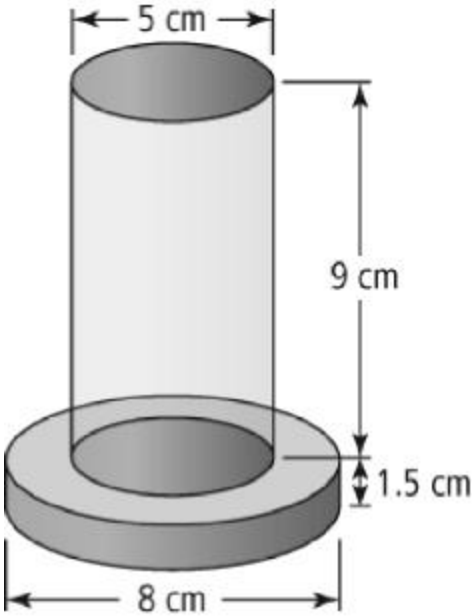


82. Write and simplify an algebraic expression for the perimeter of the rectangle.

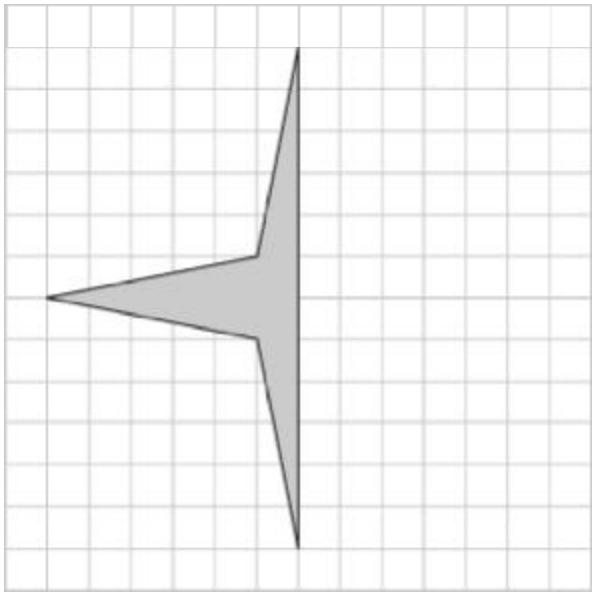


Problem

83. Whitney wants to repaint her bird feeder before she rehangs it in the yard. What is the surface area of the feeder? Express your answer to the nearest tenth of a square centimetre.

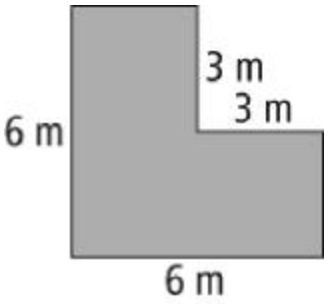


84. Use the line of symmetry to complete the figure.

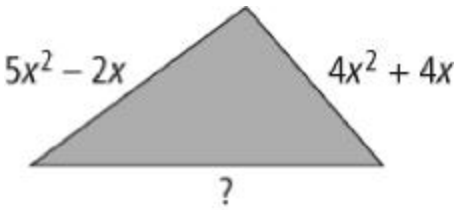


85. Kevin explained to Brad that $4^6 \div 4^2 = 4^3$.
a) Was Kevin's explanation correct or incorrect? Explain your thinking.
b) Evaluate $4^6 \div 4^2$.

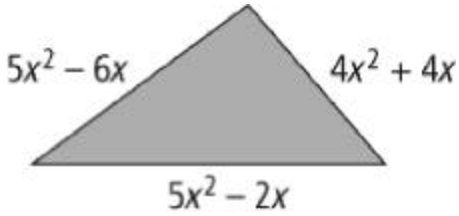
86. A flower garden is shown below. What is the area of the garden?



87. The perimeter of the triangle below can be represented by the polynomial $14x^2 + 8x$. What is the missing side length?

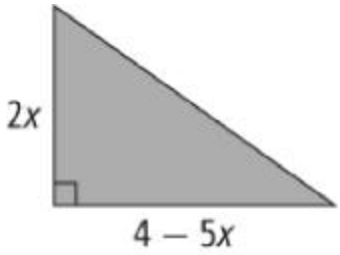


88. Calculate the perimeter of the triangle shown.

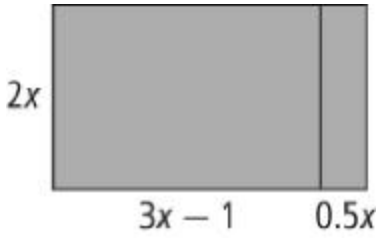


89. Write an expression to represent this model. What is the opposite expression?

90. Write a simplified expression for the area of the triangle.



91. Show two ways to calculate the total area of the two rectangles.



Midterm Review Package
Answer Section

MULTIPLE CHOICE

1. ANS: C PTS: 1 DIF: Difficult OBJ: Section 1.3
   NAT: SS2 TOP: Surface Area KEY: surface area | composite object
2. ANS: D PTS: 1 DIF: Difficult OBJ: Section 1.3
   NAT: SS2 TOP: Surface Area
   KEY: surface area | area of face | composite object
3. ANS: A PTS: 1 DIF: Easy OBJ: Section 1.3
   NAT: SS2 TOP: Surface Area
   KEY: surface area | area of face | composite object
4. ANS: B PTS: 1 DIF: Average OBJ: Section 2.3
   NAT: N3 TOP: Problem Solving With Rational Numbers in Fraction Form
   KEY: rational numbers | fraction operations | divide
5. ANS: B PTS: 1 DIF: Average OBJ: Section 2.3
   NAT: N3 TOP: Problem Solving With Rational Numbers in Fraction Form
   KEY: rational numbers | fraction operations | add
6. ANS: B PTS: 1 DIF: Average OBJ: Section 2.3
   NAT: N3 TOP: Problem Solving With Rational Numbers in Fraction Form
   KEY: rational numbers | fraction operations | problem solving
7. ANS: B PTS: 1 DIF: Easy OBJ: Section 2.4
   NAT: N5 TOP: Determining Square Roots of Rational Numbers
   KEY: rational numbers | perfect square | problem solving | area
8. ANS: B PTS: 1 DIF: Difficult+ OBJ: Section 2.4
   NAT: N6 TOP: Determining Square Roots of Rational Numbers
   KEY: rational numbers | square root | problem solving | area
9. ANS: D PTS: 1 DIF: Difficult OBJ: Section 3.4
   NAT: N1 TOP: Using Exponents to Solve Problems
   KEY: problem solving | population growth
10. ANS: C PTS: 1 DIF: Difficult OBJ: Section 3.1
    NAT: N1 TOP: Using Exponents to Describe Numbers
    KEY: evaluate powers | exponential form
11. ANS: C PTS: 1 DIF: Average OBJ: Section 5.1
    NAT: PR5 TOP: The Language of Mathematics KEY: term | degree
12. ANS: C PTS: 1 DIF: Average OBJ: Section 5.1
    NAT: PR5 TOP: The Language of Mathematics KEY: polynomial | degree
13. ANS: D PTS: 1 DIF: Difficult OBJ: Section 5.1
    NAT: PR6 TOP: The Language of Mathematics KEY: polynomial | model
14. ANS: A PTS: 1 DIF: Easy OBJ: Section 5.2
    NAT: PR5 TOP: Equivalent Expressions KEY: expression | coefficient
15. ANS: D PTS: 1 DIF: Easy OBJ: Section 5.2
    NAT: PR5 TOP: Equivalent Expressions KEY: expression | variable
16. ANS: D PTS: 1 DIF: Difficult OBJ: Section 5.2
    NAT: PR5 TOP: Equivalent Expressions KEY: expression | simplify | like terms

17. ANS: B PTS: 1 DIF: Average OBJ: Section 5.3
NAT: PR6 TOP: Adding and Subtracting Polynomials
KEY: polynomial | simplify | subtraction
18. ANS: C PTS: 1 DIF: Average OBJ: Section 7.1
NAT: PR7 TOP: Multiplying and Dividing Monomials
KEY: multiplying monomials | area model | area of a triangle
19. ANS: A PTS: 1 DIF: Difficult OBJ: Section 7.1
NAT: PR7 TOP: Multiplying and Dividing Monomials
KEY: multiplying monomials | simplify
20. ANS: C PTS: 1 DIF: Average OBJ: Section 7.1
NAT: PR7 TOP: Multiplying and Dividing Monomials
KEY: multiplying monomials | simplify
21. ANS: B PTS: 1 DIF: Average OBJ: Section 7.1
NAT: PR7 TOP: Multiplying and Dividing Monomials
KEY: dividing monomials | area model | area of a rectangle
22. ANS: D PTS: 1 DIF: Difficult+ OBJ: Section 7.1
NAT: PR7 TOP: Multiplying and Dividing Monomials
KEY: multiplying monomials | volume
23. ANS: A PTS: 1 DIF: Easy OBJ: Section 7.2
NAT: PR7 TOP: Multiplying Polynomials by Monomials
KEY: multiplying a binomial by a monomial | area model
24. ANS: C PTS: 1 DIF: Average OBJ: Section 7.2
NAT: PR7 TOP: Multiplying Polynomials by Monomials
KEY: multiplying a binomial by a monomial | distributive property | expand
25. ANS: B PTS: 1 DIF: Average OBJ: Section 7.3
NAT: PR7 TOP: Dividing Polynomials by Monomials
KEY: dividing a polynomial by a monomial | area model

COMPLETION

26. ANS: the angle of rotation

PTS: 1 DIF: Easy OBJ: Section 1.2 NAT: SS5
TOP: Rotation Symmetry and Transformations KEY: rotation symmetry | angle of rotation
27. ANS: 15°

PTS: 1 DIF: Average OBJ: Section 1.2 NAT: SS5
TOP: Rotation Symmetry and Transformations KEY: rotation symmetry | angle of rotation
28. ANS: integers

