**Exam Review**

**Multiple Choice**

*Identify the choice that best completes the statement or answers the question.*

\_\_\_\_ 1. Which is **not** a relationship between the radius *r* and diameter *d* of a circle?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. |  | b. |  | c. |  | d. |  |

\_\_\_\_ 2. Identify all the diameters drawn in this circle.



|  |  |  |  |
| --- | --- | --- | --- |
| a. | OA, OB, OC, BC | c. | OA, OB, OC |
| b. | BC | d. | AC |

\_\_\_\_ 3. Find the circumference of this circle. Leave  in your answer.



|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | cm | b. | cm | c. | cm | d. | cm |

\_\_\_\_ 4. Estimate the circumference of this circle.



|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 174 m | b. | 87 m | c. | 32 m | d. | 44 m |

\_\_\_\_ 5. Find the area of a triangle with base 20 m and height 15.8 m.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 158 m2 | b. | 316 m2 | c. | 35.8 m2 | d. | 17.9 m2 |

\_\_\_\_ 6. Find the area of this triangle.



|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 194.3 m2 | b. | 777.2 m2 | c. | 388.6 m2 | d. | 67.28 m2 |

\_\_\_\_ 7. Find the area of a triangle with base 7.4 m and height 8.2 m.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 30.34 m2 | b. | 121.36 m2 | c. | 33.62 m2 | d. | 60.68 m2 |

\_\_\_\_ 8. A rectangular piece of fabric measures 68 cm by 96 cm. A triangular scarf with height 15 cm and base 30 cm is cut from the fabric. How much fabric is left?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 6303 cm2 | b. | 6753 cm2 | c. | 6078 cm2 | d. | 6303.5 cm2 |

\_\_\_\_ 9. A circular clock face has diameter 35.5cm.

What is the area of the clock face? Round your answer to one decimal place.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 3959.2 cm2 | b. | 1260.3 cm2 | c. | 989.8 cm2 | d. | 55.8 cm2 |

\_\_\_\_ 10. Find the area of this circle. Leave  in your answer.



|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 16.6 cm2 | b. | 23.12 cm2 | c. | 11.56 cm2 | d. | 46.24 cm2 |

\_\_\_\_ 11. The circle graph shows the different age groups of registered voters in the Cane Region.

There are 5000 registered voters in the Cane Region.

How many voters are over 60 years old?



|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 1250 | b. | 750 | c. | 1750 | d. | 1500 |

\_\_\_\_ 12. All 500 students at Robinson Junior High were surveyed to find their favourite sports.

How many more students prefer basketball to baseball?



|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 10 students | b. | 260 students | c. | 135 students | d. | 125 students |

\_\_\_\_ 13. Grade 8 students were surveyed on how many hours per week they spend on various activities.

About how many hours per week are spent on homework and school?

**How Students Spent Their Time**



|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 55 h | b. | 54 h | c. | 56 h | d. | 57 h |

The table shows the number of hours per week a college student spends on different subjects.

|  |  |
| --- | --- |
| **Subject** | **Number of Hours** |
| English | 8 |
| French | 10 |
| Art | 5 |
| Math | 8 |
| History | 9 |

\_\_\_\_ 14. What is the sector angle for History?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 81° | b. | 45° | c. | 145° | d. | 84° |

\_\_\_\_ 15. Find the sum of the fractions modelled by these fraction circles.



|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. |  | b. |  | c. |  | d. |  |

\_\_\_\_ 16. Find the sum of the fractions modelled by these 2 strips.



|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. |  | b. |  | c. | 7 | d. |  |

\_\_\_\_ 17. Find a common denominator for  and .

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 6 | b. | 5 | c. | 3 | d. | 8 |

\_\_\_\_ 18. Which number can be used as a common denominator to subtract ?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 8 | b. | 12 | c. | 6 | d. | 4 |

\_\_\_\_ 19. Subtract: 

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. |  | b. |  | c. |  | d. |  |

\_\_\_\_ 20. What numbers would replaceto make this statement true?

The difference  is less than .

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 1, 2 | b. | 1, 2, 3 | c. | 3, 4 | d. | 2, 3, 4 |

\_\_\_\_ 21. Which is a common denominator you could use to add  and ?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 12 | b. | 7 | c. | 21 | d. | 9 |

\_\_\_\_ 22. Subtract: 

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. |  | b. |  | c. |  | d. |  |

\_\_\_\_ 23. Solve this equation: *v* + *v* + 7 = 6 + 4

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 1.5 | b. | 8.5 | c. | 3 | d. | 2 |

\_\_\_\_ 24. 

