## Math 8 Final Exam

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

_____   1.   Which of these numbers is a perfect square: 50, 20, 25, or 15?
   a.   50   b.   20   c.   25   d.   15

_____   2.   What is the side length of a square with area 25 cm²?
   a.   5 cm   b.   12.5 cm   c.   6.25 cm   d.   20 cm

_____   3.   Find 8².
   a.   8   b.   64   c.   16   d.   32

_____   4.   Which whole number is $\sqrt{8}$ closer to?
   a.   5   b.   4   c.   3   d.   2

_____   5.   The area of square P is 52 cm².
   Square Q has an area equal to one quarter the area of square P.
   Find the approximate side length of square Q.
   Give your answer to 1 decimal place.
   a.   3.6 cm   b.   5.1 cm   c.   13 cm   d.   1.8 cm

_____   6.   Find the length of the hypotenuse. Give your answer to 1 decimal place.
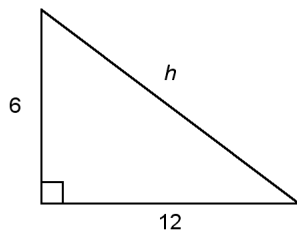
   a.   144.0   b.   10.4   c.   13.4   d.   36.0

_____ 7. The area, in square centimetres, of the square on each side of a triangle is given. Which triangle is NOT a right triangle?
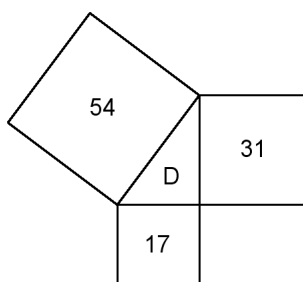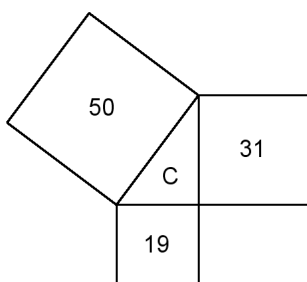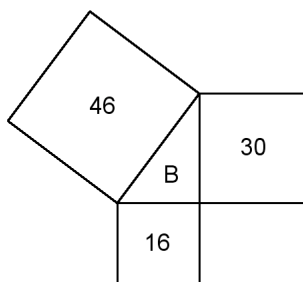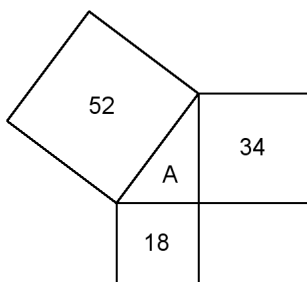
a. Triangle D   b. Triangle C   c. Triangle B   d. Triangle A

_____ 8. In a right triangle, the length of the hypotenuse is 18 m and the length of one of the legs is 15 m. Find the length of the other leg. Round your answer to the nearest tenth.
a. 5.0 m   b. 6.8 m   c. 9.9 m   d. 23.4 m

_____ 9. This diagram shows 2 flag poles that are 4.5 m tall. The distance from the top of the left pole to the base of the right pole is 7.5 m. What is the distance between the 2 flag poles?
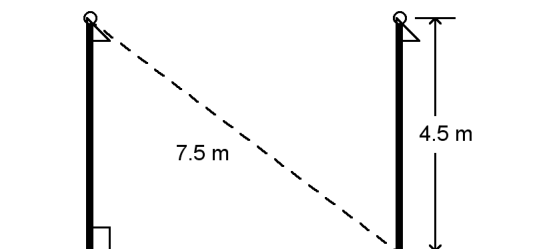
a. 5.0 m   b. 6.0 m   c. 3.0 m   d. 4.5 m

_____ 10. Find the product $(+5) \times (-9)$. Use a number line if necessary.
a. -45 b. $+45$ c. $+14$ d. -4

_____ 11. Replace $\square$ with an integer to make the equation true.
$\square \times (-5) = -30$
a. $+6$ b. -6 c. -25 d. $+25$

_____ 12. Find this product. $(-15) \times (-8)$
   a. -120 b. $+120$ c. $+23$ d. -23

_____ 13. Find the quotient $(-21) \div (-3)$. Use a number line if it helps.
   a. -24 b. -7 c. -18 d. $+7$

_____ 14. Evaluate. $9 + (-7) - (-4)$
   a. 6 b. -2 c. 12 d. 20

_____ 15. Evaluate. $(-6)[(-3) + 9]$
   a. 72 b. -36 c. -72 d. 27

_____ 16. Evaluate. $-13 + 9 \div (-3) + 9$
   a. 1 b. -1 c. 7 d. -7

_____ 17. Multiply. $2 \times \dfrac{7}{12}$
   a. $\dfrac{7}{24}$ b. $\dfrac{7}{6}$ c. $\dfrac{3}{4}$ d. $\dfrac{31}{12}$

_____ 18. Find this product. $\dfrac{4}{5} \times \dfrac{15}{20}$
   a. $\dfrac{19}{25}$ b. $\dfrac{2}{3}$ c. $\dfrac{3}{5}$ d. $\dfrac{19}{100}$

_____ 19. Find the reciprocal of $\dfrac{2}{11}$.
   a. $\dfrac{-11}{2}$ b. $\dfrac{-2}{-11}$ c. $\dfrac{-2}{11}$ d. $\dfrac{11}{2}$

_____ 20. Write $3\dfrac{2}{3}$ as an improper fraction.
   a. $\dfrac{11}{3}$ b. $\dfrac{5}{3}$ c. $\dfrac{8}{3}$ d. $\dfrac{15}{3}$

_____ 21. Multiply. $1\dfrac{1}{3} \times 2\dfrac{1}{3}$
   a. $3\dfrac{1}{9}$ b. $2\dfrac{1}{9}$ c. $1\dfrac{2}{9}$ d. $3\dfrac{2}{3}$

_____ 22. Find this quotient. $8 \div \dfrac{1}{3}$
   a. 24 b. $2\dfrac{2}{3}$ c. $\dfrac{3}{8}$ d. $\dfrac{1}{24}$

_____ 23. Find this quotient. $\dfrac{8}{12} \div 4$
   a. 6 b. $\dfrac{1}{6}$ c. $\dfrac{2}{3}$ d. $\dfrac{8}{3}$

____ 24. Find this quotient. $\dfrac{5}{3} \div \dfrac{15}{7}$

   a. $3\dfrac{4}{7}$ b. $\dfrac{7}{9}$ c. $\dfrac{7}{15}$ d. $2\dfrac{2}{15}$

____ 25. Divide. $\dfrac{4}{5} \div \dfrac{5}{4}$

   a. 1   b. $\dfrac{16}{25}$ c. $1\dfrac{9}{16}$ d. $\dfrac{8}{25}$

____ 26. Divide. $2\dfrac{1}{3} \div 2\dfrac{1}{2}$

   a. $\dfrac{14}{15}$ b. $5\dfrac{5}{6}$ c. $\dfrac{2}{3}$ d. $1\dfrac{1}{14}$

____ 27. Which operation would you do first?
$$\dfrac{5}{6} \times \left(\dfrac{6}{7} + \dfrac{7}{8} \right) \div \dfrac{8}{7} - \dfrac{5}{6}$$
   a. Addition   b. Subtraction   c. Multiplication   d. Division

____ 28. Which operation would you do first?
$$\left(\dfrac{5}{6} - \dfrac{7}{8} \right) \times \dfrac{6}{7} \div \dfrac{5}{6} + \dfrac{6}{5}$$
   a. Addition   b. Subtraction   c. Multiplication   d. Division

____ 29. Evaluate. $\dfrac{2}{3} + \dfrac{3}{5} \times \dfrac{15}{4}$
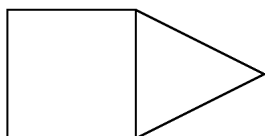
   a. $2\dfrac{11}{12}$ b. $4\dfrac{3}{4}$ c. $1\dfrac{1}{4}$ d. $2\dfrac{1}{12}$

____ 30. This is an incomplete net for a triangular prism. What shapes do you add to complete this net?

   a. 3 squares   c. 1 triangle and 3 squares
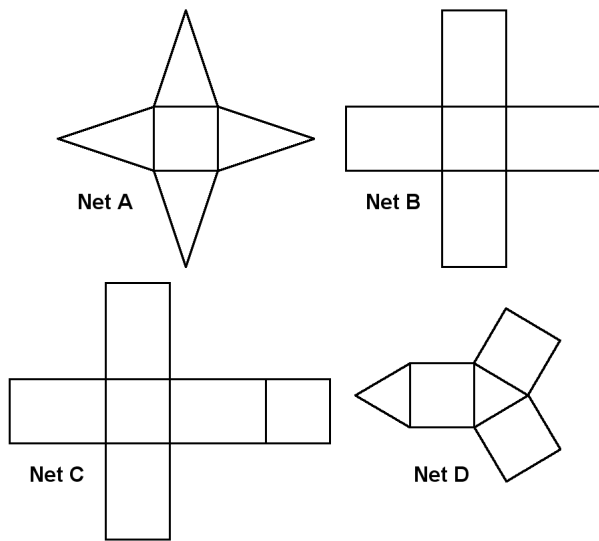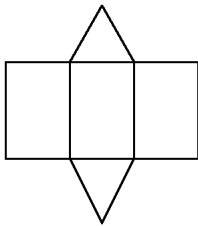   b. 1 triangle and 2 squares   d. 3 triangles

____ 31. Which diagram is the net for a square pyramid?

Net A

Net B

Net C

Net D

a.   Net A   b.   Net B   c.   Net C   d.   Net D

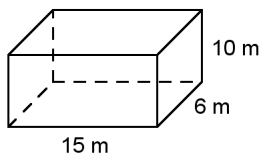____ 32. Name the polyhedron that can be made from this net.

a.   Rectangular pyramid   c.   Rectangular prism
b.   Triangular prism   d.   Triangular pyramid

____ 33. How many triangular faces are there in a pentagonal pyramid?
   a.   1   b.   5   c.   2   d.   3

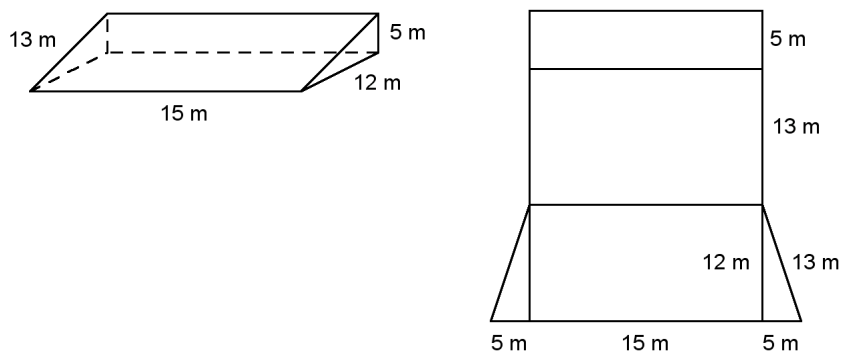____ 34. Find the surface area of this right rectangular prism.