PTS: 1 DIF: Easy OBJ: Section 2.1 NAT: N3
TOP: Comparing and Ordering Rational Numbers KEY: rational numbers | definition

29. ANS:
$-3\frac{2}{5}$
-3 2/5

PTS: 1 DIF: Easy OBJ: Section 2.3 NAT: N3
TOP: Problem Solving With Rational Numbers in Fraction Form
KEY: rational numbers | mixed numbers | improper fractions

30. ANS: product

PTS: 1 DIF: Easy OBJ: Section 2.4 NAT: N3
TOP: Determining Square Roots of Rational Numbers
KEY: rational numbers | perfect square | definition

31. ANS: $2d + 2$

PTS: 1 DIF: Easy OBJ: Section 5.2 NAT: PR6
TOP: Equivalent Expressions KEY: simplify | expression | like terms

32. ANS: $5w^2 + w - 5$

PTS: 1 DIF: Average OBJ: Section 5.2 NAT: PR6
TOP: Equivalent Expressions KEY: simplify | expression | like terms

33. ANS: $5q^2 + 3q + 4$

PTS: 1 DIF: Difficult OBJ: Section 5.2 NAT: PR6
TOP: Equivalent Expressions KEY: simplify | like terms | subtraction

34. ANS: $-7.2x^2$

PTS: 1 DIF: Easy OBJ: Section 7.1 NAT: PR7
TOP: Multiplying and Dividing Monomials KEY: multiplying monomials

35. ANS: $2t^2 - 3t + 10$

PTS: 1 DIF: Difficult OBJ: Section 7.3 NAT: PR7
TOP: Dividing Polynomials by Monomials
KEY: dividing a polynomial by a monomial | simplify

MATCHING

36. ANS: C PTS: 1 DIF: Average OBJ: Section 1.1
NAT: SS5 TOP: Line Symmetry KEY: symmetry | line of symmetry

37. ANS: F PTS: 1 DIF: Easy OBJ: Section 1.2
NAT: SS5 TOP: Rotation Symmetry and Transformations
KEY: symmetry | rotation symmetry

38. ANS: A PTS: 1 DIF: Average OBJ: Section 1.2
NAT: SS5 TOP: Rotation Symmetry and Transformations
KEY: rotation symmetry | angle of rotation

39. ANS: E PTS: 1 DIF: Average OBJ: Section 1.2
NAT: SS5 TOP: Rotation Symmetry and Transformations
KEY: rotation symmetry | order of rotation
40. ANS: B PTS: 1 DIF: Easy OBJ: Section 1.2
NAT: SS5 TOP: Rotation Symmetry and Transformations
KEY: rotation symmetry | centre of rotation

41. ANS: B PTS: 1 DIF: Easy OBJ: Section 2.1
NAT: N3 TOP: Problem Solving With Rational Numbers in Decimal Form
KEY: rational numbers | definition
42. ANS: D PTS: 1 DIF: Easy OBJ: Section 2.4
NAT: N6 TOP: Determining Square Roots of Rational Numbers
KEY: non-perfect square | definition
43. ANS: F PTS: 1 DIF: Easy OBJ: Section 2.3
NAT: N3 TOP: Problem Solving With Rational Numbers in Fraction Form
KEY: improper fraction
44. ANS: A PTS: 1 DIF: Average OBJ: Section 2.4
NAT: N5 TOP: Determining Square Roots of Rational Numbers
KEY: square root | definition
45. ANS: E PTS: 1 DIF: Easy OBJ: Section 2.3
NAT: N3 TOP: Problem Solving With Rational Numbers in Fraction Form
KEY: mixed number

46. ANS: B PTS: 1 DIF: Average OBJ: Section 3.2
NAT: N2 TOP: Exponent Laws KEY: power of power | exponent laws
47. ANS: C PTS: 1 DIF: Easy OBJ: Section 3.2
NAT: N2 TOP: Exponent Laws KEY: quotient of powers | exponent laws
48. ANS: E PTS: 1 DIF: Easy OBJ: Section 3.3
NAT: N4 TOP: Order of Operations KEY: order of operations
49. ANS: F PTS: 1 DIF: Average OBJ: Section 3.3
NAT: N4 TOP: Order of Operations KEY: order of operations
50. ANS: A PTS: 1 DIF: Easy OBJ: Section 3.2
NAT: N2 TOP: Exponent Laws KEY: quotient of powers | exponent laws

51. ANS: B PTS: 1 DIF: Easy OBJ: Section 3.1
NAT: N1 TOP: Using Exponents to Describe Numbers
KEY: exponent
52. ANS: C PTS: 1 DIF: Easy OBJ: Section 3.1
NAT: N1 TOP: Using Exponents to Describe Numbers
KEY: exponential form | repeated multiplication
53. ANS: D PTS: 1 DIF: Average OBJ: Section 3.1
NAT: N1 TOP: Using Exponents to Describe Numbers
KEY: power | exponential form
54. ANS: A PTS: 1 DIF: Easy OBJ: Section 3.1
NAT: N1 TOP: Using Exponents to Describe Numbers
KEY: base | exponential form

55. ANS: B PTS: 1 DIF: Easy OBJ: Section 3.1
NAT: N1 TOP: Using Exponents to Describe Numbers
KEY: exponential form

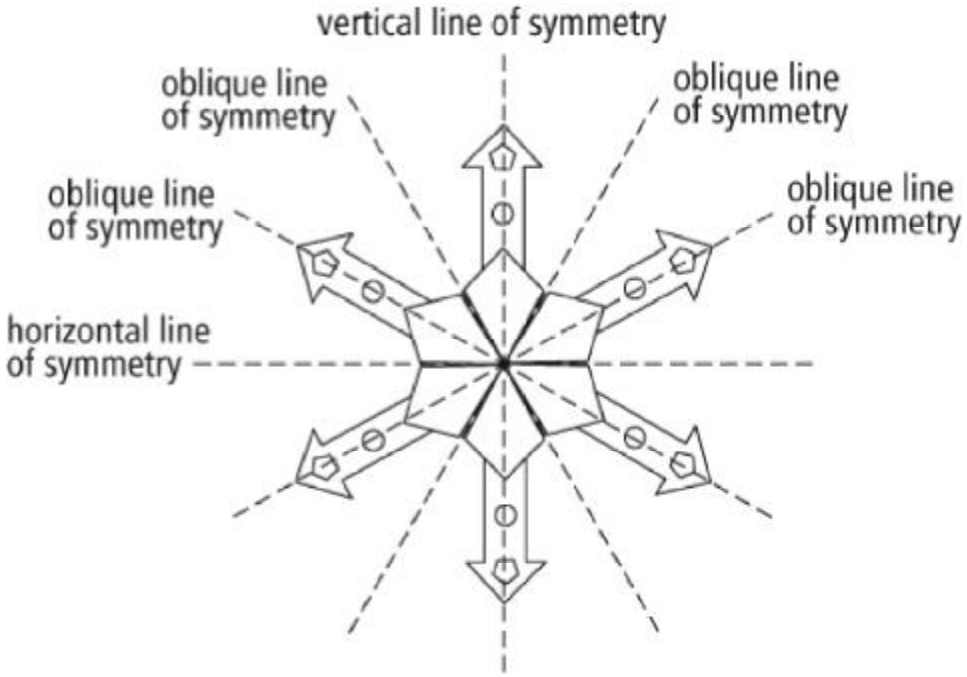
56. ANS: B PTS: 1 DIF: Average OBJ: Section 5.1
NAT: PR5 TOP: The Language of Mathematics KEY: degree | term
57. ANS: E PTS: 1 DIF: Easy OBJ: Section 5.1
NAT: PR5 TOP: The Language of Mathematics KEY: variable | symbol
58. ANS: A PTS: 1 DIF: Easy OBJ: Section 5.1
NAT: PR5 TOP: The Language of Mathematics KEY: algebra | symbol
59. ANS: D PTS: 1 DIF: Average OBJ: Section 5.1
NAT: PR5 TOP: The Language of Mathematics KEY: term | expression | variable

60. ANS: C PTS: 1 DIF: Easy OBJ: Section 7.1
NAT: PR7 TOP: Multiplying and Dividing Monomials
KEY: like terms
61. ANS: A PTS: 1 DIF: Average OBJ: Section 7.1
NAT: PR7 TOP: Multiplying and Dividing Monomials
KEY: expression
62. ANS: B PTS: 1 DIF: Average OBJ: Section 7.2
NAT: PR7 TOP: Multiplying Polynomials by Monomials
KEY: distributive property
63. ANS: D PTS: 1 DIF: Easy OBJ: Section 7.1
NAT: PR7 TOP: Multiplying and Dividing Monomials
KEY: term | simplify
64. ANS: F PTS: 1 DIF: Easy OBJ: Section 7.1
NAT: PR7 TOP: Multiplying and Dividing Monomials
KEY: variable

65. ANS: C PTS: 1 DIF: Average OBJ: Section 7.1
NAT: PR7 TOP: Multiplying Polynomials by Monomials
KEY: multiplying monomials
66. ANS: A PTS: 1 DIF: Easy OBJ: Section 7.1
NAT: PR7 TOP: Multiplying and Dividing Monomials
KEY: dividing monomials
67. ANS: F PTS: 1 DIF: Average OBJ: Section 7.2
NAT: PR7 TOP: Multiplying Polynomials by Monomials
KEY: multiplying a binomial by a monomial | distributive property
68. ANS: E PTS: 1 DIF: Average OBJ: Section 7.3
NAT: PR7 TOP: Dividing Polynomials by Monomials
KEY: dividing a polynomial by a monomial
69. ANS: B PTS: 1 DIF: Difficult OBJ: Section 7.2 | Section 7.3
NAT: PR7 TOP: Multiplying Polynomials by Monomials | Dividing Polynomials by Monomials
KEY: multiplying a polynomial by a monomial | dividing a polynomial by a monomial | distributive property

SHORT ANSWER

70. ANS:



PTS: 4 DIF: Difficult OBJ: Section 1.1 NAT: SS5
TOP: Line Symmetry
KEY: symmetry | oblique line of symmetry | horizontal line of symmetry | vertical line of symmetry

71. ANS:

area of top: $25 \times 35 = 875 \text{ cm}^2$

area of front: $25 \times 35 = 875 \text{ cm}^2$

area of side: $25 \times 25 = 625 \text{ cm}^2$

total surface area: $2(875 + 875 + 625) = 4750 \text{ cm}^2$

The cutout piece does not affect the surface area of the object.