Identify the tiles that model .

|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 25. Solve this equation: 3 + *x* = 9

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 6 | b. | 12 | c. | 3 | d. | 5 |

\_\_\_\_ 26. Identify the outliers in this set of data: 8.5, 9.5, 10.5, 2.5, 16.5, 7.5, 10.5

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 2.5 and 16.5 | b. | 16.5 only | c. | 10.5 and 16.5 | d. | 2.5 and 7.5 |

\_\_\_\_ 27. Identify the outlier of this set of data: 25, 35, 13, 30, 29, 45, 25, 38

How does the outlier affect the mean?

|  |  |
| --- | --- |
| a. | 13; it lowers the mean by about 2.4. |
| b. | 13; it raises the mean by about 2.4. |
| c. | 45; it lowers the mean by about 2.1. |
| d. | 45; it raises the mean by about 2.1. |

\_\_\_\_ 28. Terry’s times, in minutes, for his training runs were: 47, 48, 49, 51, 50, 50, 47, 52

Find Terry’s average run time.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 49.25 m | b. | 49.5 m | c. | 50 m | d. | 49 m |

\_\_\_\_ 29. Find the mean, median, and mode of these scores on a math test:

86, 69, 92, 98, 83, 97, 69, 95, 70, 69, 83, 93, 90, 97, 74, 84, 76, 100, 65, 84, 90, 94

|  |  |
| --- | --- |
| a. | Mean: 84.5, median: 85, mode: 69 |
| b. | Mean: 84.5, median: 82.5, mode: 69 |
| c. | Mean: 77.4, median: 85, mode: 82.5 |
| d. | Mean: 77.4, median: 85, mode: 69 |

\_\_\_\_ 30. Jay was absent for a math test. The test scores of his classmates were:

81, 90, 72, 95, 77, 50, 74, 83, 62, 86, 82, 55, 50, 52

Jay took a makeup test. What was Jay’s score if the class mean was 71?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 56 | b. | 55 | c. | 54 | d. | 58 |

\_\_\_\_ 31. Students in Mrs. Smart’s class have a choice of using the mean, median, or mode for their test averages. One student determines that his highest average is the mean. Which test scores are his?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | 72, 83, 95, 70, 85 | c. | 81, 85, 70, 72, 85 |
| b. | 81, 85, 73, 82, 76 | d. | 92, 83, 76, 76, 93 |

\_\_\_\_ 32. A pencil case contains 2 red felt pens, 3 white felt pens, and 7 blue felt pens.

You pick a pen without looking. Find the probability of picking a white pen.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. |  | b. |  | c. |  | d. |  |

\_\_\_\_ 33. A die labelled 1 to 6 is rolled. Find the probability of rolling a number greater than 2.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. |  | b. |  | c. |  | d. |  |

\_\_\_\_ 34. Jill wants to buy either a ball pen or an ink pen. Both pens come in 5 styles.

Find the number of possible choices.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 10 | b. | 7 | c. | 11 | d. | 8 |

\_\_\_\_ 35. A coin is tossed and a die labelled 1 to 6 is rolled.

What is the probability of the event “a head on the coin and a 5 on the die?”

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. |  | b. |  | c. |  | d. |  |

\_\_\_\_ 36. Which line segments are parallel to line segment MR?



|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | KP, NS | b. | LQ, VT | c. | VS, WT | d. | LQ, NS, VT |

\_\_\_\_ 37. Which quadrilaterals have perpendicular diagonals?

kite, parallelogram, rectangle, rhombus

|  |  |  |  |
| --- | --- | --- | --- |
| a. | kite, rhombus | c. | kite, rhombus, rectangle |
| b. | parallelogram, rhombus | d. | kite, parallelogram, rectangle, rhombus |

\_\_\_\_ 38. How many pairs of perpendicular line segments are in this diagram?



|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 4 | b. | 5 | c. | 6 | d. | 8 |

\_\_\_\_ 39. Which diagram shows the construction of a perpendicular bisector congruent in length to the given line segment?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. |  | b. |  | c. |  | d. |  |

\_\_\_\_ 40. Line segment EG is the perpendicular bisector of line segment DF.

The length of line segment DE is given. What other length do you know from this diagram?



|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. |  | b. |  | c. |  | d. | no other length |

\_\_\_\_ 41. Line segment DE is the perpendicular bisector of line segment JL. Which statement is not always true?



|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. | Kis the midpoint of JL. |
| b. |  | d. | DE is perpendicular to JL. |

\_\_\_\_ 42. The perpendicular bisectors of line segments XY and YZ meet at a point W.



Where is point W located?

|  |  |  |  |
| --- | --- | --- | --- |
| a. | inside XYZ | c. | on line segment YZ |
| b. | outside XYZ | d. | cannot be determined |

\_\_\_\_ 43. What type of construction does this diagram show?



|  |  |  |  |
| --- | --- | --- | --- |
| a. | angle bisector | c. | parallel lines |
| b. | perpendicular bisector | d. | perpendicular lines |

\_\_\_\_ 44. In this diagram, PQR is an equilateral triangle.