10 m
6 m
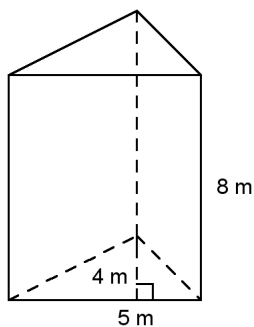15 m

a.   420 m²   b.   300 m²   c.   600 m²   d.   480 m²
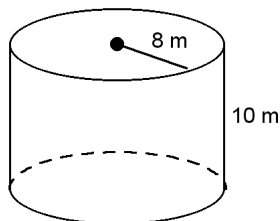
_____ 35. Use the net to find the surface area of the right triangular prism.


     a.   90 m²   b.   585 m²   c.   510 m²   d.   2340 m²

_____ 36. A right rectangular prism measures 9 cm by 7 cm by 10 cm. What is the volume of the prism?
     a.   630 cm³   b.   104 cm³   c.   223 cm³   d.   156 cm³
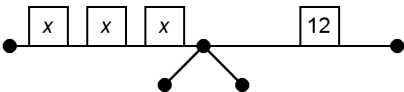
_____ 37. Find the volume of this triangular prism.

     a.   160 m³   b.   80 m³   c.   320 m³   d.   184 m³

_____ 38. Find the surface area of this cylinder to the nearest square metre.

     a.   905 m²   b.   704 m²   c.   653 m²   d.   452 m²

_____ 39. Find the volume of this cylinder. Round your answer to the nearest tenth.
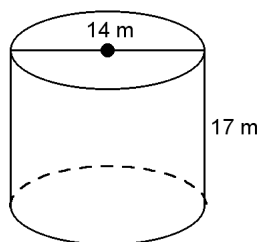
     a.   747.7 m³   b.   373.8 m³   c.   2616.9 m³   d.   238 m³

_____ 40. Write 76% as a decimal.
    a. 7.6   b. 0.76   c. 0.076   d. 76

_____ 41. Write this fraction as a percent.
$$\frac{659}{100}$$
    a. 659%   b. 653%   c. 6.59%   d. 6.57%

_____ 42. Find 274% of 70.
    a. 39.14   b. 1918   c. 19.18   d. 191.8

_____ 43. Calculate the sale price of this item before taxes.
30% off a bike for $397.95
    a. $179.08   b. $119.39   c. $238.77   d. $278.57

_____ 44. The sales taxes are 14%. Find the tax paid for a pair of running shoes that costs $115.
    a. $16.10   b. $161.00   c. $1.22   d. $2.25

_____ 45. What is the ratio of triangles to circles?

    a. 6:5   b. 5:6   c. 7:5   d. 5:7

_____ 46. The ratio of boys to girls in a class is 5 to 6.
What is the ratio of boys to students in the class?
    a. 6 to 30   b. 6 to 11   c. 5 to 30   d. 5 to 11

_____ 47. The ratios 40: ■ and 8:7 are equivalent. Find the missing number.
    a. 42   b. 35   c. 32   d. 55

_____ 48. Find the value of the variable.
$18:12 = 30:w$
    a. 28   b. 40   c. 56   d. 20

_____ 49. One hundred nautical miles is about 185 km.
About how many kilometres is 120 nautical miles?
    a. 65 km   b. 222 km   c. 185 km   d. 2220 km

_____ 50. At the market, 5 cans of soup cost $4.75. What is the cost of 1 can of soup?
    a. 97¢   b. $1.90   c. 96¢   d. 95¢

_____ 51. You pay $2.80 for 7 bagels. Find the unit cost for these bagels.
    a. $0.47 per bagel   c. $0.50 per bagel
    b. $0.40 per bagel   d. $0.20 per bagel

_____ 52. Use this balance-scales model to solve for x.

    a. −4   b. 9   c. 15   d. 4

_____ 53. Solve this equation. $3x + 11 = 23$
   a. 9   b. 4   c. 11   d. −4

_____ 54. Write an equation for this situation.
Patricia has p posters. She sold 8 and has 18 left.
a. $p + 18 = 8$ c. $p + 8 = 18$
b. $p - 8 = 18$ d. $p = 18 - 8$

_____ 55. Solve this equation. $4y + 8 = 36$
a. 1 b. 3 c. 7 d. 24

_____ 56. Solve this equation. $\dfrac{x}{-6} = -9$
a. 54 b. -54 c. -15 d. -3

_____ 57. Solve this equation. $9 + \dfrac{d}{4} = 23$
a. 83 b. -13 c. 56 d. 10

_____ 58. Solve this equation. $\dfrac{t}{-2} - 7 = 16$
a. -46 b. -25 c. 30 d. 21

_____ 59. Expand. $4(x + 7)$
a. $4x + 7$ b. $4x + 28$ c. $4 + x + 7$ d. $28x$

_____ 60. Expand. $-6(5 - x)$
a. $-30 + 6x$ b. $-30 - 6x$ c. $-11 - 6x$ d. $-30 - x$

_____ 61. Solve this equation: $-5(a + 4) = 15$
a. 1 b. -7 c. 40 d. 7

_____ 62. The ordered pair (5,) is in the linear relation with equation $y = -2x + 8$.
Find the missing number in the ordered pair.
a. 1 b. 11 c. -2 d. -18

____ 63. Graph the relation $y = -2x + 3$ for integer values of x from 0 to 4.
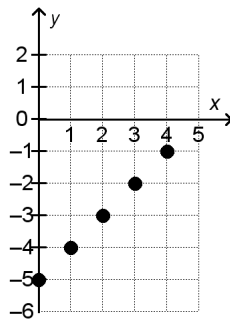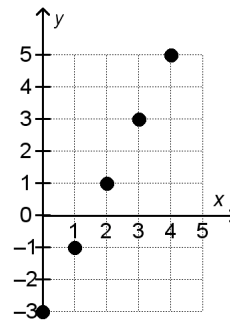
a.
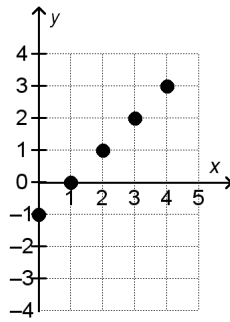
c.
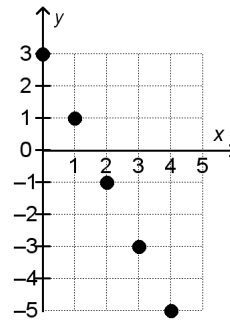
b.

d.

____ 64. Which relations have graphs that are lines going up to the right?

i) $y = -5x + 3$

ii) $y = 5x + 3$

iii) $y = -5x - 3$

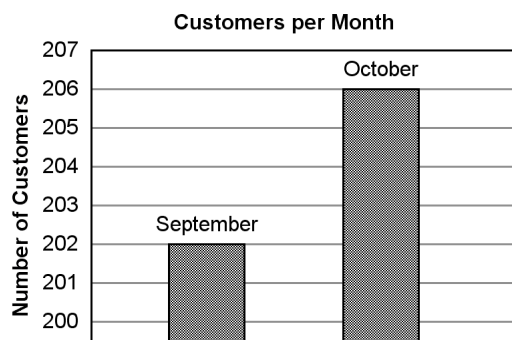iv) $y = 5x - 3$

a.   ii and iv   b.   i and iii   c.   ii   d.   i, ii, and iv

____ 65. This graph shows the number of customers buying from a store in September and October.

Is the graph misleading? If it is misleading, explain why.

a.   Yes, the bars do not touch.

b.   No, the graph is not misleading.

c.   Yes, the intervals on the vertical axis between 200 and 207 are not even.

d.   Yes, the graph exaggerates the difference in the number of customers between September and October.

_____ 66. A clothing manufacturer offers 2 different styles of jeans, relaxed fit and regular fit, in 5 different colours. How many combinations of a style and a colour are possible?

    a.   4   b.   8   c.   7   d.   10

_____ 67. A coin is tossed and a regular 6-sided die labelled 1 to 6 is rolled.
What is the probability of tossing a head and rolling a 5?

    a. $\dfrac{1}{12}$ b. $\dfrac{1}{4}$ c. $\dfrac{2}{3}$ d. $\dfrac{1}{6}$

_____ 68. A red die, a blue die, and a green die are rolled. Each is a regular 6-sided die labelled 1 to 6.
What is the probability of rolling an even number on each die?

    a. $\dfrac{1}{6}$ b. $\dfrac{1}{216}$ c. $\dfrac{1}{2}$ d. $\dfrac{1}{8}$

_____ 69. This object is made using 4 linking cubes. Draw the right side view of the object.
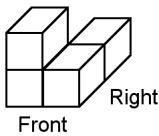
    a.   b.   c.   d.
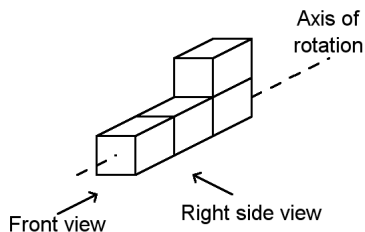

_____ 70. Draw the side view of this object.
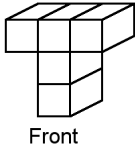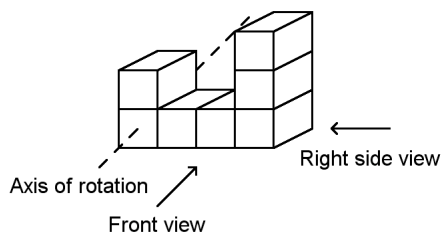

    a.   b.   c.   d.