The total surface area of the object is 4750 cm^2.

PTS: 2 DIF: Average OBJ: Section 1.3 NAT: SS2
TOP: Surface Area KEY: surface area | faces | composite object

72. ANS:

PTS: 4 DIF: Average OBJ: Section 2.1 NAT: N3
TOP: Comparing and Ordering Rational Numbers
KEY: rational numbers | ordering | decimal numbers | fractions | mixed numbers

73. ANS:
Area of bedroom $= 16 \times$ area of desk

$= 16 \times 10\,000$

$= 160\,000 \text{ cm}^2$

Side length of bedroom $= \sqrt{160\,000}$

$= 400 \text{ cm}$

The side length of the square bedroom is 400 cm.

PTS: 1 DIF: Average OBJ: Section 2.4 NAT: N5
TOP: Determining Square Roots of Rational Numbers KEY: perfect square | problem solving | area

74. ANS:
$(4.5 - 7.8) \times (8.4 \div 2) = (-3.3) \times 4.2$

$= -13.86$

No, Denise did not evaluate the expression correctly. She made a mistake subtracting 7.8 from 4.5. The answer should be negative, not positive.

PTS: 1 DIF: Average OBJ: Section 2.2 NAT: N3
TOP: Problem Solving With Rational Numbers in Decimal Form
KEY: rational numbers | order of operations | number operations | subtract | multiply | divide | positive and negative integers

75. ANS:
a) 9^4 **c)** -1^3
b) 4^5 **d)** 6^6

PTS: 1 DIF: Average OBJ: Section 3.1 NAT: N1
TOP: Using Exponents to Describe Numbers KEY: represent powers

76. ANS:
a) 2^6 **c)** 6^4
b) 3^5 **d)** 8^4

PTS: 1 DIF: Average OBJ: Section 3.1 NAT: N1
TOP: Using Exponents to Describe Numbers KEY: represent powers | exponential form

77. ANS:
a) 512 cm^3 **c)** 125 000 mm^3
b) 2744 m^3 **d)** 0.216 km^3

PTS: 1 DIF: Average OBJ: Section 3.4 NAT: N1
TOP: Using Exponents to Solve Problems KEY: volume of a cube | problem solving

78. ANS:
a) 256 **c)** 20
b) 88 **d)** 25

PTS: 1 DIF: Average OBJ: Section 3.3 NAT: N4
TOP: Order of Operations KEY: order of operations

79. ANS:

PTS: 1 DIF: Easy OBJ: Section 5.2 NAT: PR6
TOP: Equivalent Expressions KEY: model | polynomial

80. ANS:

$p^2 - p + 3$

PTS: 1 DIF: Average OBJ: Section 5.3 NAT: PR6
TOP: Adding and Subtracting Polynomials KEY: expression | simplify | model

81. ANS:

$SA = 2(2a \times a) + 2(3a \times a) + 2(2a \times 3a)$

$= 4a^2 + 6a^2 + 12a^2$

$= 22a^2$

The surface area of the rectangular prism is $22a^2$.

PTS: 1 DIF: Difficult OBJ: Section 7.1 NAT: PR7
TOP: Multiplying and Dividing Monomials KEY: multiplying monomials | like terms

82. ANS:

$2(4x + 3) + 2(3x^2 - x - 2)$
$= 8x + 6 + 6x^2 - 2x - 4$
$= 6x^2 + 6x + 2$

The perimeter of the rectangle is $6x^2 + 6x + 2$.

PTS: 1 DIF: Average OBJ: Section 7.2 NAT: PR7
TOP: Multiplying Polynomials by Monomials
KEY: multiplying a binomial by a monomial | area model

PROBLEM

83. ANS:

Surface area of top cylinder: $2p2.5^2 + 2p2.5(9)$

$= 39.25 + 141.3$

$= 180.55 \text{ cm}^2$

Surface area of bottom cylinder: $2p4^2 + 2p4(1.5)$

$= 50.24 + 37.68$

$= 87.92 \text{ cm}^2$

Surface area of join: $2p2.5^2$

$= 39.25 \text{ cm}^2$

Total surface area: surface area of top + surface area of bottom – surface area of join

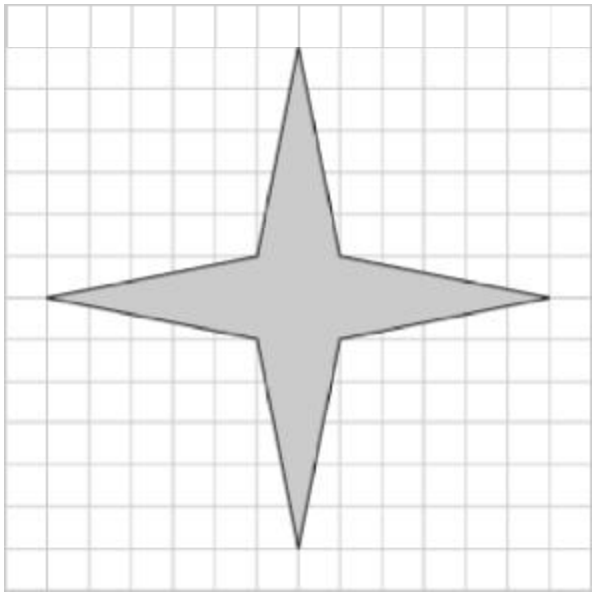
$= 180.25 + 87.92 - 39.25$

$= 228.92 \text{ cm}^2$

The total surface area of Whitney's bird feeder is 228.9 cm^2.

PTS: 5 DIF: Difficult+ OBJ: Section 1.3 NAT: SS2
TOP: Surface Area KEY: surface area | faces | area of face | cylinder

84. ANS:



PTS: 1 DIF: Average OBJ: Section 1.1 NAT: SS5
TOP: Line Symmetry
KEY: symmetry | oblique line of symmetry | draw shape with symmetry

85. ANS:

a) Kevin's explanation was incorrect. When dividing powers, the exponents should be subtracted. Kevin divided the exponent.

b) $4^6 \div 4^2 = 4^{(6-2)}$

$= 4^4$

$= 256$

The correct answer is 256.

PTS: 1 DIF: Average OBJ: Section 3.2 NAT: N2
TOP: Exponent Laws KEY: quotient of powers | exponent laws

86. ANS:

$6^2 - 3^2 = 36 - 9$

$= 27$

The garden has an area of 27 m^2.

PTS: 1 DIF: Easy OBJ: Section 3.3 NAT: N4
TOP: Order of Operations KEY: area | problem solving

87. ANS:

Example:

$\text{Part Perimeter} = 5x^2 - 2x + 4x^2 + 4x$

$= 9x^2 + 2x$

$\text{Difference from perimeter} = (14x^2 + 8x) - (9x^2 + 2x)$

$= 5x^2 + 6x$

The missing side length is $5x^2 + 6x$.

PTS: 1 DIF: Average OBJ: Section 5.3 NAT: PR5
TOP: Adding and Subtracting Polynomials KEY: polynomial | subtraction | perimeter

88. ANS:

$P = 5x^2 - 2x + 4x^2 + 4x + 5x^2 + 6x$

$P = 14x^2 + 8x$

The perimeter is $14x^2 + 8x$.

PTS: 1 DIF: Easy OBJ: Section 5.3 NAT: PR5
TOP: Adding and Subtracting Polynomials KEY: polynomial | subtraction | perimeter

89. ANS:

$(3x^2 - 2x + 4)$ and $(-3x^2 + 2x - 4)$

PTS: 1 DIF: Average OBJ: Section 5.2 NAT: PR6
TOP: Equivalent Expressions KEY: model | expression

90. ANS:

$A = \frac{bh}{2}$

$A = \frac{(2x)(4-5x)}{2}$

$A = \frac{8x-10x^2}{2}$

$A = 4x - 5x^2$

An expression for the area of the triangle is $4x - 5x^2$.

PTS: 1 DIF: Average OBJ: Section 7.2 NAT: PR7
TOP: Multiplying Polynomials by Monomials
KEY: multiplying a binomial by a monomial | area | simplify

91. ANS:

Example:
Calculate the area of each rectangle and add.

$A = (2x)(3x-1) + (2x)(0.5x)$

$A = 6x^2 - 2x + x^2$

$A = 7x^2 - 2x$

Calculate the total length of the long side of the rectangle and use it to calculate the area.

$A = (2x)(3x-1+0.5x)$

$A = (2x)(3.5x-1)$

$A = 7x^2 - 2x$

PTS: 1 DIF: Average OBJ: Section 7.2 NAT: PR7
TOP: Multiplying Polynomials by Monomials
KEY: multiplying a binomial by a monomial | area

Name: _____ **Class:** _____ **Date:** _____ **ID: B**

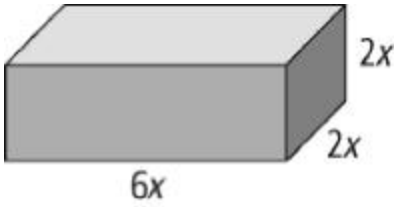
Midterm Review Package

Multiple Choice
Identify the choice that best completes the statement or answers the question.