Line segment QS is the bisector of  and line segment QT is the bisector of .

What is the measure of ?



|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 15 | b. | 30 | c. | 45 | d. | 75 |

\_\_\_\_ 45. Which diagram shows the construction of the bisector of this angle?



|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 46. A Mira is used to bisect an angle. Which diagram shows the correct position of the Mira?



|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | Figure A | b. | Figure B | c. | Figure C | d. | Figure D |

\_\_\_\_ 47. Translate point C(0, 5) 3 units left and 1 unit down.

Write a rule to describe the translation. What are the coordinates of the image point **?

|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. | 6) |

\_\_\_\_ 48.  has vertices P(–5, 5), Q(8, –1), and R(–6, –3).

The triangle is translated 2 units right and 4 units up.

Write the coordinates of each vertex of the image .

|  |  |  |  |
| --- | --- | --- | --- |
| a. | (–3, 9), (10, 3), (–4, 1) | c. | (–7, 9), (6, 3), (–8, 1) |
| b. | (–3, 1), (10, –5), (–4, –7) | d. | (–7, 1), (6, –5), (–8, –7) |

\_\_\_\_ 49. ** has vertices F(4, 4), G(5, 1), and H(2, 2).

The triangle is reflected in the *x*-axis.

Which diagram shows  and its reflection image **?

|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

\_\_\_\_ 50. Draw the image of this shape after a  rotation about point O.



|  |  |  |  |
| --- | --- | --- | --- |
| a. |  | c. |  |
| b. |  | d. |  |

**Short Answer**

51. A square has a side length of 32 cm.

What is the diameter of the largest circle that can be drawn in the square?

52. Draw a circle. Label the centre O.

Draw a diameter and label it AB. Draw a radius OD so that AOD = BOD.

What is the measure of AOD and BOD?

53. Replace each  with a number or operator to make the statement true.

*d*  *r* = 

54. Copy and complete the tables for the circumference of a circle.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Diameter *d* (cm)** | 1 | 2 | 3 | 4 | 5 |
| **Circumference *C* (cm)** |  |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Radius *r* (cm)** | 1 | 2 | 3 | 4 | 5 |
| **Circumference *C* (cm)** |  |  |  |  |  |

Use the pattern to answer the following questions.

|  |  |
| --- | --- |
| a) | What is the circumference of a circle with diameter 22 cm? |
| b) | What is the circumference of a circle with radius 22 cm? |

55. A circular lawn has a diameter of 22 m. The lawn is surrounded by a path 5 m wide.

What is the distance around the outside edge of the path?

Round your answer to two decimal places.

56. A round table has a circumference of 4.3 m. What is the radius to the nearest centimetre?

57. A circular garden has radius 2.2 m. The garden is to be surrounded by edging wire.

Edging wire is sold in whole metre lengths.

|  |  |
| --- | --- |
| a) | How many metres of wire are needed? |
| b) | Edging wire costs $4.63/m. What is the cost to edge the garden? |

58. Draw 3 different parallelograms with area 24 cm2.

59. Find the total area of the figure.



60. The area of a triangle is 104 cm2. Find the base if the height measures 13 cm.

61. Which triangles have the same area?



62. The radius of the larger circle is 11 cm. The radius of the smaller circle 8 cm.

Estimate the area of the ring formed by the circles.



63. Calculate the area of the semicircle. Round your answer to the nearest square centimetre.



64. A large pizza has diameter 36 cm and a medium pizza has diameter 30 cm.

What is the difference in area of the pizzas?

Round your answer to the nearest square centimetre.

65. The circle graph shows the results of a survey on the colour of a T-shirt students would buy to support a charity. The organizer plans to sell 1000 T-shirts.

How many of each colour should be ordered?



66. The circle graph shows Jack’s monthly budget.



Jack’s take home pay is $1620.

|  |  |
| --- | --- |
| a) | How much does he spend on food? |
| b) | How much does he save? |

67. The circle graph shows the modes of transportation people use to get to work.



If 150 people were surveyed, how many people use each mode of transportation?

|  |  |
| --- | --- |
| a) | car pool? |
| b) | other methods? |

68. The circle graph shows how many hours per week students spend on chores.

If 80 students were questioned, how many students spend 15 - 19 h per week on chores?



69. The circle graph shows the votes to elect a president of the student council.



|  |  |
| --- | --- |
| a) | Who was elected president? |
| b) | If 600 students voted, how many votes did Briana get? |
| c) | Do you think Chris should be vice president? Explain. |

70. Workers were surveyed to find their choice of transportation during work days.

Here are the results:

|  |  |
| --- | --- |
| • | 56% chose to drive on their own. |
| • | 17% chose to be in a car pool. |
| • | 12% chose transit. |
| • | 15% chose other modes, such as biking or walking. |

Complete this table needed for a circle graph. Round your angle measure to the nearest degree.

|  |  |  |
| --- | --- | --- |
| **Facility** | **Percent Surveyed** | **Sector Angle** |
| Driving Alone | 56% |  |
| Car Pool | 17% |  |
| Transit | 12% |  |
| Other | 15% |  |

71. This table shows the results of a survey on how students get to school.

A circle graph is to be used to display the data.