_____ 71. This object is built using 4 linking cubes.
The object is rotated vertically 90° clockwise about the axis shown.
Draw the right side view of the object after the rotation.

    a.   b.   c.   d.

_____ 72. This object is built using 7 linking cubes.
The object is rotated vertically 90° clockwise about the axis shown.

Which view is the front view of the object after the rotation?
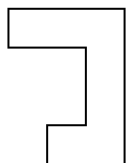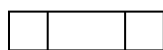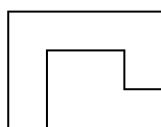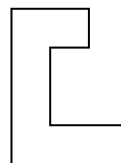
View K   View L   View M   View N

a. View K   b. View L   c. View M   d. View N

_____ 73. These are views of an object built using linking cubes. Sketch the object.
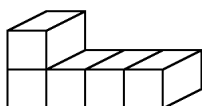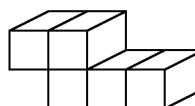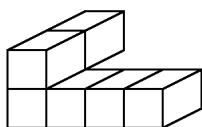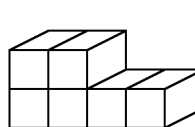
Top view

Left side view   Front view   Right side view

a.

c.

b.

d.

____ 74. These are views of an object built using linking cubes. Sketch the object.

Top view

Left side view Front view Right side view
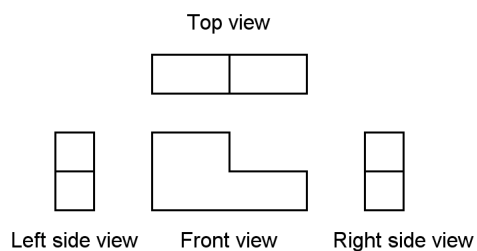
a.
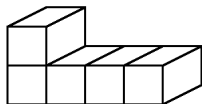
c.
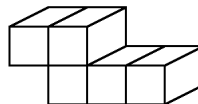
b.
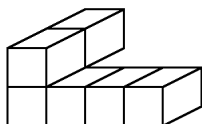
d.
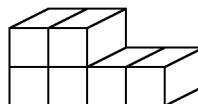
____ 75. These are views of an object built using linking cubes.
The letters refer to the colours of the cubes.
R = red, B = blue, G = green, Y = yellow, and P = purple
Sketch the object and label the colours.

Top view

| R | B | P |

| R | | R | | P | | P |
| G | | G | B | Y | | Y |

Left side view   Front view   Right side view
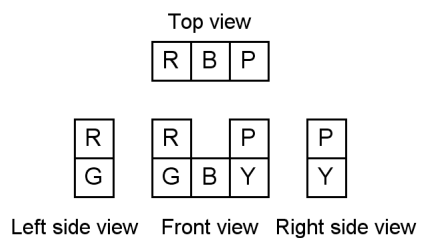
a.
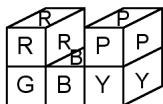
c.

b.

d.
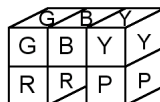
_____ 76. Triangle B is a translation image of Triangle A. Describe the translation.
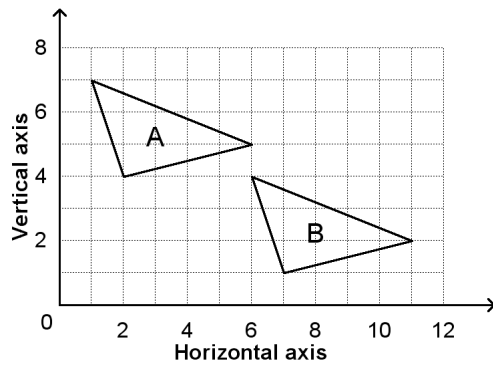
    a.   5 units right and 3 units down   c.   3 units right and 5 units down

    b.   5 units left and 3 units up   d.   3 units left and 5 units up

_____ 77. Triangle B is the image of Triangle A after a reflection in a vertical line through the point (6, 0). Which diagram shows the correct position of Triangle B?

    a.

    c.

    b.

    d.
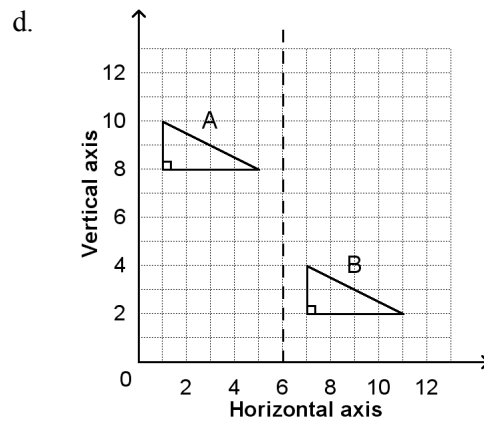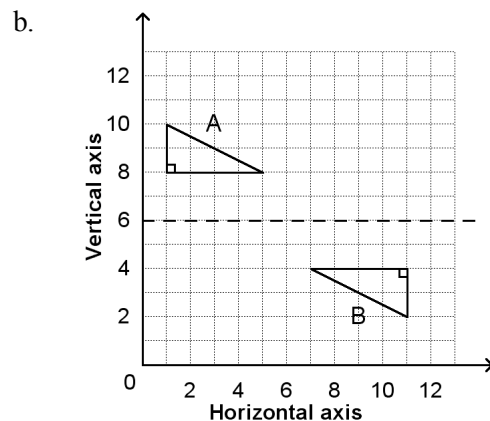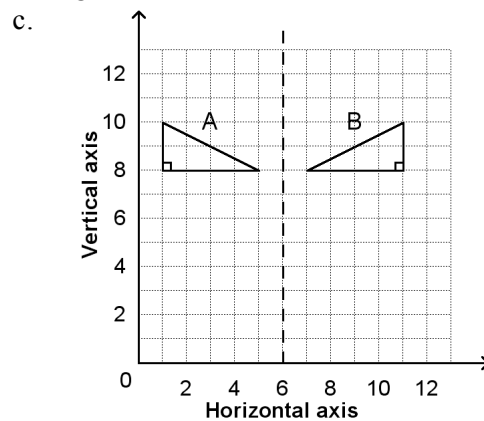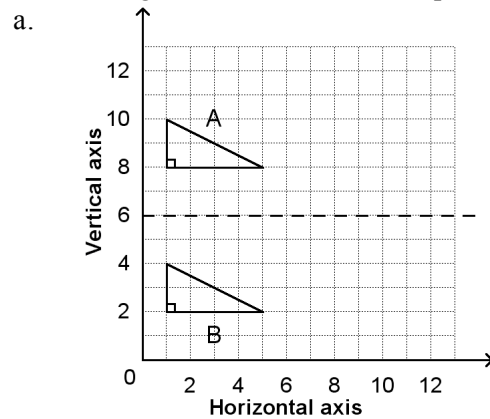
____ 78. Triangle SOQ is a transformation image of Triangle KOV. Describe the transformation.
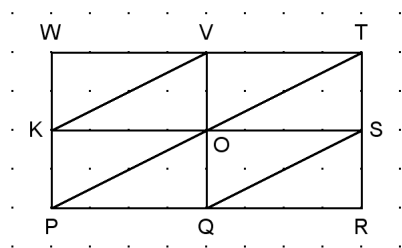
    a. 90° clockwise rotation about O
    b. Reflection in the line PT
    c. 180° rotation about O
    d. Translation 4 units right and 2 units down

____ 79. Which shape does not tessellate?
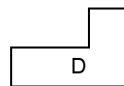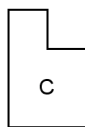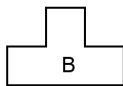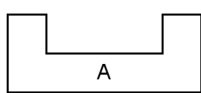
    a. Shape A   b. Shape B   c. Shape C   d. Shape D

____ 80. This L-shape below is used to create the design on its right.
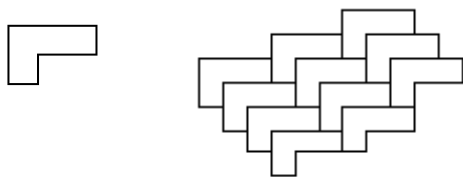
    Identify the transformations used.
    a. Translations only
    b. Reflections only
    c. Rotations only
    d. None of these

Short Answer

81. Order from least to greatest: 5^2, 4^2, $\sqrt{289}$, 19

82. What is a factor?

83. This logo is made up of 4 congruent right triangles. Find the perimeter of the logo.
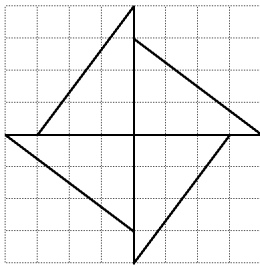
84. Write the next 2 terms in this pattern. Then write a pattern rule.
+2, −6, +18, −54, ...

85. The water level in a pool dropped 80 mm each hour. The total drop in water level was 480 mm. How long did it take for the water level to change?

86. Find $\frac{2}{3}$ of $\frac{4}{7}$.

87. Find this product. $\frac{3}{8} \times \frac{20}{21}$

88. Evaluate. $\sqrt{\frac{25}{36}}$

89. Write the mixed number and the improper fraction represented by this picture.
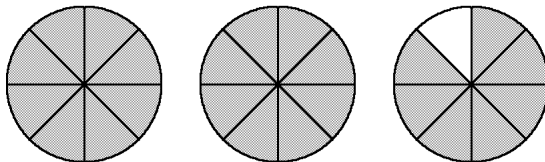
90. Write the reciprocal of $2\frac{3}{4}$.

91. Write $\frac{41}{4}$ as a mixed number.

92. Evaluate. $2\frac{7}{10} \times 1\frac{1}{4} \div 3\frac{3}{8}$

93. Sketch a net for each object.
    a) a closed cylinder
    b) an open cylinder

94. The surface area of a cube is 216 cm².
    a) What is the surface area of one face of the cube?
    b) What is the length of one edge of the cube?

95. The 2 ends of a right triangular prism are equilateral triangles. Each has an area of 27 cm².
    The total surface area of the prism is 390 cm². Calculate the area of each rectangular face.