1. What is the degree of the term $9s^4t^3$?
   A) 9 B) 4 C) 3 D) 7

2. Evaluate $\frac{11}{21}+\frac{1}{3}$.
   A) $\frac{13}{14}$ B) $\frac{6}{7}$ C) $\frac{3}{4}$ D) $\frac{2}{3}$

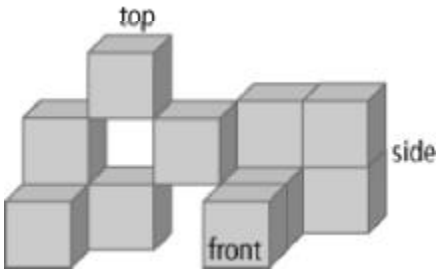
3. What is the volume of this rectangular prism?



   A) $-24x$ B) $-24x^2$ C) 24 D) $24x^3$

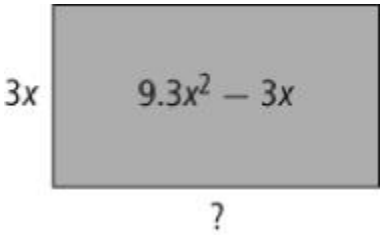
4. Use the distributive property to expand $(5.2x)(-3x+2)$.
   A) $-15.6x+10.4$ B) $-15.6x^2+10.4x$ C) $15.6x^2-10.4x$ D) $15.6x^2+10.4x$

5. Each of the 12 identical cubes in the object has dimensions of 2 cm. What is the exposed surface area of the object, excluding the base?



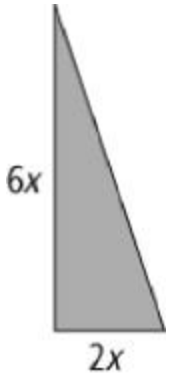
   A) 47 cm^2 B) 94 cm^2 C) 414 cm^2 D) 188 cm^2

6. What is the unknown dimension of the rectangle shown below?



   A) 3.1 B) $3.1x-1$ C) $3.1x$ D) $3.1x+1$

7. What is the area of the triangle shown below?



A) $3x^2$ B) $6x^2$ C) $12x^2$ D) $3x$

8. Determine the simplified form of the expression $(3xy)(2x)$.
A) $6xy$ B) $6x^2y$ C) $1.5xy^2$ D) $5x^2y$

9. The degree of the polynomial $5m^4 + 2m^3 - m^2 + 3m + 7$ is
A) 4 B) 2 C) 10 D) 3

10. A square picture has an area of 110.25 cm^2. To create a border, the picture is centred on a square mat with an area of 331.24 cm^2. Determine the width of mat around the picture.
A) 1.28 cm B) 3.85 cm C) 14.87 cm D) 55.25 cm

11. What is the side length of a square with an area of 196 m^2?
A) 9 m B) 14 m C) 49 m D) 98 m

12. Subtract the following polynomials. $(7j^2 - 2j) - (-4j + 5)$
A) $7j^2 - 2j - 5$ B) $7j^2 + 4j - 5$ C) $7j^2 + 2j - 5$ D) $7j^2 + 6j + 5$

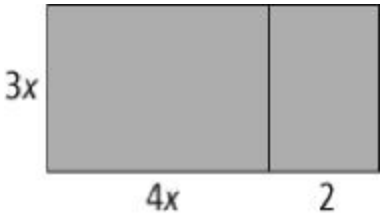
13. In the expression $2y^3 + 4y - 5$, the 2 is a(n)
A) variable B) exponent C) term D) coefficient

14. The model shown below can be represented by the polynomial

A) $-z^2 - 3z - 2$ B) $z^2 + 3z - 2$ C) $2z^2 + 5z - 2$ D) $3z^2 + 7z + 2$

15. Simplify the following expression by grouping like terms. $8q - 2q^2 + 3q - 6 + 5q^2 - 4q + 4 + 3q^2 - 2 - 2q$
A) $6q^2 + 5q - 4$ B) $10q^2 - 15q - 8$ C) $3q^2 + 11q - 8$ D) $10q^2 + 17q - 12$

16. Which multiplication statement is represented by the area model below?



A) $(3x)(4x+2) = 12x^2 + 6x$ B) $(3x)(4x+2) = 7x+2$ C) $(3x)(4x-2) = 7x-2$ D) $(3x)(4x-2) = 12x^2 - 6x$

17. In the expression $3d^4 + 5d^2 - 15$, the d is a(n)
A) coefficient B) variable C) term D) exponent

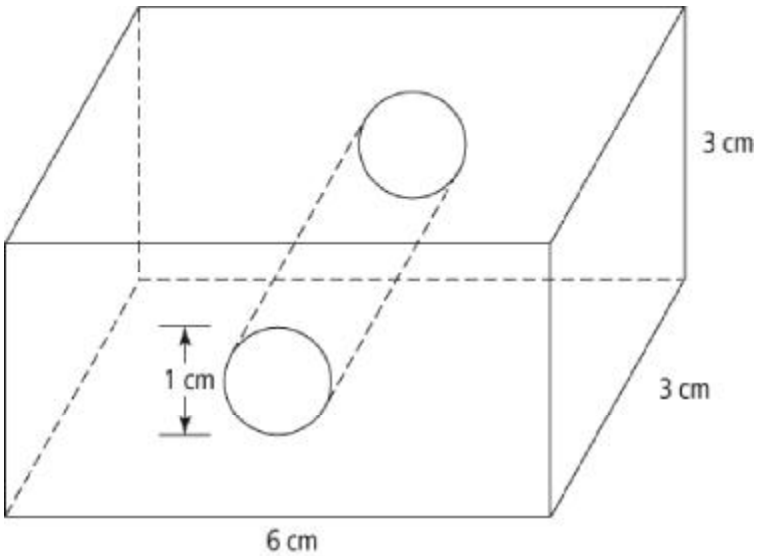
18. Which expression represents $\left(\frac{2}{3}\right)^2 (3x)$ in simplified form?

A) $\frac{4}{3}x$ B) $2x$ C) $\frac{27}{2}x$ D) $4x$

19. Which powers are equal in value? -32^2, 4^6, $(-5)^4$, 2^{10}
A) 4^6 and $(-5)^4$ B) $(-5)^4$ and 2^{10} C) -32^2 and 2^{10} D) -32^2 and 4^6

20. Julia had $\frac{5}{6}$ of a pizza left over from a party. She gave Brooke $\frac{2}{5}$ of the leftover pizza. How much of the original pizza did Julia give to Brooke?
A) $\frac{7}{30}$ B) $\frac{1}{3}$ C) $\frac{7}{11}$ D) $\frac{2}{3}$

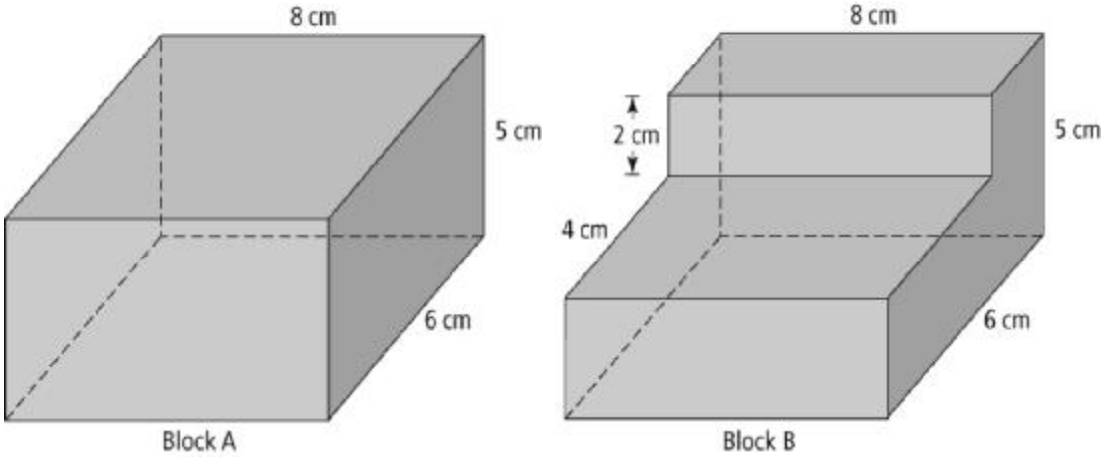
21. In the figure shown below, the hole in the front surface extends straight through the object. The total surface area of the figure is



A) 82.15 cm^2 B) 88.43 cm^2 C) 97.85 cm^2 D) 99.42 cm^2

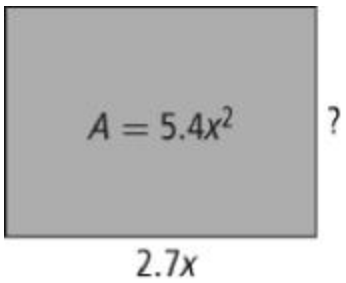
22. A colony of 500 bacteria triples in size every 1.5 h. Determine the size of the colony after 6 h.
A) 2598 B) 3000 C) 20 250 D) 40 500

23. Compare the total surface area of Block A to Block B. Which statement is correct?



A) The surface area of Block B is greater than that of Block A B) The surface area of Block A is greater than that of Block B C) The surface area of Block A is equal to that of Block B D) The surface area of Block B cannot be determined

24. Determine the missing dimension of the rectangle below.



A) $2.7x^2$ B) $2x$ C) $14.58x^3$ D) $0.5x$

25. What is $\frac{20}{27} \div \frac{5}{9}$?
A) $\frac{3}{2}$ B) $\frac{4}{3}$ C) $\frac{3}{4}$ D) $\frac{2}{3}$

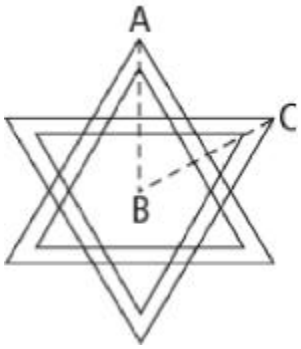
Name: _____ **ID: B**

Completion
Complete each statement.