Calculate the sector angle, to the nearest degree, for each method of transportation.

|  |  |
| --- | --- |
| **Transportation** | **Number of Students** |
| Bus | 39 |
| Bike | 12 |
| Walk | 25 |
| Car | 24 |

72. This table shows the results of a survey on the most popular facility of an arena.

A circle graph is used to display the data. Calculate the sector angle, to the nearest degree, for each facility.

|  |  |
| --- | --- |
| **Facility** | **Number of Users** |
| Swimming Pool | 45 |
| Gymnasium | 33 |
| Skating Rink | 12 |
| Fitness Room | 10 |

73. Betty budgeted her expenses for the month: $150 on food, $175 on housing, and $175 on other items.

Draw a circle graph to display Betty’s expenses.

74. Students were asked to name their favourite flavours of smoothie.

Calculate the sector angles if the data were to be displayed in a circle graph.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Favourite smoothie** | **Orange** | **Cranberry** | **Strawberry** | **Chocolate** |
| Number of Students | 12 | 6 | 8 | 24 |
| Percent |  |  |  |  |
| Sector Angle |  |  |  |  |

75. In a telephone survey 400 people voted for their favourite radio stations.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Radio station** | **CLAS 2** | **AROS** | **PNSB** | **ROK 5** |
| Number of votes | 120 | 140 |  | 90 |
| Sector angle |  |  |  |  |

|  |  |
| --- | --- |
| a) | How many people voted for station PNSB? |
| b) | Calculate the sector angles if the data were to be displayed in a circle graph. |

76. What fraction of this circle is shaded?



77. What fraction of this circle is shaded?



78. Shade  of this circle.



79. Find the sum of the fractions modelled by these fraction circles.



80. Add: 

81. Cheryl spends an average of 10 min per day answering e-mails and 40 min per day calling friends.

|  |  |
| --- | --- |
| a) | Is the total time spent answering e-mails and calling friends more or less than an hour? |
| b) | Express the total time spent as a fraction of an hour. |

82. Write 2 fractions that are equivalent to .

83. Add:  and 

84. Add: 

85. A large pizza has 12 slices. Tasha takes 3 slices and Rena takes 4 slices.

What fraction of the pizza is taken?

86. This large rectangle is a floor plan of an office.



|  |  |
| --- | --- |
| a) | Shade these fractions for 2 rooms:  Room 1:  Room 2: |
| b) | What fraction of the office is used for the 2 rooms? |

87. Add: 

88. Write 2 fractions with different denominators that add to .

89. A box contains 63 chocolates. Connie ate  of the chocolates and Jorge ate  of them.

|  |  |
| --- | --- |
| a) | What fraction of the chocolates did Connie and Jorge eat? |
| b) | How many chocolates did they eat? |

90. Find a common denominator for these 2 fractions.

 and 

91. Replace *x* with a number to make this equation true.



92. Replace *x* with a number to make this equation true.



93. Find the sum of  and .

94. A charity collects gifts for children. The circle graph shows the gifts collected.



|  |  |
| --- | --- |
| a) | What fraction of the gifts are books or games? |
| b) | What fraction of the gifts are toys or puzzles? |
| c) | Which 2 gifts make up  of all the gifts? |

95. Add: 

96. A recipe calls for  tablespoon of spice. Denis has  tablespoon of spice.

Does he have enough for the recipe?

97. Let each strip represent 1.

|  |  |
| --- | --- |
| a) | What fraction is modelled by each shaded part? |
| b) | Write a subtraction equation for the difference of the 2 fractions. |





98. Justin ate  of the pizza and Molly ate  of the pizza. Who ate more? By how much?

99. Write  as a difference of 2 fractions.

100. A rectangular grid has  shaded green and  shaded yellow.

|  |  |
| --- | --- |
| a) | What fraction of the rectangle is shaded? |
| b) | Write a subtraction equation to show the fraction that is not shaded. |

101.

|  |  |
| --- | --- |
| a) | Subtract  from . |
| b) | Subtract the result of part a from . |

102. Ian has 3 m of ribbon. He cuts off  m for wrapping a gift. How much ribbon is left?

103. Farima is scheduled to work 5 h on the weekend. She worked 1 h on Friday night and 3 h on Saturday. How many more hours does she have to work on Sunday?

104. What is the lowest common denominator you could use for this subtraction?



105. What is the lowest common denominator you could use for this subtraction?



106. Subtract:   

107. Subtract: 

108. Subtract: 

109. Amanda drank  bottle of water. Jeff drank  bottle of water.

Who drank more water? How much more?