96. If each of the length, width, and height of a rectangular prism is doubled, what happens to the volume?

97. Calculate the volume of this triangular prism.
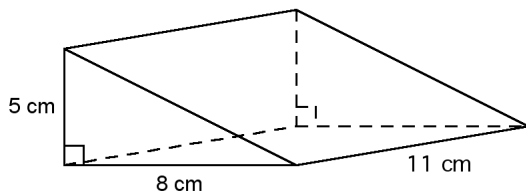
98. A circle has radius 18 cm. Find the circumference to the nearest centimetre.

99. There are 26 concrete cylindrical pillars in a stadium.
    Each column has diameter 3.4 m and height 12 m.
    Calculate the total volume of concrete in the pillars, to the nearest cubic metre. Use $\pi = 3.14$.

100. Write $\dfrac{18}{240}$ as a decimal and as a percent.

101. What percent of 200 is 69?

102. You have 4 red cubes, 5 blue cubes, and 7 green cubes.
    Which sets of cubes could you use to show the ratio 7:9?

103. Write 2 ratios equivalent to the ratio 5:2.

104. Miguel made 5 of 12 free shots in his basketball game.
    Nadia made 8 of 11 free shots in her basketball game.
    Who played better? Explain.

105. What is the mass needed to balance these scales?
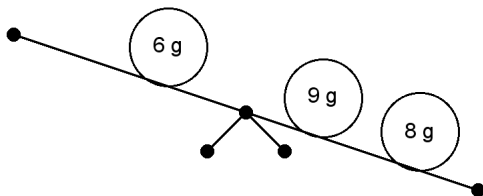
106. A white square represents +1, a black square represents –1, and a black rectangle represents –x. Find the value of x.
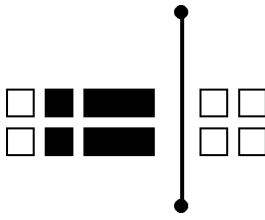
107. Solve this equation. $-6p + 9 = -33$

108. Solve this equation: $5(y - 6) = 10$

109. Make a table of values for the relation $y = x - 4$ for $x = -4, -3, -2, -1, 0$.

110. This table of values is for the linear relation with equation $y = b - x$, where b is a constant. Find the value of b.

x	1	2	3	4	5
y	11	10	9	8	7

111. Two regular 6-sided dice, each labelled 1 to 6, are rolled. What is the probability of rolling 2 even numbers?

112. A yellow die, a purple die, and a green die are rolled. Each is a regular 8-sided die labelled 1 to 8. What is the probability of rolling a 4 on the yellow die, a 2 on the purple die, and a 7 on the green die?

113. There are 3 decks of standard playing cards. Each of 3 students picks a card at random from a deck. What is the probability of each student picking a face card (Jack, Queen, King)?

114. This object is made using linking cubes. Sketch the right side, front, and top views of the object.
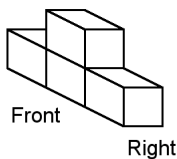
115. This object is built using 8 linking cubes.
The object is rotated vertically 90° away from you about the horizontal axis shown.
Draw the top, front, and side views of the rotated object.

Axis of rotation

Front view

Left side view
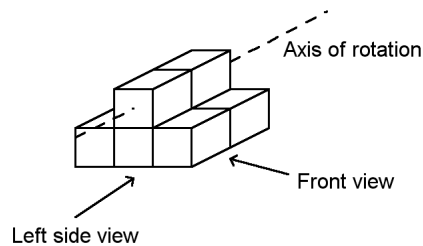
116. These are the views of an object built using linking cubes.
Use these views to build the object.

Top view   Left side view   Front view   Right side view
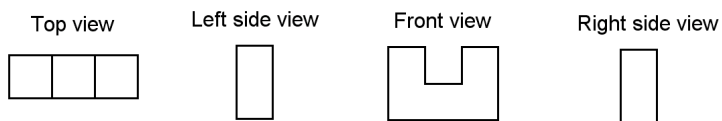
117. Use this diagram to identify each transformation.

V

P
Q   T

R
S
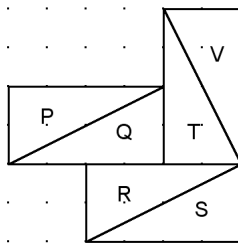
a) Triangle R is the image of Triangle V.
b) Triangle R is the image of Triangle P.

118. Create a design by applying each transformation to the original shape.

Line m

Line l

O
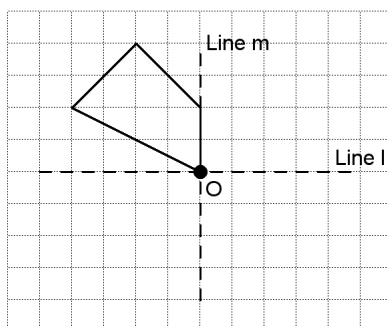
a) Reflection in Line m
b) 180° rotation about point O
c) Reflection in Line l

119. Jodi wants to tile her bedroom floor with octagons. This pattern shows part of the floor.
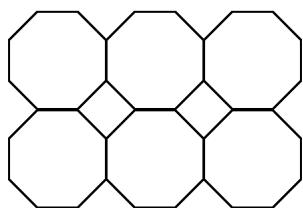
   Does Jodi need another shape to cover the floor with no gaps? If so, what is it?

120. Draw the 4th tile in this tessellation.

Problem

121. A square and a rectangle have the same area.
    The rectangle has length 9 cm and height 16 cm.
    Find the area and perimeter of the square.

122. The length of the hypotenuse of a right triangle is $\sqrt{10}$ cm.
    Give 3 possible lengths of the legs of the triangle.

123. In this diagram, $PT = RT$. Find the measure of ST. Show your work.
    Give your answer to 1 decimal place.
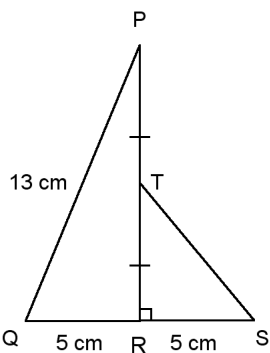
124. Sarah says triangle ABC is a right triangle.
     Is she correct? Justify your answer.
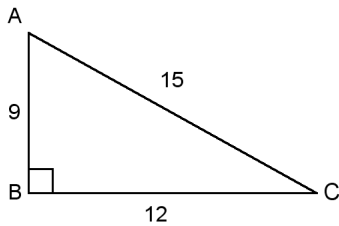
125. Find the length of BC to the nearest tenth. Show your work.
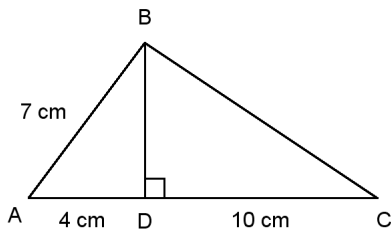
126. Explain how you could predict the sign of the product $(-8)(+9)(+7)(-4)$ without actually multiplying.

127. Find all the integers that divide -22 exactly. Show your work.

128. In a darts game, Jamie and Corinne each threw 10 darts.
     Jamie had three $(+6)$ scores, four $(+7)$ scores, and three (-8) scores.
     Corinne had five $(+6)$ scores, two $(+7)$ scores, and three (-8) scores.
     a) What were the final scores for Jamie and Corinne? Show your work.
     b) If the winner was the one with the greater score, who won?

129. Multiply $4\frac{4}{5} \times 6\frac{1}{4} \times \frac{7}{20}$. Show your work.

130. Evaluate. Show your steps.
     $$\sqrt{5\frac{1}{4} \div 1\frac{5}{7}}$$

131. Which object has the greater surface area?
     •   A cylinder with radius 3 cm and length 8 cm
     •   A cube of edge length 6 cm
     Explain.

132. An immunization program claims that 99.75% of those vaccinated are safe from a virus.
     If 564 000 children were vaccinated, about how many are still at risk? Show your work.

133. A bag contains 234 red cubes and green cubes in the ratio of 6 red to 7 green.
     How many of each colour are there in the bag? Explain your strategy.

134. In 3 stores, the same detergent is on special. Which store offers the best buy? Explain.
     A: 6 bottles for $12.48
     B: 7 bottles for $14.42
     C: 5 bottles for $10.35

135. Use this balance-scales model to solve for x. Show your work.

     | x | x | 2 | | x | 3 | 4 |
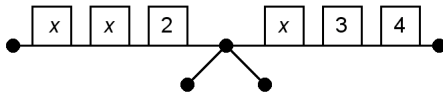
136. a) Graph both relations on the same coordinate axes.
        i) $y = 8 - x$
        ii) $y = x + 2$
     b) Find the ordered pair on the graph that are in both relations.

137. Victor has 20 songs on a CD. The songs are: 4 by group A, 6 by group B, 3 by group C, and 7 by
     group D. He selects a setting that randomly chooses songs to play.
     Find the probability of each event.
     a) The first 3 songs played are by group A.
     b) The first song played is by group B, and the next 2 songs are by group D.
     c) The first 3 songs played are not by group A.
     Show your work.

138. Draw the image of Shape A after a reflection in the diagonal Line m.
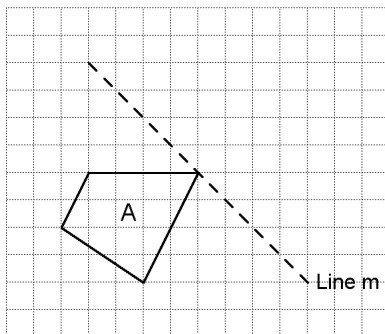
139. In this tessellation, Triangle Q is the image of Triangle P.
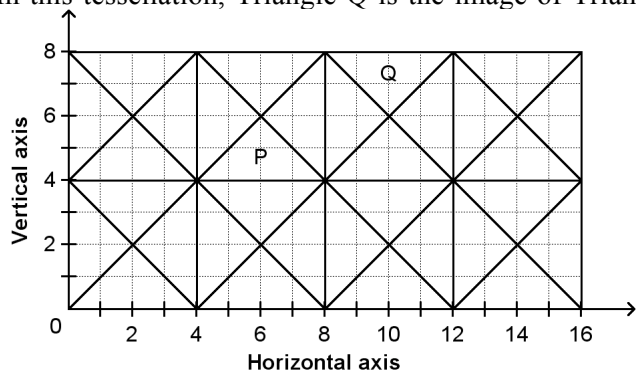
Describe possible combinations of transformations you can use to transform Triangle P to Triangle Q.