26. The measurement of the angle of rotation for the figure is _____.

27. The product of $3.6x$ and $-2x$ is _____.

28. The dashed lines show the angle formed at the centre and between adjacent vertices. $\angle ABC$ is called _____.



29. A perfect square can be expressed as the _____ of two equal rational factors.

30. The quotient of $\frac{4.8t^2 - 7.2t + 24}{2.4}$ is _____.

31. Rational numbers are numbers that can be written in the form $\frac{a}{b}$, where a and b are _____.

32. Simplify the following by combining like terms.
$-5d + 4 + 7d - 2$

33. Subtract and simplify by combining like terms.
$(3q^2 - 2q - 2) - (-2q^2 - 5q - 6)$

34. Simplify the following by combining like terms.
$2w^2 - 2w + 4 + 3w^2 + 3w - 9$

35. Written as a mixed number, $-\frac{17}{5}$ is _____.

Matching

Match the correct term to each of the following descriptions.A term may be used more than once or not at all.

A) base
B) exponent
C) exponential form
D) power
E) standard form
F) scientific notation

36. the number 5 in the expression 5^1
37. represents the number of times you multiply a number by itself
38. used to represent $2 \times 2 \times 2 \times 2$ as 2^4
39. refers to an expression such as 5^2 or 2^4
40. the number 2 in the expression 5^2

Match the correct term to each of the following descriptions. A term may be used more than once or not at all..

A) square root
B) rational number
C) perfect square
D) non-perfect square
E) mixed number
F) improper fraction

41. a number of the form $\frac{a}{b}$, where a and b are integers and $b \neq 0$
42. a factor that multiplies by itself to give that number
43. a fraction such as $3\frac{2}{3}$
44. a rational number that cannot be expressed as the product of two equal rational factors
45. a fraction such as $\frac{11}{3}$

Match the correct answer to the expression in each question. An answer may be used more than once or not at all.

A) 7^6
B) 4^3
C) 3^4
D) 140
E) 134
F) 9

46. $\left(2^2\right)^3$
47. $3^6 \div 3^2$
48. $3^3 \div \left(3^3 \div 9\right)$
49. $6 + (4^3 \times 2)$
50. $\frac{7^7}{7}$

Identify the letter of the term that best matches the description, definition, or example given below. Each term may be used more than once or not at all.

A) algebraic expression
B) distributive property
C) like terms
D) polynomial
E) term
F) variable

51. $a(x + y) = ax + ay$
52. a mathematical phrase made up of numbers and variables, connected by addition or subtraction operators
53. a quantity whose value can change or vary
54. terms that have identical variables
55. a number or a variable, or the product of numbers and variables

Match the correct term to each of the following descriptions. A term may be used more than once or not at all.

A) angle of rotation
B) centre of rotation
C) line of symmetry
D) mirror line
E) order of rotation
F) rotation symmetry

56. a figure may have one or more of these, or it may have none at all
57. the point about which the rotation of an object or design turns
58. occurs when a shape or design can be turned about its centre of rotation so that it fits onto its outline more than once in a complete turn
59. the number of times a shape or design fits onto itself in one turn
60. the minimum number of degrees or fractions of a turn needed to turn a shape or design onto itself

Identify the letter of the term that is equivalent to the expression below. Each term may be used more than once or not at all.

A) $-4x$
B) $-4x - 8$
C) $-6.2x^2$
D) $4x^2$
E) $5x^2 - 4x$
F) $8x^2 + 12x$

61. $(4x)(2x + 3)$
62. $(3.1x)(-2x)$
63. $\dfrac{15x^2 - 12x}{3}$
64. $\dfrac{(x + 2)(-4x)}{x}$
65. $\dfrac{-8x^2}{2x}$

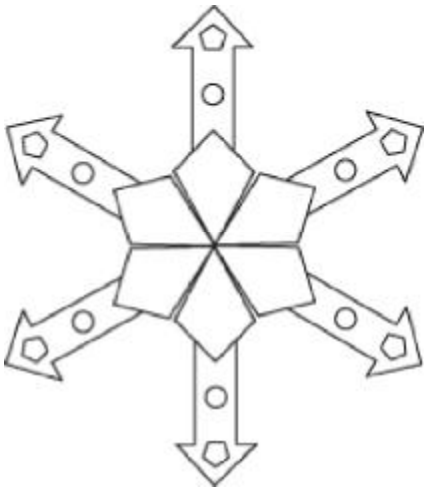
Match the correct term to each of the following descriptions. A term may be used more than once or not at all.

A) algebra
B) degree of a term
C) expression
D) term
E) variable

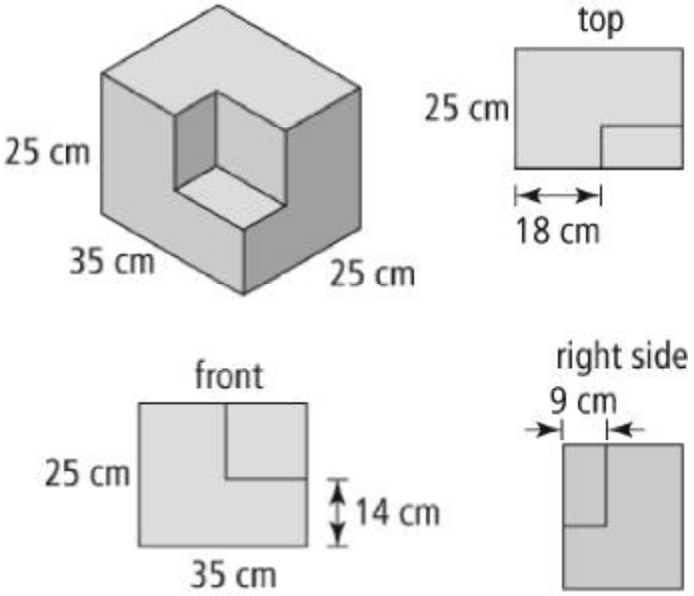
66. a branch of mathematics that uses symbols to represent unknown numbers or quantities
67. the sum of the exponents on the variables in a single term
68. a symbol that represents an unknown number
69. in $10p + 7$, $10p$ is an example of this, so is 7

Short Answer

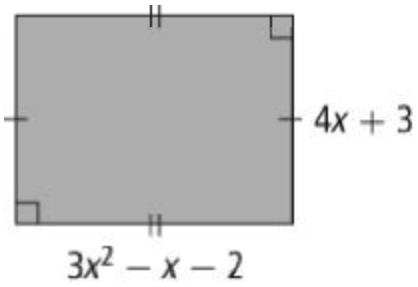
70. For the following figure, draw and label all lines of symmetry.



71. What is the surface area of the object?

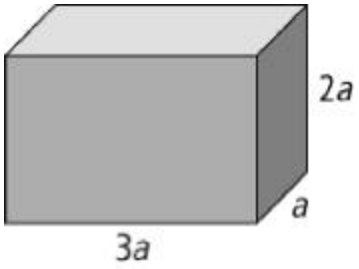


72. Write and simplify an algebraic expression for the perimeter of the rectangle.



73. Jerry's bedroom is square. He has a square desk in his bedroom which has an area of 10 000 cm^2. The area of the bedroom is sixteen times the area of the desk. What is the side length of the bedroom?

74. What is the total surface area of this rectangular prism?



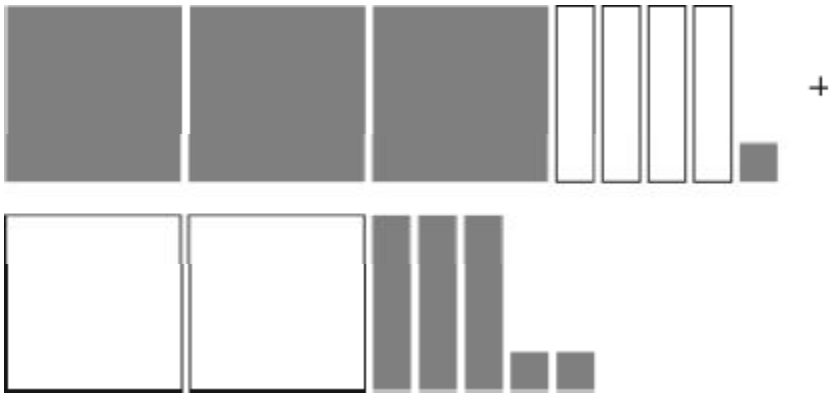
75. Denise evaluated the following expression as shown:
$(4.5 - 7.8) \times (8.4 \div 2) = 3.3 \times 4.2$

$= 13.86$

Did she evaluate the expression correctly? If not, show all the steps to correctly evaluate the expression and show the correct solution. Explain where Denise went wrong.

76. Given the side lengths below, calculate the volume of each cube.
a) 8 cm **c)** 50 mm
b) 14 m **d)** 0.6 km

77. Simplify. Show the answer as an expression.

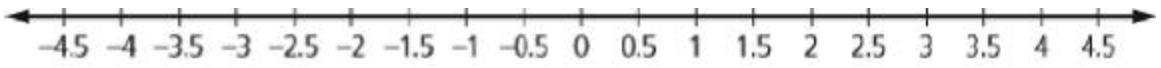


78. Write each expression as a power.
a) $9 \times 9 \times 9 \times 9$ **c)** $-1 \times -1 \times -1$
b) $4 \times 4 \times 4 \times 4 \times 4$ **d)** $6 \times 6 \times 6 \times 6 \times 6 \times 6$

79. Evaluate.
a) $10 \times 4 + 6^3$ **c)** $8^2 \div 4 + 2^2$
b) $5 \times 2^5 - 6^2 \times 2$ **d)** $2 \times 5^3 \div (35 - 5^2)$

Write your answer in the space provided.