110. Write an addition equation modelled by the fraction circles in this picture.



111. Write the addition equation modelled by the strips in this picture.



112. Louise mixed  kg oranges with  kg grapefruit. What was the mass of the mixture?

113. A recipe calls for  cups of sugar. Marjorie has only  cups of sugar.

How much more sugar will she need?

114. Zania has  m of hose. She cuts off  m for use in watering plants. How much hose is left?

115. Subtract:   

116. The difference of 2 fractions is . The greater fraction is . What is the other fraction?

117. Replacewith a number to make this equation true.

  = 

118. Find the value of *y* that makes this equation true.

7*y* = 28

119. Solve this equation: 

120. A number divided by 5 is 9.

|  |  |
| --- | --- |
| a) | Write an equation you can solve to find the number. |
| b) | Solve the equation to find the number. |

121. The length of each side of a regular decagon is 23 cm.

|  |  |
| --- | --- |
| a) | Write an equation you can solve to find the perimeter, *P* cm, of the decagon. |
| b) | Solve the equation to find the perimeter. |

122. The 2 pans of the scales are balanced. Find the value of the unknown mass C.



123. Sketch a 2-pan balance to represent this equation: *x* + 5 = 8. Then solve the equation.

124. Solve this equation: 5*z* + 72 = 87

125. The area of this parallelogram is given by the formula .

Substitute the values for *A* and *b* in the formula to get an equation you can solve for the height *h*.

Then find the height.



126. On the left pan of a 2-pan balance are 3 identical unknown masses *x* with 2 masses of 2 g and 5 g.

On the right pan are 2 masses of 8 g and 8 g.

|  |  |
| --- | --- |
| a) | Write an equation modelled by the balance scales. |
| b) | Solve the equation. |

127. Draw tiles that model .

128. Tiles are arranged on each side of the line to represent an equation.

The rectangle represents *x* and a white square represents +1.

Solve the equation modelled by this picture.



129. Tiles are arranged on each side of the line to represent an equation.

The rectangle represents *x*, a white square represents +1, and a black square represents 1.

Solve the equation modelled by this picture.



130. Solve this equation: 9 + *x* = 5

131. Solve this equation: *x* + *x* + 3 = 13

132. Solve this equation: *x* + 4 + 7 = 5

133. A number decreased by 5 is 11. Write an equation to find the number. Solve the equation.

134. Solve this equation: 6*x* + 8 = 32

135. Solve this equation: 5*x*  6 = 9

136. Nine less than 4 times a number is 11.

Write an equation you can use to find the number. Find the number.

137. Each term of a number pattern is represented by **, where *n* represents the term number.

|  |  |
| --- | --- |
| a) | What is the value of the 10th term? |
| b) | What is the term number for a term value of 76? |

138. Sean paid $70 to rent a boat to go fishing. The rental rate was $40 plus $6 per hour.

For how many hours did Sean rent the boat?

Write an equation, then solve the problem.

139. Jacqui has $30 in her savings account. She saves $20 each week.

How long will it take before she has $350 in her account?

Write an equation, then solve the problem.

140. A rectangle has a length (*x* + 7) cm and a width 6 cm. The perimeter is 36 cm.

Write an equation, then find the length of the rectangle.

141. Tiles are arranged on each side of the line to represent an equation.

A rectangle represents *x* and a white square represents +1.

Solve the equation modelled by this picture.



142. The 2 pans of the scales are balanced. Find the value of the unknown mass W.



143. The perimeter of a regular hexagon is 48 cm.

Write an equation you can use to find the side length of the hexagon. Solve the equation.

144. When the expressions *x*  7, *x*  22, and *x*  13 are added, the result is 17.

Use an equation to find the value of *x*.

145. Hatif has $150 in his account. He saves $80 each month.

How long will it take before he has $630 in his account?

146. Jake has 33 energy bars. He keeps 6 for himself and shares the rest equally among his team of volleyball players. Each player gets 3 bars. How many players are in Jake’s volleyball team?

Use an equation to solve the problem.

147. The graph shows the most popular activities at a camp.



|  |  |
| --- | --- |
| a) | Which is the most popular activity? |
| b) | Calculate the mean. |
| c) | Find the mode. |

148. Here are the scores for 8 students in a math competition:

90, 92, 96, 92, 89, 92, 93, 92

|  |  |
| --- | --- |
| a) | What is the top score? |
| b) | What is the mean score? |
| c) | What is the most common score? |

149. The masses, in tonnes, of garbage collected in 6 days are: 146, 129, 154, 140, 152, 149

|  |  |
| --- | --- |
| a) | Find the mean and mode of the data. |
| b) | On day 7, 138 tonnes are collected. What is the new mean? |

150. The mean of a set of data is 42. How will the mean change if 48 is added to the set of data? Explain.

151. A set of data has mean *x* and mode *y*. If each number in the set of data is tripled, what will happen to the mean and mode?