Math 8 Final Exam
Answer Section

MULTIPLE CHOICE

1. ANS: C   PTS: 1   DIF: Easy
   REF: 1.1 Square Numbers and Area Models   LOC: 8.N1
   TOP: Number   KEY: Conceptual Understanding
2. ANS: A   PTS: 1   DIF: Easy
   REF: 1.1 Square Numbers and Area Models   LOC: 8.N1
   TOP: Number   KEY: Conceptual Understanding
3. ANS: B   PTS: 1   DIF: Easy   REF: 1.2 Squares and Square Roots
   LOC: 8.N1   TOP: Number   KEY: Conceptual Understanding
4. ANS: C   PTS: 1   DIF: Easy   REF: 1.4 Estimating Square Roots
   LOC: 8.N2   TOP: Number   KEY: Conceptual Understanding
5. ANS: A   PTS: 1   DIF: Difficult   REF: 1.4 Estimating Square Roots
   LOC: 8.N2   TOP: Number   KEY: Conceptual Understanding
6. ANS: C   PTS: 1   DIF: Easy   REF: 1.5 The Pythagorean
   Theorem
   LOC: 8.N1 | 8.SS1   TOP: Number | Shape and Space (Measurement)
   KEY: Conceptual Understanding
7. ANS: A   PTS: 1   DIF: Easy
   REF: 1.6 Exploring the Pythagorean Theorem   LOC: 8.SS1
   TOP: Shape and Space (Measurement)   KEY: Conceptual Understanding
8. ANS: C   PTS: 1   DIF: Easy
   REF: 1.7 Applying the Pythagorean Theorem   LOC: 8.SS1
   TOP: Shape and Space (Measurement)   KEY: Conceptual Understanding
9. ANS: B   PTS: 1   DIF: Moderate
   REF: 1.7 Applying the Pythagorean Theorem   LOC: 8.SS1
   TOP: Shape and Space (Measurement)   KEY: Conceptual Understanding
10. ANS: A   PTS: 1   DIF: Easy
    REF: 2.1 Using Models to Multiply Integers   LOC: 8.N7
    TOP: Number   KEY: Conceptual Understanding
11. ANS: A   PTS: 1   DIF: Moderate
    REF: 2.1 Using Models to Multiply Integers   LOC: 8.N7
    TOP: Number   KEY: Conceptual Understanding | Problem-solving Skills
12. ANS: B   PTS: 1   DIF: Easy
    REF: 2.2 Developing Rules to Multiply Integers   LOC: 8.N7
    TOP: Number   KEY: Conceptual Understanding
13. ANS: D   PTS: 1   DIF: Easy
    REF: 2.3 Using Models to Divide Integers   LOC: 8.N7
    TOP: Number   KEY: Conceptual Understanding
14. ANS: A   PTS: 1   DIF: Moderate
    REF: 2.5 Order of Operations with Integers   LOC: 8.N7
    TOP: Number   KEY: Conceptual Understanding | Procedural Knowledge
15. ANS: B   PTS: 1   DIF: Moderate
    REF: 2.5 Order of Operations with Integers   LOC: 8.N7
    TOP: Number   KEY: Conceptual Understanding | Procedural Knowledge
16. ANS: D   PTS: 1   DIF: Moderate
    REF: 2.5 Order of Operations with Integers   LOC: 8.N7
    TOP: Number   KEY: Conceptual Understanding | Procedural Knowledge

17. ANS: B PTS: 1 DIF: Moderate
    REF: 3.1 Using Models to Multiply Fractions and Whole Numbers
    LOC: 8.N6 TOP: Number KEY: Conceptual Understanding
18. ANS: C PTS: 1 DIF: Moderate
    REF: 3.2 Using Models to Multiply Fractions LOC: 8.N6
    TOP: Number KEY: Conceptual Understanding
19. ANS: D PTS: 1 DIF: Easy REF: 3.3 Multiplying Fractions
    LOC: 8.N6 TOP: Number KEY: Conceptual Understanding
20. ANS: A PTS: 1 DIF: Easy REF: 3.4 Multiplying Mixed
    Numbers
    LOC: 8.N6 TOP: Number KEY: Conceptual Understanding
21. ANS: A PTS: 1 DIF: Moderate REF: 3.4 Multiplying Mixed
    Numbers
    LOC: 8.N6 TOP: Number KEY: Conceptual Understanding
22. ANS: A PTS: 1 DIF: Easy
    REF: 3.5 Dividing Whole Numbers and Fractions LOC: 8.N6
    TOP: Number KEY: Conceptual Understanding
23. ANS: B PTS: 1 DIF: Moderate
    REF: 3.5 Dividing Whole Numbers and Fractions LOC: 8.N6
    TOP: Number KEY: Conceptual Understanding
24. ANS: B PTS: 1 DIF: Easy REF: 3.6 Dividing Fractions
    LOC: 8.N6 TOP: Number KEY: Conceptual Understanding
25. ANS: B PTS: 1 DIF: Moderate REF: 3.6 Dividing Fractions
    LOC: 8.N6 TOP: Number KEY: Conceptual Understanding
26. ANS: A PTS: 1 DIF: Moderate REF: 3.7 Dividing Mixed Numbers
    LOC: 8.N6 TOP: Number KEY: Conceptual Understanding
27. ANS: A PTS: 1 DIF: Easy
    REF: 3.9 Order of Operations with Fractions LOC: 8.N6
    TOP: Number KEY: Procedural Knowledge
28. ANS: B PTS: 1 DIF: Easy
    REF: 3.9 Order of Operations with Fractions LOC: 8.N6
    TOP: Number KEY: Procedural Knowledge
29. ANS: A PTS: 1 DIF: Moderate
    REF: 3.9 Order of Operations with Fractions LOC: 8.N6
    TOP: Number KEY: Procedural Knowledge
30. ANS: B PTS: 1 DIF: Easy REF: 4.1 Exploring Nets
    LOC: 8.SS2 TOP: Shape and Space (Measurement) KEY: Conceptual Understanding
31. ANS: A PTS: 1 DIF: Easy REF: 4.1 Exploring Nets
    LOC: 8.SS2 TOP: Shape and Space (Measurement) KEY: Conceptual Understanding
32. ANS: B PTS: 1 DIF: Easy REF: 4.2 Creating Objects from
    Nets
    LOC: 8.SS2 TOP: Shape and Space (Measurement) KEY: Conceptual Understanding
33. ANS: B PTS: 1 DIF: Easy REF: 4.2 Creating Objects from
    Nets
    LOC: 8.SS2 TOP: Shape and Space (Measurement) KEY: Conceptual Understanding
34. ANS: C PTS: 1 DIF: Moderate
    REF: 4.3 Surface Area of a Right Rectangular Prism LOC: 8.SS3
    TOP: Shape and Space (Measurement) KEY: Conceptual Understanding
35. ANS: C PTS: 1 DIF: Easy
    REF: 4.4 Surface Area of a Right Triangular Prism LOC: 8.SS3
    TOP: Shape and Space (Measurement) KEY: Conceptual Understanding

36. ANS: A   PTS: 1   DIF: Easy
    REF: 4.5 Volume of a Right Rectangular Prism   LOC: 8.SS4
    TOP: Shape and Space (Measurement)   KEY: Conceptual Understanding
37. ANS: B   PTS: 1   DIF: Easy
    REF: 4.6 Volume of a Right Triangular Prism   LOC: 8.SS4
    TOP: Shape and Space (Measurement)   KEY: Conceptual Understanding
38. ANS: A   PTS: 1   DIF: Easy
    REF: 4.7 Surface Area of a Right Cylinder   LOC: 8.SS3
    TOP: Shape and Space (Measurement)   KEY: Conceptual Understanding
39. ANS: C   PTS: 1   DIF: Moderate   REF: 4.8 Volume of a Right
    Cylinder
    LOC: 8.SS4   TOP: Shape and Space (Measurement)   KEY: Conceptual Understanding
40. ANS: B   PTS: 1   DIF: Easy
    REF: 5.1 Relating Fractions, Decimals, and Percents   LOC: 8.N3
    TOP: Number   KEY: Conceptual Understanding
41. ANS: A   PTS: 1   DIF: Moderate   REF: 5.2 Calculating Percents
    LOC: 8.N3   TOP: Number   KEY: Conceptual Understanding
42. ANS: D   PTS: 1   DIF: Moderate   REF: 5.2 Calculating Percents
    LOC: 8.N3   TOP: Number   KEY: Conceptual Understanding
43. ANS: D   PTS: 1   DIF: Easy   REF: 5.4 Sales Tax and Discount
    LOC: 8.N3   TOP: Number   KEY: Conceptual Understanding
44. ANS: A   PTS: 1   DIF: Easy   REF: 5.4 Sales Tax and Discount
    LOC: 8.N3   TOP: Number   KEY: Conceptual Understanding
45. ANS: D   PTS: 1   DIF: Easy   REF: 5.5 Exploring Ratios
    LOC: 8.N4   TOP: Number   KEY: Conceptual Understanding
46. ANS: D   PTS: 1   DIF: Moderate   REF: 5.5 Exploring Ratios
    LOC: 8.N4   TOP: Number   KEY: Conceptual Understanding
47. ANS: B   PTS: 1   DIF: Moderate   REF: 5.6 Equivalent Ratios
    LOC: 8.N5   TOP: Number   KEY: Conceptual Understanding
48. ANS: D   PTS: 1   DIF: Moderate   REF: 5.8 Solving Ratio Problems
    LOC: 8.N5   TOP: Number   KEY: Conceptual Understanding
49. ANS: B   PTS: 1   DIF: Moderate   REF: 5.8 Solving Ratio Problems
    LOC: 8.N5   TOP: Number   KEY: Conceptual Understanding
50. ANS: D   PTS: 1   DIF: Easy   REF: 5.9 Exploring Rates
    LOC: 8.N5   TOP: Number   KEY: Conceptual Understanding
51. ANS: B   PTS: 1   DIF: Easy   REF: 5.10 Comparing Rates
    LOC: 8.N5   TOP: Number   KEY: Conceptual Understanding
52. ANS: D   PTS: 1   DIF: Easy
    REF: 6.1 Solving Equations Using Models   LOC: 8.PR2
    TOP: Patterns and Relations (Variables and Equations)   KEY: Conceptual Understanding
53. ANS: B   PTS: 1   DIF: Moderate
    REF: 6.1 Solving Equations Using Models   LOC: 8.PR2
    TOP: Patterns and Relations (Variables and Equations)   KEY: Conceptual Understanding
54. ANS: B   PTS: 1   DIF: Easy
    REF: 6.2 Solving Equations Using Algebra   LOC: 8.PR2
    TOP: Patterns and Relations (Variables and Equations)
    KEY: Conceptual Understanding | Communication
55. ANS: C   PTS: 1   DIF: Moderate
    REF: 6.2 Solving Equations Using Algebra   LOC: 8.PR2
    TOP: Patterns and Relations (Variables and Equations)   KEY: Conceptual Understanding