80. Indicate where each number falls on the number line.
a) 0.75 **b)** $-\frac{1}{3}$ **c)** $2\frac{4}{5}$ **d)** –3.5



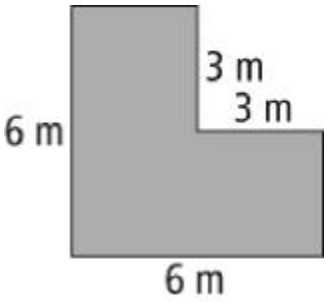
81. Evaluate each expression.
a) 64 as a power of 2 **c)** 1296 as a power of 6
b) 243 as a power of 3 **d)** 4096 as a power of 8

82. Use an algebra tile model to represent the polynomial $4x^2 - 2x - 3$.

Name: _____ **ID: B**

Problem

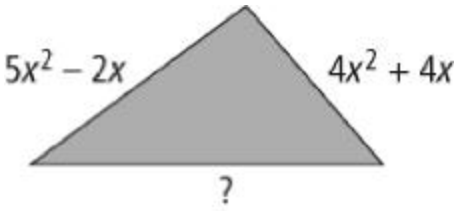
83. A flower garden is shown below. What is the area of the garden?



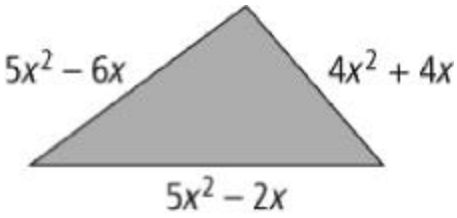
84. Write an expression to represent this model. What is the opposite expression?

85. Kevin explained to Brad that $4^6 \div 4^2 = 4^3$.
a) Was Kevin's explanation correct or incorrect? Explain your thinking.
b) Evaluate $4^6 \div 4^2$.

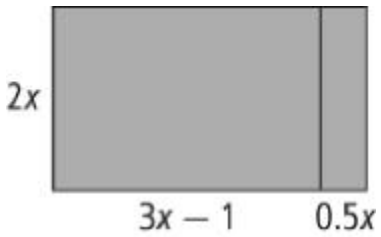
86. The perimeter of the triangle below can be represented by the polynomial $14x^2 + 8x$. What is the missing side length?



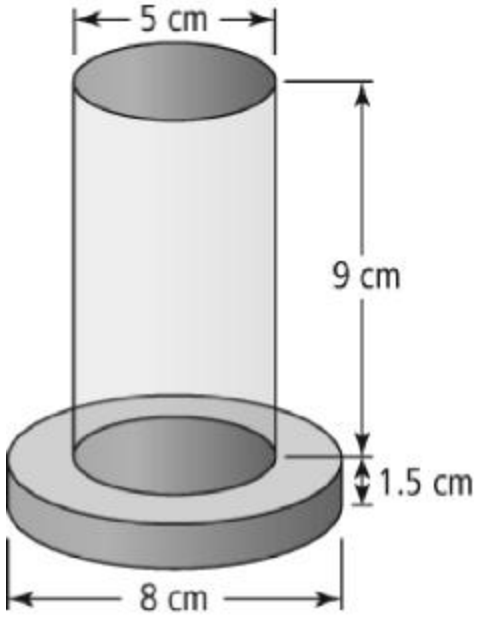
87. Calculate the perimeter of the triangle shown.



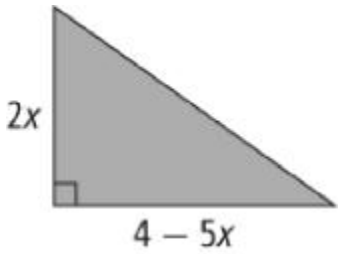
88. Show two ways to calculate the total area of the two rectangles.



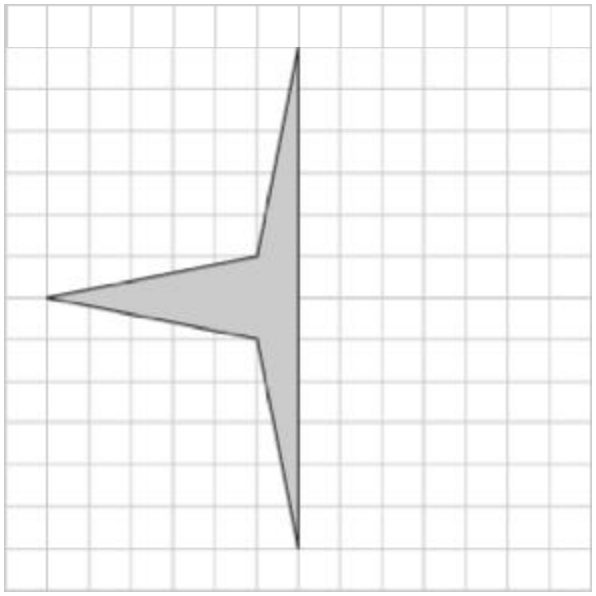
89. Whitney wants to repaint her bird feeder before she rehangs it in the yard. What is the surface area of the feeder? Express your answer to the nearest tenth of a square centimetre.



90. Write a simplified expression for the area of the triangle.



91. Use the line of symmetry to complete the figure.



Midterm Review Package
Answer Section

MULTIPLE CHOICE

1. ANS: D PTS: 1 DIF: Average OBJ: Section 5.1
   NAT: PR5 TOP: The Language of Mathematics KEY: term | degree
2. ANS: B PTS: 1 DIF: Average OBJ: Section 2.3
   NAT: N3 TOP: Problem Solving With Rational Numbers in Fraction Form
   KEY: rational numbers | fraction operations | add
3. ANS: D PTS: 1 DIF: Difficult+ OBJ: Section 7.1
   NAT: PR7 TOP: Multiplying and Dividing Monomials
   KEY: multiplying monomials | volume
4. ANS: B PTS: 1 DIF: Average OBJ: Section 7.2
   NAT: PR7 TOP: Multiplying Polynomials by Monomials
   KEY: multiplying a binomial by a monomial | distributive property | expand
5. ANS: D PTS: 1 DIF: Difficult OBJ: Section 1.3
   NAT: SS2 TOP: Surface Area
   KEY: surface area | area of face | composite object
6. ANS: B PTS: 1 DIF: Average OBJ: Section 7.3
   NAT: PR7 TOP: Dividing Polynomials by Monomials
   KEY: dividing a polynomial by a monomial | area model
7. ANS: B PTS: 1 DIF: Average OBJ: Section 7.1
   NAT: PR7 TOP: Multiplying and Dividing Monomials
   KEY: multiplying monomials | area model | area of a triangle
8. ANS: B PTS: 1 DIF: Average OBJ: Section 7.1
   NAT: PR7 TOP: Multiplying and Dividing Monomials
   KEY: multiplying monomials | simplify
9. ANS: A PTS: 1 DIF: Average OBJ: Section 5.1
   NAT: PR5 TOP: The Language of Mathematics KEY: polynomial | degree
10. ANS: B PTS: 1 DIF: Difficult+ OBJ: Section 2.4
    NAT: N6 TOP: Determining Square Roots of Rational Numbers
    KEY: rational numbers | square root | problem solving | area
11. ANS: B PTS: 1 DIF: Easy OBJ: Section 2.4
    NAT: N5 TOP: Determining Square Roots of Rational Numbers
    KEY: rational numbers | perfect square | problem solving | area
12. ANS: C PTS: 1 DIF: Average OBJ: Section 5.3
    NAT: PR6 TOP: Adding and Subtracting Polynomials
    KEY: polynomial | simplify | subtraction
13. ANS: D PTS: 1 DIF: Easy OBJ: Section 5.2
    NAT: PR5 TOP: Equivalent Expressions KEY: expression | coefficient
14. ANS: B PTS: 1 DIF: Difficult OBJ: Section 5.1
    NAT: PR6 TOP: The Language of Mathematics KEY: polynomial | model
15. ANS: A PTS: 1 DIF: Difficult OBJ: Section 5.2
    NAT: PR5 TOP: Equivalent Expressions KEY: expression | simplify | like terms

16. ANS: A PTS: 1 DIF: Easy OBJ: Section 7.2
NAT: PR7 TOP: Multiplying Polynomials by Monomials
KEY: multiplying a binomial by a monomial | area model
17. ANS: B PTS: 1 DIF: Easy OBJ: Section 5.2
NAT: PR5 TOP: Equivalent Expressions KEY: expression | variable
18. ANS: A PTS: 1 DIF: Difficult OBJ: Section 7.1
NAT: PR7 TOP: Multiplying and Dividing Monomials
KEY: multiplying monomials | simplify
19. ANS: C PTS: 1 DIF: Difficult OBJ: Section 3.1
NAT: N1 TOP: Using Exponents to Describe Numbers
KEY: evaluate powers | exponential form
20. ANS: B PTS: 1 DIF: Average OBJ: Section 2.3
NAT: N3 TOP: Problem Solving With Rational Numbers in Fraction Form
KEY: rational numbers | fraction operations | problem solving
21. ANS: C PTS: 1 DIF: Difficult OBJ: Section 1.3
NAT: SS2 TOP: Surface Area KEY: surface area | composite object
22. ANS: D PTS: 1 DIF: Difficult OBJ: Section 3.4
NAT: N1 TOP: Using Exponents to Solve Problems
KEY: problem solving | population growth
23. ANS: C PTS: 1 DIF: Easy OBJ: Section 1.3
NAT: SS2 TOP: Surface Area
KEY: surface area | area of face | composite object
24. ANS: B PTS: 1 DIF: Average OBJ: Section 7.1
NAT: PR7 TOP: Multiplying and Dividing Monomials
KEY: dividing monomials | area model | area of a rectangle
25. ANS: B PTS: 1 DIF: Average OBJ: Section 2.3
NAT: N3 TOP: Problem Solving With Rational Numbers in Fraction Form
KEY: rational numbers | fraction operations | divide

COMPLETION

26. ANS: 15°

PTS: 1 DIF: Average OBJ: Section 1.2 NAT: SS5
TOP: Rotation Symmetry and Transformations KEY: rotation symmetry | angle of rotation