152. Write 3 numbers with a mode of 13 and a mean of 15.

153. In a series of trials for the 400-m race, an athlete’s times, in seconds, were:

129, 128, 127, 125, 120, 125, 126, 122

Find the mean and median times.

154. The waiting times, in minutes, at a fast-food restaurant were:

6, 8, 0, 4, 0, 6, 7, 0

Find the median, the mode, and the range.

155. Find the mean, median, and range of this set of data: 80, 71, 66, 77, 82, 74

156. In the last 6 basketball seasons, Roon scored these points: 134, 111, 130, 140, 119, 122

Find the mean, median, and range of the scores.

157. Which set of data has an outlier of 57?

P: 52, 60, 57, 54, 63

Q: 57, 82, 72, 87, 77

R: 63, 57, 60, 59, 61

S: 55, 52, 50, 57, 54

158. Here is a set of data: 24, 22, 19, 24, 7, 26, 39, 22, 24

Calculate the mean without the outliers.

159. A set of data has a significantly high outlier. If the outlier is removed, will the mean increase, decrease, or remain the same? Explain.

160. A set of data has a significantly low outlier. If the outlier is removed, will the mean increase, decrease, or remain the same? Explain.

161. Jessie records the time she spends travelling to work by bus each day for 12 days.

Here are the times, in minutes:

19, 23, 34, 20, 23, 22, 33, 22, 22, 24, 25, 24

|  |  |
| --- | --- |
| a) | Calculate the mean. |
| b) | Identify the outliers. |
| c) | Calculate the mean without the outliers. |

162. Here are the math test marks, out of 25, for a group of grade 7 students;

18, 20, 0, 15, 16, 18, 18, 15, 19, 10, 1, 17

|  |  |
| --- | --- |
| a) | Calculate the mean mark. |
| b) | Identify the outliers. |
| c) | Calculate the mean mark without the outliers. |

163. Here are the masses, in kilograms, of garbage the Lee family puts out each week for the last 9 weeks:

19, 16, 15, 35, 19, 15, 16, 18, 18

|  |  |
| --- | --- |
| a) | Calculate the mean. |
| b) | Identify the outlier. Then calculate the mean without the outlier. |
| c) | Suggest a reason for the outlier. |

164. Pat recorded the masses of the first 10 fish she caught.

Here are the masses, in kilograms: 4, 3, 4.5, 3, 3.5, 3, 3.5, 2.5, 9.5, 4.5

|  |  |
| --- | --- |
| a) | Find the mean, median, and mode of the data. |
| b) | Pat wants to know what mass was caught the most often.  Which measure in part a would answer her question? |

165. The weekly overtime earnings, in dollars, of a group of 10 workers were:

100, 87, 87, 85, 90, 95, 100, 75, 105, 115

Find the mean, median, and mode of the data.

166. Grace has saved $124 for a 5-day vacation. She plans to spend an average of $35 per day.

How much more does she need for her vacation?

167. The table shows the number of ice-cream bars sold over a holiday weekend.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Day** | Friday | Saturday | Sunday | Monday |
| **Ice-cream Bars Sold** | 79 | 139 | 159 | 119 |

|  |  |
| --- | --- |
| a) | What was the average number of ice-cream bars sold per day? |
| b) | Which day had the best sales? |

168. The times, in minutes, that a group of students spent playing video games were:

40, 37, 51, 34, 41, 41, 37, 34, 37, 31, 36, 37

|  |  |
| --- | --- |
| a) | Find the mean, median, and mode of the data. |
| b) | Find the range and any outliers. |

169. Stan received these marks on 6 math tests: 81, 87, 93, 89, 61, 81

He wants to make his performance in math look the best possible.

Which measure, the mean, the median, or the mode, should Stan use to report his average math result?

170. The pointer of this spinner is spun once. What is the probability that it will land on a multiple of 3?



171. Ten cards are lettered from A to J. A card is picked without looking.

|  |  |
| --- | --- |
| a) | What is the probability of picking a vowel? |
| b) | What is the probability of picking X, Y, or Z? |

Express each probability as a percent.

172. Peter Penner wrote each letter of his name on a card. He put all 11 cards inside a hat.

Then he pulled out a card without looking. What was the probability of

|  |  |
| --- | --- |
| a) | picking an E? |
| b) | picking an R? |
| c) | picking an A? |

173. A barrel contains 30 cans of fish, all of the same size.

There are: 6 salmon flakes, 6 chunk salmon, 11 tuna flakes, 7 chunk tuna

Daisy picked a can of fish without looking. What is the probability that the can contains:

|  |  |
| --- | --- |
| a) | salmon? |
| b) | fish that is not chunk tuna? |

174. Two coins are tossed. What is the probability of getting 2 tails?

175. At a pizza parlor, choices for the topping are ham, pineapple, and pepperoni. The available sizes are small and large.

|  |  |
| --- | --- |
| a) | Draw a tree diagram to list the possible 1-topping pizzas. |
| b) | Find the probability of choosing at random a large pineapple pizza. |

176. A spinner is divided into 4 equal sectors of red, green, blue, and purple.

A die labelled 1 to 6 is rolled and the pointer of the spinner is spun.