56. ANS: A   PTS: 1   DIF: Moderate
    REF: 6.3 Solving Equations Involving Fractions   LOC: 8.PR2
    TOP: Patterns and Relations (Variables and Equations)   KEY: Conceptual Understanding
57. ANS: C   PTS: 1   DIF: Moderate
    REF: 6.3 Solving Equations Involving Fractions   LOC: 8.PR2
    TOP: Patterns and Relations (Variables and Equations)   KEY: Conceptual Understanding
58. ANS: A   PTS: 1   DIF: Difficult
    REF: 6.3 Solving Equations Involving Fractions   LOC: 8.PR2
    TOP: Patterns and Relations (Variables and Equations)   KEY: Conceptual Understanding
59. ANS: B   PTS: 1   DIF: Easy   REF: 6.4 The Distributive Property
    LOC: 8.PR2   TOP: Patterns and Relations (Variables and Equations)
    KEY: Conceptual Understanding
60. ANS: A   PTS: 1   DIF: Moderate   REF: 6.4 The Distributive Property
    LOC: 8.PR2   TOP: Patterns and Relations (Variables and Equations)
    KEY: Conceptual Understanding
61. ANS: B   PTS: 1   DIF: Moderate
    REF: 6.5 Solving Equations Involving the Distributive Property
    LOC: 8.PR2   TOP: Patterns and Relations (Variables and Equations)
    KEY: Conceptual Understanding
62. ANS: C   PTS: 1   DIF: Moderate   REF: 6.6 Creating a Table of Values
    LOC: 8.PR1   TOP: Patterns and Relations (Patterns)   KEY: Conceptual Understanding
63. ANS: C   PTS: 1   DIF: Moderate   REF: 6.7 Graphing Linear Relations
    LOC: 8.PR1   TOP: Patterns and Relations (Patterns)
    KEY: Conceptual Understanding | Communication
64. ANS: A   PTS: 1   DIF: Moderate   REF: 6.7 Graphing Linear Relations
    LOC: 8.PR1   TOP: Patterns and Relations (Patterns)
    KEY: Conceptual Understanding | Problem-solving Skills
65. ANS: D   PTS: 1   DIF: Moderate   REF: 7.2 Misrepresenting Data
    LOC: 8.SP1   TOP: Statistics and Probability (Data Analysis)
    KEY: Conceptual Understanding | Communication
66. ANS: D   PTS: 1   DIF: Easy
    REF: 7.3 Probability of Independent Events   LOC: 8.SP2
    TOP: Statistics and Probability (Chance and Uncertainty)   KEY: Conceptual Understanding
67. ANS: A   PTS: 1   DIF: Moderate
    REF: 7.3 Probability of Independent Events   LOC: 8.SP2
    TOP: Statistics and Probability (Chance and Uncertainty)   KEY: Conceptual Understanding
68. ANS: D   PTS: 1   DIF: Easy
    REF: 7.4 Solving Problems Involving Independent Events   LOC: 8.SP2
    TOP: Statistics and Probability (Chance and Uncertainty)   KEY: Conceptual Understanding
69. ANS: C   PTS: 1   DIF: Easy   REF: 8.1 Sketching Views of Objects
    LOC: 8.SS5   TOP: Shape and Space (3-D Objects and 2-D Shapes)
    KEY: Conceptual Understanding
70. ANS: D   PTS: 1   DIF: Easy   REF: 8.1 Sketching Views of Objects
    LOC: 8.SS5   TOP: Shape and Space (3-D Objects and 2-D Shapes)
    KEY: Conceptual Understanding
71. ANS: B   PTS: 1   DIF: Moderate
    REF: 8.2 Drawing Views of Rotated Objects   LOC: 8.SS5
    TOP: Shape and Space (3-D Objects and 2-D Shapes)
    KEY: Conceptual Understanding | Communication

72. ANS: D   PTS: 1   DIF: Moderate
    REF: 8.2 Drawing Views of Rotated Objects   LOC: 8.SS5
    TOP: Shape and Space (3-D Objects and 2-D Shapes)
    KEY: Conceptual Understanding | Communication
73. ANS: B   PTS: 1   DIF: Moderate
    REF: 8.3 Building Objects from Their Views   LOC: 8.SS5
    TOP: Shape and Space (3-D Objects and 2-D Shapes)
    KEY: Conceptual Understanding | Communication
74. ANS: A   PTS: 1   DIF: Moderate
    REF: 8.3 Building Objects from Their Views   LOC: 8.SS5
    TOP: Shape and Space (3-D Objects and 2-D Shapes)
    KEY: Conceptual Understanding | Communication
75. ANS: A   PTS: 1   DIF: Difficult
    REF: 8.3 Building Objects from Their Views   LOC: 8.SS5
    TOP: Shape and Space (3-D Objects and 2-D Shapes)
    KEY: Procedural Knowledge | Problem-solving Skills
76. ANS: A   PTS: 1   DIF: Easy   REF: 8.4 Identifying
    Transformations
    LOC: 8.SS6   TOP: Shape and Space (Transformations)
    KEY: Conceptual Understanding | Communication
77. ANS: C   PTS: 1   DIF: Moderate   REF: 8.4 Identifying
    Transformations
    LOC: 8.SS6   TOP: Shape and Space (Transformations)
    KEY: Conceptual Understanding | Communication
78. ANS: C   PTS: 1   DIF: Moderate   REF: 8.4 Identifying
    Transformations
    LOC: 8.SS6   TOP: Shape and Space (Transformations)
    KEY: Conceptual Understanding | Communication
79. ANS: A   PTS: 1   DIF: Moderate   REF: 8.5 Constructing Tessellations
    LOC: 8.SS6   TOP: Shape and Space (Transformations)
    KEY: Conceptual Understanding | Problem-solving Skills
80. ANS: A   PTS: 1   DIF: Easy
    REF: 8.6 Identifying Transformations in Tessellations   LOC: 8.SS6
    TOP: Shape and Space (Transformations)   KEY: Conceptual
    Understanding

SHORT ANSWER

81. ANS:
    4^2, $\sqrt{289}$, 19, 5^2

    PTS: 1   DIF: Moderate   REF: 1.2 Squares and Square Roots
    LOC: 8.N1   TOP: Number   KEY: Conceptual Understanding
82. ANS:
    A factor is a number that divides exactly into another number.

    PTS: 1   DIF: Moderate   REF: 1.2 Squares and Square Roots
    LOC: 8.N1   TOP: Number   KEY: Conceptual Understanding

83. ANS:
24 units

PTS: 1   DIF: Moderate   REF: 1.7 Applying the Pythagorean Theorem
LOC: 8.SS1   TOP: Shape and Space (Measurement)   KEY: Conceptual Understanding
84. ANS:
The next 2 terms are: +162, −486
Start at +2. Multiply by −3 each time.

PTS: 1   DIF: Moderate   REF: 2.2 Developing Rules to Multiply Integers
LOC: 8.N7   TOP: Number   KEY: Communication | Problem-solving Skills
85. ANS:
6 h

PTS: 1   DIF: Moderate   REF: 2.3 Using Models to Divide Integers
LOC: 8.N7   TOP: Number   KEY: Conceptual Understanding | Problem-solving Skills
86. ANS:
$\dfrac{8}{21}$

PTS: 1   DIF: Moderate   REF: 3.2 Using Models to Multiply Fractions
LOC: 8.N6   TOP: Number   KEY: Conceptual Understanding
87. ANS:
$\dfrac{5}{14}$

PTS: 1   DIF: Moderate   REF: 3.3 Multiplying Fractions
LOC: 8.N6   TOP: Number   KEY: Conceptual Understanding
88. ANS:
$\dfrac{5}{6}$

PTS: 1   DIF: Moderate   REF: 3.3 Multiplying Fractions
LOC: 8.N6   TOP: Number   KEY: Conceptual Understanding | Procedural Knowledge
89. ANS:
$2\dfrac{7}{8}, \dfrac{23}{8}$

PTS: 1   DIF: Easy   REF: 3.4 Multiplying Mixed Numbers
LOC: 8.N6   TOP: Number   KEY: Communication
90. ANS:
$\dfrac{4}{11}$

PTS: 1   DIF: Easy   REF: 3.6 Dividing Fractions
LOC: 8.N6   TOP: Number   KEY: Conceptual Understanding

91. ANS:

$10\dfrac{1}{4}$

    PTS: 1   DIF: Easy   REF: 3.7 Dividing Mixed Numbers
    LOC: 8.N6   TOP: Number   KEY: Conceptual Understanding

92. ANS:

1

    PTS: 1   DIF: Difficult   REF: 3.7 Dividing Mixed Numbers
    LOC: 8.N6   TOP: Number   KEY: Conceptual Understanding | Procedural Knowledge

93. ANS:

    a) Diagrams may vary. Sample:
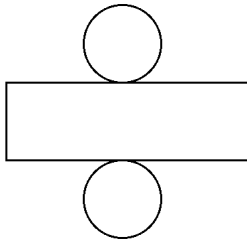
    b) Diagrams may vary. Sample:
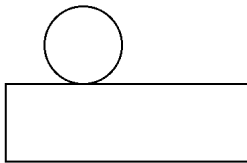
    PTS: 1   DIF: Moderate   REF: 4.1 Exploring Nets
    LOC: 8.SS2   TOP: Shape and Space (Measurement)
    KEY: Procedural Knowledge | Communication

94. ANS:
    a) 36 cm^2
    b) 6 cm

    PTS: 1   DIF: Moderate   REF: 4.3 Surface Area of a Right Rectangular Prism
    LOC: 8.SS3   TOP: Shape and Space (Measurement)
    KEY: Conceptual Understanding | Problem-solving Skills

95. ANS:
    The area of each rectangular face is 112 cm^2.

    PTS: 1   DIF: Moderate   REF: 4.4 Surface Area of a Right Triangular Prism
    LOC: 8.SS3   TOP: Shape and Space (Measurement)   KEY: Conceptual Understanding

96. ANS:
    The new volume equals the original volume multiplied by 8.

    PTS: 1   DIF: Difficult   REF: 4.5 Volume of a Right Rectangular Prism
    LOC: 8.SS4   TOP: Shape and Space (Measurement)
    KEY: Communication | Problem-solving Skills

97. ANS:
The volume of the prism is 220 cm³.

PTS: 1   DIF: Easy   REF: 4.6 Volume of a Right Triangular Prism
LOC: 8.SS4   TOP: Shape and Space (Measurement)   KEY: Conceptual Understanding
98. ANS:
The circumference of the circle is about 113 cm.