27. ANS: $-7.2x^2$

PTS: 1 DIF: Easy OBJ: Section 7.1 NAT: PR7
TOP: Multiplying and Dividing Monomials KEY: multiplying monomials

28. ANS: the angle of rotation

PTS: 1 DIF: Easy OBJ: Section 1.2 NAT: SS5
TOP: Rotation Symmetry and Transformations KEY: rotation symmetry | angle of rotation

29. ANS: product

PTS: 1 DIF: Easy OBJ: Section 2.4 NAT: N3
TOP: Determining Square Roots of Rational Numbers
KEY: rational numbers | perfect square | definition

30. ANS: $2t^2 - 3t + 10$

PTS: 1 DIF: Difficult OBJ: Section 7.3 NAT: PR7
TOP: Dividing Polynomials by Monomials
KEY: dividing a polynomial by a monomial | simplify

31. ANS: integers

PTS: 1 DIF: Easy OBJ: Section 2.1 NAT: N3
TOP: Comparing and Ordering Rational Numbers KEY: rational numbers | definition

32. ANS: $2d + 2$

PTS: 1 DIF: Easy OBJ: Section 5.2 NAT: PR6
TOP: Equivalent Expressions KEY: simplify | expression | like terms

33. ANS: $5q^2 + 3q + 4$

PTS: 1 DIF: Difficult OBJ: Section 5.2 NAT: PR6
TOP: Equivalent Expressions KEY: simplify | like terms | subtraction

34. ANS: $5w^2 + w - 5$

PTS: 1 DIF: Average OBJ: Section 5.2 NAT: PR6
TOP: Equivalent Expressions KEY: simplify | expression | like terms

35. ANS:
$-3\frac{2}{5}$
-3 2/5

PTS: 1 DIF: Easy OBJ: Section 2.3 NAT: N3
TOP: Problem Solving With Rational Numbers in Fraction Form
KEY: rational numbers | mixed numbers | improper fractions

MATCHING

36. ANS: A PTS: 1 DIF: Easy OBJ: Section 3.1
NAT: N1 TOP: Using Exponents to Describe Numbers
KEY: base | exponential form

37. ANS: B PTS: 1 DIF: Easy OBJ: Section 3.1
NAT: N1 TOP: Using Exponents to Describe Numbers
KEY: exponent

38. ANS: C PTS: 1 DIF: Easy OBJ: Section 3.1
NAT: N1 TOP: Using Exponents to Describe Numbers
KEY: exponential form | repeated multiplication

39. ANS: D PTS: 1 DIF: Average OBJ: Section 3.1
NAT: N1 TOP: Using Exponents to Describe Numbers
KEY: power | exponential form
40. ANS: B PTS: 1 DIF: Easy OBJ: Section 3.1
NAT: N1 TOP: Using Exponents to Describe Numbers
KEY: exponential form

41. ANS: B PTS: 1 DIF: Easy OBJ: Section 2.1
NAT: N3 TOP: Problem Solving With Rational Numbers in Decimal Form
KEY: rational numbers | definition
42. ANS: A PTS: 1 DIF: Average OBJ: Section 2.4
NAT: N5 TOP: Determining Square Roots of Rational Numbers
KEY: square root | definition
43. ANS: E PTS: 1 DIF: Easy OBJ: Section 2.3
NAT: N3 TOP: Problem Solving With Rational Numbers in Fraction Form
KEY: mixed number
44. ANS: D PTS: 1 DIF: Easy OBJ: Section 2.4
NAT: N6 TOP: Determining Square Roots of Rational Numbers
KEY: non-perfect square | definition
45. ANS: F PTS: 1 DIF: Easy OBJ: Section 2.3
NAT: N3 TOP: Problem Solving With Rational Numbers in Fraction Form
KEY: improper fraction

46. ANS: B PTS: 1 DIF: Average OBJ: Section 3.2
NAT: N2 TOP: Exponent Laws KEY: power of power | exponent laws
47. ANS: C PTS: 1 DIF: Easy OBJ: Section 3.2
NAT: N2 TOP: Exponent Laws KEY: quotient of powers | exponent laws
48. ANS: F PTS: 1 DIF: Average OBJ: Section 3.3
NAT: N4 TOP: Order of Operations KEY: order of operations
49. ANS: E PTS: 1 DIF: Easy OBJ: Section 3.3
NAT: N4 TOP: Order of Operations KEY: order of operations
50. ANS: A PTS: 1 DIF: Easy OBJ: Section 3.2
NAT: N2 TOP: Exponent Laws KEY: quotient of powers | exponent laws

51. ANS: B PTS: 1 DIF: Average OBJ: Section 7.2
NAT: PR7 TOP: Multiplying Polynomials by Monomials
KEY: distributive property
52. ANS: A PTS: 1 DIF: Average OBJ: Section 7.1
NAT: PR7 TOP: Multiplying and Dividing Monomials
KEY: expression
53. ANS: F PTS: 1 DIF: Easy OBJ: Section 7.1
NAT: PR7 TOP: Multiplying and Dividing Monomials
KEY: variable
54. ANS: C PTS: 1 DIF: Easy OBJ: Section 7.1
NAT: PR7 TOP: Multiplying and Dividing Monomials
KEY: like terms

55. ANS: D PTS: 1 DIF: Easy OBJ: Section 7.1
NAT: PR7 TOP: Multiplying and Dividing Monomials
KEY: term | simplify

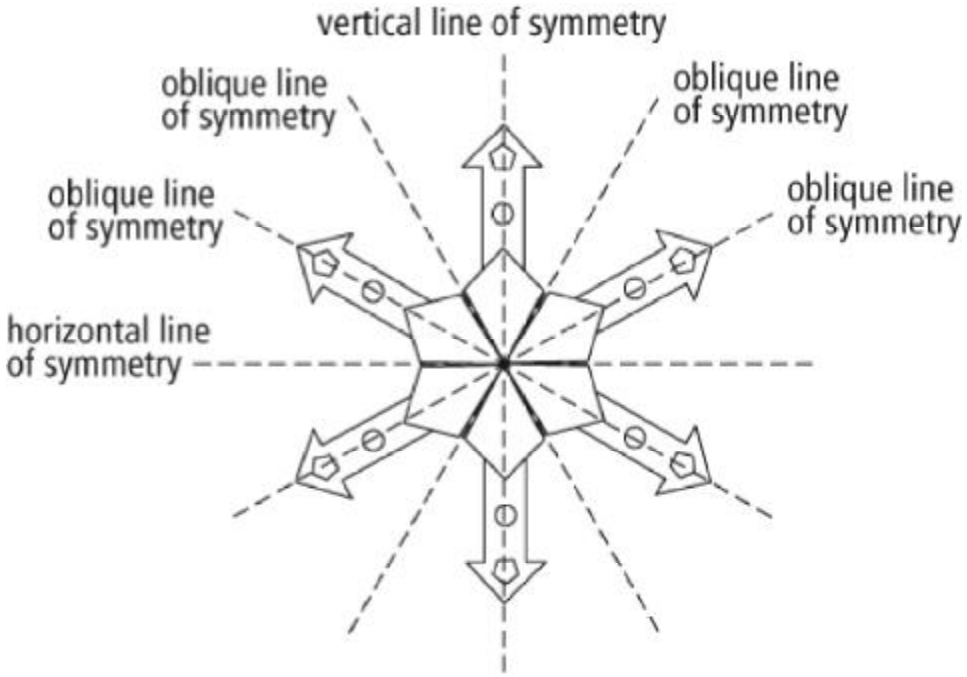
56. ANS: C PTS: 1 DIF: Average OBJ: Section 1.1
NAT: SS5 TOP: Line Symmetry KEY: symmetry | line of symmetry
57. ANS: B PTS: 1 DIF: Easy OBJ: Section 1.2
NAT: SS5 TOP: Rotation Symmetry and Transformations
KEY: rotation symmetry | centre of rotation
58. ANS: F PTS: 1 DIF: Easy OBJ: Section 1.2
NAT: SS5 TOP: Rotation Symmetry and Transformations
KEY: symmetry | rotation symmetry
59. ANS: E PTS: 1 DIF: Average OBJ: Section 1.2
NAT: SS5 TOP: Rotation Symmetry and Transformations
KEY: rotation symmetry | order of rotation
60. ANS: A PTS: 1 DIF: Average OBJ: Section 1.2
NAT: SS5 TOP: Rotation Symmetry and Transformations
KEY: rotation symmetry | angle of rotation

61. ANS: F PTS: 1 DIF: Average OBJ: Section 7.2
NAT: PR7 TOP: Multiplying Polynomials by Monomials
KEY: multiplying a binomial by a monomial | distributive property
62. ANS: C PTS: 1 DIF: Average OBJ: Section 7.1
NAT: PR7 TOP: Multiplying Polynomials by Monomials
KEY: multiplying monomials
63. ANS: E PTS: 1 DIF: Average OBJ: Section 7.3
NAT: PR7 TOP: Dividing Polynomials by Monomials
KEY: dividing a polynomial by a monomial
64. ANS: B PTS: 1 DIF: Difficult OBJ: Section 7.2 | Section 7.3
NAT: PR7 TOP: Multiplying Polynomials by Monomials | Dividing Polynomials by Monomials
KEY: multiplying a polynomial by a monomial | dividing a polynomial by a monomial | distributive property
65. ANS: A PTS: 1 DIF: Easy OBJ: Section 7.1
NAT: PR7 TOP: Multiplying and Dividing Monomials
KEY: dividing monomials

66. ANS: A PTS: 1 DIF: Easy OBJ: Section 5.1
NAT: PR5 TOP: The Language of Mathematics KEY: algebra | symbol
67. ANS: B PTS: 1 DIF: Average OBJ: Section 5.1
NAT: PR5 TOP: The Language of Mathematics KEY: degree | term
68. ANS: E PTS: 1 DIF: Easy OBJ: Section 5.1
NAT: PR5 TOP: The Language of Mathematics KEY: variable | symbol
69. ANS: D PTS: 1 DIF: Average OBJ: Section 5.1
NAT: PR5 TOP: The Language of Mathematics KEY: term | expression | variable

SHORT ANSWER

70. ANS:



PTS: 4 DIF: Difficult OBJ: Section 1.1 NAT: SS5
TOP: Line Symmetry
KEY: symmetry | oblique line of symmetry | horizontal line of symmetry | vertical line of symmetry

71. ANS:

area of top: $25 \times 35 = 875 \text{ cm}^2$

area of front: $25 \times 35 = 875 \text{ cm}^2$

area of side: $25 \times 25 = 625 \text{ cm}^2$

total surface area: $2(875 + 875 + 625) = 4750 \text{ cm}^2$

The cutout piece does not affect the surface area of the object.