What is the probability of the pointer landing on red and getting an even number on the die?

177. Lewis has a pair of blue shorts and a pair of green shorts. He also has a yellow T-shirt, a red T-shirt, and a white T-shirt.

|  |  |
| --- | --- |
| a) | Draw a tree diagram to show all possible combinations of shorts and T-shirt Lewis can wear. |
| b) | Lewis picks a pair of shorts and a T-shirts without looking.  What is the probability that he picks a yellow or red T-shirt and a pair of blue shorts? |

178. A bag contains 8 red, 5 blue, and 6 green crayons. Students take turns to pick a crayon.

|  |  |
| --- | --- |
| a) | Dodi picks a crayon without looking. What is the probability that she picks a red crayon? |
| b) | When it is Otto’s turn, 3 red and 4 green crayons have been picked and removed from the bag.  What is the probability that Otto will pick a blue crayon? |

179. In this diagram, line segment AB is equal in length to line segment BC.



Use a ruler and protractor to construct line segment KC perpendicular to line segment BC.

Use a plastic right triangle to construct a line segment LA perpendicular to line segment AB.

Label the point D at where the 2 perpendiculars intersect.

Describe quadrilateral ABCD.

180. Describe how you use a Mira to construct the perpendicular bisector of line segment AB.



181. Construct the perpendicular bisector of line segment PQ.

Mark any point K on the perpendicular bisector left of line segment PQ.

Mark any point L on the perpendicular bisector right of line segment PQ.

Join KP, KQ, LP, and LQ.

Describe quadrilateral KPLQ.



182. Construct the perpendicular bisectors of line segments AB and BC.

Label the point P at where the perpendicular bisectors intersect.

Join AP and PC.

Describe quadrilateral BAPC.



183. Construct the perpendicular bisectors of AB and BC.

Label the point K at where the perpendicular bisectors intersect.

Measure the distance from point K to points A and C.

What can you say about point K?



184. Construct the bisector of  in this diagram.



185. Draw a large rhombus ABCD.

Construct the bisectors of DAB and ADC.

|  |  |
| --- | --- |
| a) | Find the measure of the angle formed at the intersection of the 2 angle bisectors. |
| b) | What else do you notice about the angle bisectors? |

186. Use a ruler and a compass to construct an angle of 90 from this diagram.



187. Draw a large acute ABC. Extend AC to D.

Bisect  and  Label the point K at where the 2 angle bisectors intersect.

Measure  and .

What is the relationship between the measures of  and ?

188. An architect is designing a parking lot. He uses the origin of a coordinated grid as the centre of the lot and places 4 lights at points with these coordinates: A(3, 2), B(0, 5), C(5, 1), D(1, 5).

Plot the points to show where the 4 lights are located in the parking lot.

189. Find the coordinates of point A that will make ABC isosceles with AB = AC.

Give at least 3 different answers.



190. The point A(6, 7) is moved 6 units left and 8 units down.

What are the new coordinates of point A?

191. The points A(–4, 5), B(–4, 3), and C(7, 3) are 3 vertices of a rectangle.

Find the coordinates of point D, the 4th vertex.

192. Fifteen points are plotted on this coordinated grid.

|  |  |
| --- | --- |
| a) | What is the greatest number of points with the same *x-*coordinate? |
| b) | What is the greatest number of points with the same *y-*coordinate? |
| c) | How many points have equal *x*- and *y*-coordinates? |



193. ** is translated 2 units to the right and 3 units down.

Draw and label its translation image **.



194. Point A(–3, –5) is reflected in the *y*-axis to form its image point B.

Point B is then reflected in the *x*-axis to form its image point C(3, 5).

Points A and C are opposite vertices of a rectangle ABCD.

|  |  |
| --- | --- |
| a) | What are the coordinates of the vertices B and D? |
| b) | Identify the transformation that will move vertex C to vertex D. |

195. Describe two different transformations that will move shape A to shape B.



196.

|  |  |
| --- | --- |
| a) | Line segment AB is reflected in the *y-*axis to form line segment .  Write the coordinates of point .  What type of triangle is ? |
| b) | is reflected in the *x-*axis to form .  Write the coordinates of point .  What type of quadrilateral is quadrilateral ? |



197. Quadrilateral WXYZhas vertices W(3, 5), X(1, 3), Y(1, 5), and Z(1, 7).

Draw and label the quadrilateral on a coordinate grid.