PTS: 1   DIF: Easy   REF: 4.7 Surface Area of a Right Cylinder
LOC: 8.SS3   TOP: Shape and Space (Measurement)   KEY: Conceptual Understanding
99. ANS:
The volume of concrete in the pillars is about 2831 m³.

PTS: 1   DIF: Moderate   REF: 4.8 Volume of a Right Cylinder
LOC: 8.SS4   TOP: Shape and Space (Measurement)
KEY: Conceptual Understanding | Problem-solving Skills
100. ANS:
0.075; 7.5%

PTS: 1   DIF: Moderate   REF: 5.1 Relating Fractions, Decimals, and Percents
LOC: 8.N3   TOP: Number   KEY: Conceptual Understanding
101. ANS:
69 is 34.5% of 200.

PTS: 1   DIF: Easy   REF: 5.3 Solving Percent Problems
LOC: 8.N3   TOP: Number   KEY: Conceptual Understanding
102. ANS:
Green to red and blue

PTS: 1   DIF: Moderate   REF: 5.5 Exploring Ratios
LOC: 8.N5   TOP: Number   KEY: Conceptual Understanding | Problem-solving Skills
103. ANS:
Answers may vary. Sample:
The equivalent ratios are 10:4 and 15:6.

PTS: 1   DIF: Easy   REF: 5.6 Equivalent Ratios
LOC: 8.N5   TOP: Number   KEY: Conceptual Understanding
104. ANS:
Nadia played better.
Miguel: 5:12 = 55:132
Nadia: 8:11 = 96:132
The ratio 5:12 is less than the ratio 8:11.

PTS: 1   DIF: Moderate   REF: 5.7 Comparing Ratios
LOC: 8.N5   TOP: Number   KEY: Conceptual Understanding | Communication
105. ANS:
A mass of 11 g is needed for the left pan.

PTS: 1   DIF: Moderate   REF: 6.1 Solving Equations Using Models
LOC: 8.PR2   TOP: Patterns and Relations (Variables and Equations)
KEY: Conceptual Understanding

106. ANS:
$x = -2$

PTS: 1 DIF: Moderate REF: 6.1 Solving Equations Using Models
LOC: 8.PR2 TOP: Patterns and Relations (Variables and Equations)
KEY: Conceptual Understanding
107. ANS:
$p = 7$

PTS: 1 DIF: Moderate REF: 6.2 Solving Equations Using Algebra
LOC: 8.PR2 TOP: Patterns and Relations (Variables and Equations)
KEY: Conceptual Understanding
108. ANS:
$y = 8$

PTS: 1 DIF: Easy
REF: 6.5 Solving Equations Involving the Distributive Property
LOC: 8.PR2 TOP: Patterns and Relations (Variables and Equations)
KEY: Conceptual Understanding
109. ANS:

x	−4	−3	−2	−1	0
y	−8	−7	−6	−5	−4

PTS: 1 DIF: Moderate REF: 6.6 Creating a Table of Values
LOC: 8.PR1 TOP: Patterns and Relations (Patterns) KEY: Conceptual Understanding
110. ANS:
$b = 12$

PTS: 1 DIF: Difficult REF: 6.6 Creating a Table of Values
LOC: 8.PR1 TOP: Patterns and Relations (Patterns) KEY: Problem-solving Skills
111. ANS:
P(even and even) = $\frac{1}{4}$.

PTS: 1 DIF: Easy REF: 7.3 Probability of Independent Events
LOC: 8.SP2 TOP: Statistics and Probability (Chance and Uncertainty)
KEY: Conceptual Understanding
112. ANS:
P(4 on yellow, 2 on purple, and 7 on green) = $\frac{1}{512}$

PTS: 1 DIF: Moderate REF: 7.4 Solving Problems Involving Independent Events
LOC: 8.SP2 TOP: Statistics and Probability (Chance and Uncertainty)
KEY: Conceptual Understanding

113. ANS:

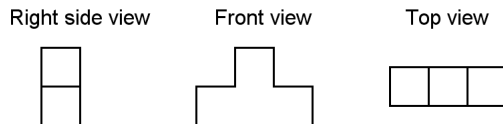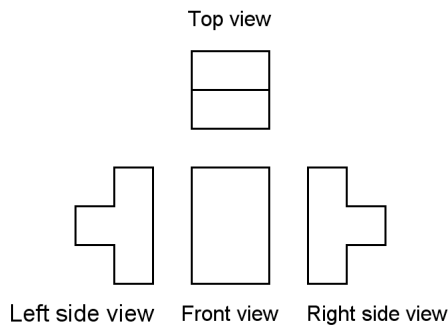$$P(3 \text{ face cards in a row}) = \frac{27}{2197}$$

PTS: 1 DIF: Moderate REF: 7.4 Solving Problems Involving Independent Events
LOC: 8.SP2 TOP: Statistics and Probability (Chance and Uncertainty)
KEY: Conceptual Understanding

114. ANS:

PTS: 1 DIF: Easy REF: 8.1 Sketching Views of Objects
LOC: 8.SS5 TOP: Shape and Space (3-D Objects and 2-D Shapes)
KEY: Conceptual Understanding | Communication

115. ANS:

PTS: 1 DIF: Difficult REF: 8.2 Drawing Views of Rotated Objects
LOC: 8.SS5 TOP: Shape and Space (3-D Objects and 2-D Shapes)
KEY: Conceptual Understanding | Communication

116. ANS:
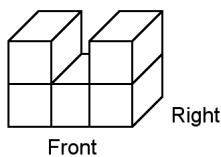
PTS: 1 DIF: Moderate REF: 8.3 Building Objects from Their Views
LOC: 8.SS5 TOP: Shape and Space (3-D Objects and 2-D Shapes)
KEY: Communication | Problem-solving Skills

117. ANS:
a) 90° counterclockwise rotation about the vertex the triangles share.
b) Translation 2 units right and 2 units down.

PTS: 1 DIF: Moderate REF: 8.4 Identifying Transformations
LOC: 8.SS6 TOP: Shape and Space (Transformations)
KEY: Conceptual Understanding | Communication

118. ANS:
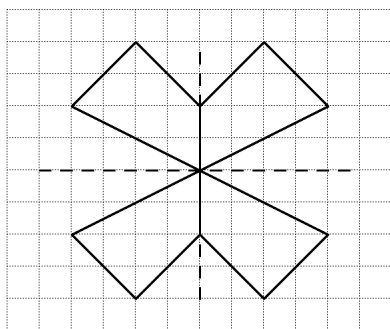
PTS: 1   DIF: Moderate   REF: 8.4 Identifying Transformations
LOC: 8.SS6   TOP: Shape and Space (Transformations)
KEY: Conceptual Understanding | Communication

119. ANS:
A square

PTS: 1   DIF: Easy   REF: 8.5 Constructing Tessellations
LOC: 8.SS6   TOP: Shape and Space (Transformations)
KEY: Conceptual Understanding | Problem-solving Skills

120. ANS:

PTS: 1   DIF: Moderate   REF: 8.5 Constructing Tessellations
LOC: 8.SS6   TOP: Shape and Space (Transformations)
KEY: Conceptual Understanding | Communication

PROBLEM

121. ANS:
Find the area of the square:

The area of the square is the same as the area of the rectangle.
The area of the rectangle is: $9 \times 16 = 144$ cm²
So, the area of the square is 144 cm².

Find the side length of the square:

Find a number which, when multiplied by itself, gives 144.
$12 \times 12 = 144$
So, the square has side length 12 cm.

Perimeter is the distance around the square.
So, $P = 12$ cm + 12 cm + 12 cm + 12 cm
    = 48 cm
The perimeter of the square is 48 cm.

PTS: 1   DIF: Difficult   REF: 1.1 Square Numbers and Area Models
LOC: 8.N1   TOP: Number
KEY: Procedural Knowledge | Communication | Problem-solving Skills

122. ANS:
Sample answer:
Find 3 pairs of numbers whose sum is 10: 1 and 9, 2 and 8, 3 and 7
So, three possible lengths of the legs are: 1 and 3, $\sqrt{2}$ and $\sqrt{8}$, $\sqrt{3}$ and $\sqrt{7}$

PTS: 1   DIF: Moderate   REF: 1.5 The Pythagorean Theorem
LOC: 8.N1 | 8.SS1   TOP: Number | Shape and Space (Measurement)
KEY: Problem-solving Skills

123. ANS:
     Methods may vary. Sample:
     $PR^2 + QR^2 = PQ^2$
     $\quad PR^2 + 5^2 = 13^2$
     $\qquad PR^2 = 13^2 - 5^2$
     $\qquad\quad = 144$
     $\qquad PR = \sqrt{144}$
     $\qquad\quad = 12$

     $RT = \dfrac{1}{2} PR$

     $\quad = \dfrac{1}{2} \times 12$

     $\quad = 6$

     $ST^2 = RS^2 + RT^2$
     $\quad = 5^2 + 6^2$
     $\quad = 61$
     $ST = \sqrt{61}$
     $\quad \doteq 7.8$

     The measure of ST is about 7.8 cm.