The total surface area of the object is 4750 cm^2.

PTS: 2 DIF: Average OBJ: Section 1.3 NAT: SS2
TOP: Surface Area KEY: surface area | faces | composite object

72. ANS:
$2(4x + 3) + 2(3x^2 – x – 2)$
$= 8x + 6 + 6x^2 – 2x – 4$
$= 6x^2 + 6x + 2$
The perimeter of the rectangle is $6x^2 + 6x + 2$.

PTS: 1 DIF: Average OBJ: Section 7.2 NAT: PR7
TOP: Multiplying Polynomials by Monomials
KEY: multiplying a binomial by a monomial | area model

73. ANS:
Area of bedroom $= 16 \times$ area of desk
$= 16 \times 10\,000$
$= 160\,000 \text{ cm}^2$
Side length of bedroom $= \sqrt{160\,000}$
$= 400 \text{ cm}$
The side length of the square bedroom is 400 cm.

PTS: 1 DIF: Average OBJ: Section 2.4 NAT: N5
TOP: Determining Square Roots of Rational Numbers KEY: perfect square | problem solving | area

74. ANS:
$SA = 2(2a \times a) + 2(3a \times a) + 2(2a \times 3a)$
$= 4a^2 + 6a^2 + 12a^2$
$= 22a^2$
The surface area of the rectangular prism is $22a^2$.

PTS: 1 DIF: Difficult OBJ: Section 7.1 NAT: PR7
TOP: Multiplying and Dividing Monomials KEY: multiplying monomials | like terms

75. ANS:
$(4.5 – 7.8) \times (8.4 \div 2) = (–3.3) \times 4.2$
$= –13.86$
No, Denise did not evaluate the expression correctly. She made a mistake subtracting 7.8 from 4.5. The answer should be negative, not positive.

PTS: 1 DIF: Average OBJ: Section 2.2 NAT: N3
TOP: Problem Solving With Rational Numbers in Decimal Form
KEY: rational numbers | order of operations | number operations | subtract | multiply | divide | positive and negative integers

76. ANS:
a) 512 cm^3 **c)** 125 000 mm^3
b) 2744 m^3 **d)** 0.216 km^3

PTS: 1 DIF: Average OBJ: Section 3.4 NAT: N1
TOP: Using Exponents to Solve Problems KEY: volume of a cube | problem solving

77. ANS:
$p^2 - p + 3$

PTS: 1 DIF: Average OBJ: Section 5.3 NAT: PR6
TOP: Adding and Subtracting Polynomials KEY: expression | simplify | model

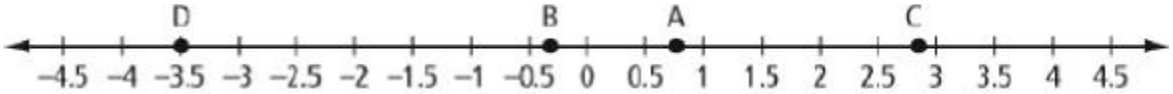
78. ANS:
a) 9^4 **c)** -1^3
b) 4^5 **d)** 6^6

PTS: 1 DIF: Average OBJ: Section 3.1 NAT: N1
TOP: Using Exponents to Describe Numbers KEY: represent powers

79. ANS:
a) 256 **c)** 20
b) 88 **d)** 25

PTS: 1 DIF: Average OBJ: Section 3.3 NAT: N4
TOP: Order of Operations KEY: order of operations

80. ANS:



PTS: 4 DIF: Average OBJ: Section 2.1 NAT: N3
TOP: Comparing and Ordering Rational Numbers
KEY: rational numbers | ordering | decimal numbers | fractions | mixed numbers

81. ANS:
a) 2^6 **c)** 6^4
b) 3^5 **d)** 8^4

PTS: 1 DIF: Average OBJ: Section 3.1 NAT: N1
TOP: Using Exponents to Describe Numbers KEY: represent powers | exponential form

82. ANS:

PTS: 1 DIF: Easy OBJ: Section 5.2 NAT: PR6
TOP: Equivalent Expressions KEY: model | polynomial

PROBLEM

83. ANS:

$6^2 - 3^2 = 36 - 9$

$= 27$

The garden has an area of 27 m^2.

PTS: 1 DIF: Easy OBJ: Section 3.3 NAT: N4
TOP: Order of Operations KEY: area | problem solving

84. ANS:

$(3x^2 - 2x + 4)$ and $(-3x^2 + 2x - 4)$

PTS: 1 DIF: Average OBJ: Section 5.2 NAT: PR6
TOP: Equivalent Expressions KEY: model | expression

85. ANS:

a) Kevin's explanation was incorrect. When dividing powers, the exponents should be subtracted. Kevin divided the exponent.

b) $4^6 \div 4^2 = 4^{(6-2)}$

$= 4^4$

$= 256$

The correct answer is 256.

PTS: 1 DIF: Average OBJ: Section 3.2 NAT: N2
TOP: Exponent Laws KEY: quotient of powers | exponent laws

86. ANS:

Example:

Part Perimeter $= 5x^2 - 2x + 4x^2 + 4x$

$= 9x^2 + 2x$

Difference from perimeter $= (14x^2 + 8x) - (9x^2 + 2x)$

$= 5x^2 + 6x$

The missing side length is $5x^2 + 6x$.

PTS: 1 DIF: Average OBJ: Section 5.3 NAT: PR5
TOP: Adding and Subtracting Polynomials KEY: polynomial | subtraction | perimeter

87. ANS:

$P = 5x^2 - 2x + 4x^2 + 4x + 5x^2 + 6x$

$P = 14x^2 + 8x$

The perimeter is $14x^2 + 8x$.

PTS: 1 DIF: Easy OBJ: Section 5.3 NAT: PR5
TOP: Adding and Subtracting Polynomials KEY: polynomial | subtraction | perimeter

88. ANS:
Example:
Calculate the area of each rectangle and add.
$A = (2x)(3x - 1) + (2x)(0.5x)$

$A = 6x^2 - 2x + x^2$

$A = 7x^2 - 2x$

Calculate the total length of the long side of the rectangle and use it to calculate the area.
$A = (2x)(3x - 1 + 0.5x)$

$A = (2x)(3.5x - 1)$

$A = 7x^2 - 2x$

PTS: 1 DIF: Average OBJ: Section 7.2 NAT: PR7
TOP: Multiplying Polynomials by Monomials
KEY: multiplying a binomial by a monomial | area

89. ANS:
Surface area of top cylinder: $2p2.5^2 + 2p2.5(9)$

$= 39.25 + 141.3$

$= 180.55 \text{ cm}^2$

Surface area of bottom cylinder: $2p4^2 + 2p4(1.5)$

$= 50.24 + 37.68$

$= 87.92 \text{ cm}^2$

Surface area of join: $2p2.5^2$

$= 39.25 \text{ cm}^2$

Total surface area: surface area of top + surface area of bottom – surface area of join

$= 180.25 + 87.92 - 39.25$

$= 228.92 \text{ cm}^2$

The total surface area of Whitney's bird feeder is 228.9 cm^2.

PTS: 5 DIF: Difficult+ OBJ: Section 1.3 NAT: SS2
TOP: Surface Area KEY: surface area | faces | area of face | cylinder

90. ANS:

$A = \frac{bh}{2}$

$A = \frac{(2x)(4-5x)}{2}$

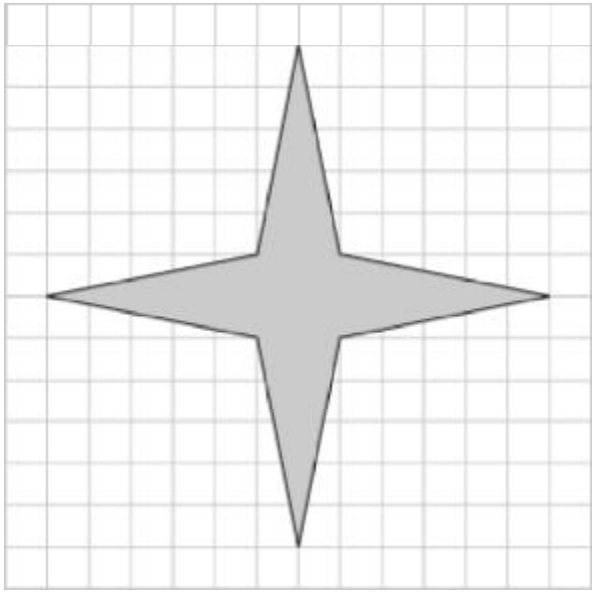
$A = \frac{8x-10x^2}{2}$

$A = 4x - 5x^2$

An expression for the area of the triangle is $4x - 5x^2$.

PTS: 1 DIF: Average OBJ: Section 7.2 NAT: PR7
TOP: Multiplying Polynomials by Monomials
KEY: multiplying a binomial by a monomial | area | simplify

91. ANS:



PTS: 1 DIF: Average OBJ: Section 1.1 NAT: SS5
TOP: Line Symmetry
KEY: symmetry | oblique line of symmetry | draw shape with symmetry