     PTS: 1   DIF: Difficult   REF: 1.5 The Pythagorean Theorem
     LOC: 8.N1 | 8.SS1   TOP: Number | Shape and Space (Measurement)
     KEY: Communication | Problem-solving Skills

124. ANS:
     $9^2 + 12^2 = 15^2$
     $81 + 144 = 225$
     $225 = 225$
     Since 225 = 225, triangle ABC is a right triangle.

     PTS: 1   DIF: Difficult   REF: 1.6 Exploring the Pythagorean Theorem
     LOC: 8.SS1   TOP: Shape and Space (Measurement)
     KEY: Communication | Problem-solving Skills

125. ANS:
    Methods may vary. Sample:
    ΔABD is a right triangle.
    $AD^2 + BD^2 = AB^2$
    $\quad 4^2 + BD^2 = 7^2$
    $\qquad BD^2 = 7^2 - 4^2$
    $\qquad\quad = 33$
    ΔBCD is a right triangle.
    $BC^2 = BD^2 + CD^2$
    $BC^2 = 33 + 10^2$
    $BC^2 = 33 + 100$
    $\quad = 133$
    $BC = \sqrt{133}$
    $\quad \doteq 11.5$
    The length of BC is about 11.5 cm.

    PTS: 1   DIF: Difficult   REF: 1.7 Applying the Pythagorean Theorem
    LOC: 8.SS1   TOP: Shape and Space (Measurement)
    KEY: Communication | Problem-solving Skills
126. ANS:
    The sign of the product $(-8)(+9)(+7)(-4)$ is positive.

    Explanations may vary. Sample:
    There are 2 negative factors in the product. Their product is positive.
    The product of any number of positive integers is always positive.
    So, the sign of the product $(-8)(+9)(+7)(-4)$ is positive.

    PTS: 1   DIF: Difficult   REF: 2.2 Developing Rules to Multiply Integers
    LOC: 8.N7   TOP: Number   KEY: Communication | Problem-solving Skills
127. ANS:
    Factors of 22 are: 1, 2, 11, 22
    The integers that divide −22 exactly are: −1, −2, −11, −22, +1, +2, +11, +22

    PTS: 1   DIF: Difficult   REF: 2.4 Developing Rules to Divide Integers
    LOC: 8.N7   TOP: Number   KEY: Communication | Problem-solving Skills
128. ANS:
    a) Jamie: $3 \times (+6) + 4 \times (+7) + 3 \times (-8)$
    $\qquad = (+18) + (+28) + (-24)$
    $\qquad = 22$
       Corinne: $5 \times (+6) + 2 \times (+7) + 3 \times (-8)$
    $\qquad = (+30) + (+14) + (-24)$
    $\qquad = 20$
    b) Since $22 > 20$, Jamie won.

    PTS: 1   DIF: Difficult   REF: 2.5 Order of Operations with Integers
    LOC: 8.N7   TOP: Number   KEY: Communication | Problem-solving Skills

129. ANS:

$$4\frac{4}{5} \times 6\frac{1}{4} \times \frac{7}{20} = \frac{24}{5} \times \frac{25}{4} \times \frac{7}{20}$$
$$= \frac{24 \times 25 \times 7}{5 \times 4 \times 20}$$

Divide the numerator and denominator by common factors.

$$\frac{24 \times 25 \times 7}{5 \times 4 \times 20} = 10\frac{1}{2}$$

PTS: 1   DIF: Difficult   REF: 3.4 Multiplying Mixed Numbers
LOC: 8.N6   TOP: Number   KEY: Communication

130. ANS:

$$\sqrt{5\frac{1}{4} \div 1\frac{5}{7}}$$
$$= \sqrt{\frac{21}{4} \div \frac{12}{7}}$$
$$= \sqrt{\frac{21}{4} \times \frac{7}{12}}$$
$$= \sqrt{\frac{147}{48}}$$
$$= \sqrt{\frac{49}{16}}$$
$$= \frac{7}{4}$$
$$= 1\frac{3}{4}$$

PTS: 1   DIF: Difficult   REF: 3.7 Dividing Mixed Numbers
LOC: 8.N6   TOP: Number   KEY: Procedural Knowledge | Communication

131. ANS:

Surface area of cylinder $= 2\pi r^2 + 2\pi rh$
$$= 2\pi \times 3^2 + 2\pi \times 3 \times 8$$
$$\doteq 207$$

Surface area of cube $= 6s^2$
$$= 6 \times 6^2$$
$$= 216$$

The cube has the greater surface area.

PTS: 1   DIF: Moderate   REF: 4.7 Surface Area of a Right Cylinder
LOC: 8.SS3   TOP: Shape and Space (Measurement)   KEY: Communication

132. ANS:
Methods may vary. Sample:
Percent of vaccinated children at risk:
$100\% - 99.75\% = 0.25\%$

Number of children at risk: $\dfrac{0.25}{100} \times 564\,000 = 1410$

About 1410 children are still at risk of being infected by the virus.

PTS: 1   DIF: Difficult   REF: 5.2 Calculating Percents
LOC: 8.N3   TOP: Number   KEY: Communication | Problem-solving Skills

133. ANS:
Methods may vary. Sample:
The ratio of red cubes to green cubes is 6:7.
So, the ratio of red cubes to total number of cubes (red plus green) is 6:13.
For every 13 cubes, 6 are red and 7 are green.
Since $234 = 13 \times 18$, multiply each of 6 and 7 by 18.
$6 \times 18 = 108$
$7 \times 18 = 126$
There are 108 red cubes and 126 green cubes in the bag.

PTS: 1   DIF: Difficult   REF: 5.5 Exploring Ratios
LOC: 8.N5   TOP: Number   KEY: Communication | Problem-solving Skills

134. ANS:
Store B offers the best buy.
A: Each bottle costs $2.08.
B: Each bottle costs $2.06.
C: Each bottle costs $2.07.

PTS: 1   DIF: Moderate   REF: 5.9 Exploring Rates
LOC: 8.N5   TOP: Number   KEY: Communication

135. ANS:
Answers may vary. Sample:
Write the equation represented by the balance-scales model.
$x + x + 2 = x + 3 + 4$
Remove x from each side.
$x + 2 = 3 + 4$
$x + 2 = 7$
Remove 2 from each side.
$x + 2 - 2 = 7 - 2$
$\qquad x = 5$

PTS: 1   DIF: Difficult   REF: 6.1 Solving Equations Using Models
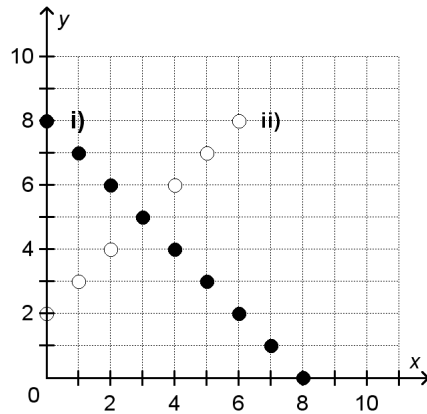LOC: 8.PR2   TOP: Patterns and Relations (Variables and Equations)
KEY: Procedural Knowledge | Communication

136. ANS:
    a) Graphs may vary. Sample:

    b) The ordered pair (3, 5) is in both relations.

PTS: 1   DIF: Difficult   REF: 6.7 Graphing Linear Relations
LOC: 8.PR1   TOP: Patterns and Relations (Patterns)
KEY: Communication | Problem-solving Skills

137. ANS:
    a) $P(A) = \dfrac{1}{5}$

    $P(\text{first 3 A}) = P(A) \times P(A) \times P(A) = \dfrac{1}{5} \times \dfrac{1}{5} \times \dfrac{1}{5} = \dfrac{1}{125}$

    b) $P(B) = \dfrac{3}{10}$

    $P(D) = \dfrac{7}{20}$

    $P(\text{B, then D 2 times}) = P(B) \times P(D) \times P(D) = \dfrac{3}{10} \times \dfrac{7}{20} \times \dfrac{7}{20} = \dfrac{147}{4000}$

    c) $P(\text{not A}) = \dfrac{4}{5}$

    $P(\text{not A 3 times}) = P(\text{not A}) \times P(\text{not A}) \times P(\text{not A}) = \dfrac{4}{5} \times \dfrac{4}{5} \times \dfrac{4}{5} = \dfrac{64}{125}$
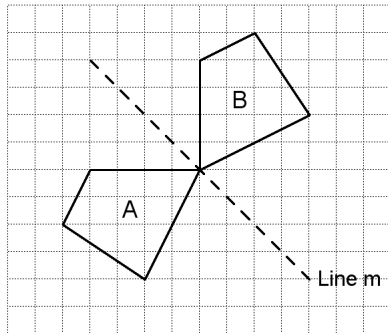
PTS: 1   DIF: Difficult   REF: 7.4 Solving Problems Involving Independent Events
LOC: 8.SP2   TOP: Statistics and Probability (Chance and Uncertainty)
KEY: Communication | Problem-solving Skills

17

138. ANS:
Shape B is the image of Shape A after a reflection in the diagonal Line m.

PTS: 1   DIF: Difficult   REF: 8.4 Identifying Transformations
LOC: 8.SS6   TOP: Shape and Space (Transformations)
KEY: Procedural Knowledge | Problem-solving Skills

139. ANS:
Answers may vary. Sample:
- Translation 4 units right followed by reflection in the horizontal line through 6 on the vertical axis
- 90° clockwise rotation about point (8, 4) followed by 90° clockwise rotation about point (10, 6)
- Reflection in the horizontal line through 6 on the vertical axis followed by reflection in the vertical line through 8 on the horizontal axis

PTS: 1   DIF: Difficult   REF: 8.6 Identifying Transformations in Tessellations
LOC: 8.SS6   TOP: Shape and Space (Transformations)
KEY: Communication | Problem-solving Skills