Rotate the quadrilateral  about the origin and draw its image quadrilateral .

198. Plot the points P(–5, 0), Q(–9, –3), and R(–1, –2) on a coordinate grid.

Join the points to form .

Rotate   about the origin. Label the image .

Write the coordinates of each vertex of .

199. Can hexagon P be moved to hexagon Q using each of the following transformations?

|  |  |
| --- | --- |
| a) | translation |
| b) | reflection |
| c) | rotation |

Describe the possible transformations.



200. Rotate pentagon A  about the origin. Draw and label its image pentagon B.

Rotate pentagon B  about the point (8,0). Draw and label its image pentagon C.



**Problem**

201. A strip of cardboard measures 8 cm by 50 cm.

|  |  |
| --- | --- |
| a) | What is the radius of the largest circle that can be cut from this strip? |
| b) | How many more identical circles can be cut from the strip? |

202. This diagram shows 5 circles drawn in a square. What is the radius of each circle?



203. The diameter of a tire is 0.75 m.

|  |  |
| --- | --- |
| a) | Find the circumference of the tire. Round your answer to two decimal places. |
| b) | About how many times will the tire have to rotate to travel 1 km? |

Show your work.

204. A metal gate is made of a square frame of side length 68 cm and 4 circles.

What is the total length of metal required to make the frame and the 4 circles?

Round your answer to the nearest centimetre. Show your work.



205. Find the perimeter of the figure. Round your answer to one decimal place.



206. Parallelogram A has height 2.5 cm and area 26.5 cm2.

Parallelogram B has the same base as parallelogram A but double the area.

Determine the height of parallelogram B.

207. The graph shows the surface area of five lakes in a region.



|  |  |
| --- | --- |
| a) | Which two lakes cover the largest area? |
| b) | If the total area of the lakes is 8000 km2, what is the area of each lake?  i) Horse Lake  ii) Beaver Lake |

208. The circle graph shows Veronica’s weekly budget.



|  |  |
| --- | --- |
| a) | What percent of her money goes to savings? |
| b) | If she budgets $58 for food, what is her total budget? |
| c) | How much does she budget for transport? |

209. Find the sum of the fractions modelled by these fraction circles.



210. Find the sum of the fractions modelled by these fraction circles.



211. Replace eachwith a number to complete this addition equation.

Use the digits 2, 3, 4, and 5 only once.

 + = 

212. Write the fractions  with the same denominator.

213. Replace each with a number to make both sides equal. Use the digits 1, 2, 3, and 4 only once.

 + = 

214. A rectangle has length  m and width  m. What is the perimeter of the rectangle?

215. Three people shared a cake. Which of the following statements could be true? Explain.

|  |  |
| --- | --- |
| a) | Omar ate , Henri ate , and Ira ate . |
| b) | Omar ate , Henri ate , and Ira ate . |

216. Evaluate: 

217. Casey has to spend 3 h per week on swimming practice. He spent  h on Monday,

 h on Tuesday,  h on Wednesday, and  h on Thursday. How many more hours does he have to spend on swimming practice this week?

218. Replace each with a number to make both sides equal. Use the digits 1, 2, 3, and 4 only once.

 = 

219. Replace *x* with a number to make this equation true.



220. Find 3 different ways to write  as a difference of 2 fractions with the different denominators.

221. Replacewith a number to make this equation true.

3 + = 6

222. Evaluate:  +   

Give your answer as a mixed number in simplest form.

223. Evaluate:  +   

Give your answer as a mixed number in simplest form.

224. Evaluate: 6    

Give your answer as a mixed number in simplest form.

225. Replacewith a mixed number to make this equation true.

 += 

226. Mandy and 2 friends bought some mechanical pencils at a special sale. They shared the pencils equally. Mandy then gave 2 to her brother and had 10 pencils left.

How many pencils did Mandy and her friends buy at the sale?

|  |  |
| --- | --- |
| a) | Write an equation you can use to solve the problem. |
| b) | Solve the equation to answer the question. |

227. Ms. Shaban has 79 fruit bars. She keeps 4 for herself and shares the rest equally among the Math Club members. Each member gets 5 bars. How many members are in the Math Club?

|  |  |
| --- | --- |
| a) | Write an equation you can use to solve the problem. |
| b) | Solve the equation to answer the question. |

228.

|  |  |
| --- | --- |
| a) | Write an expression for the perimeter, in centimetres, of this shape below. |
| b) | Write an equation for its perimeter when *x* = 11. |
| c) | Find the perimeter when *x* = 11. |



229. You have 3 known masses of 1 kg, 3 kg, and 5 kg.

Show how you can use these masses and a two-pan balance to find an unknown mass of 1 kg to 9 kg.

Use this table to help.

|  |  |  |
| --- | --- | --- |
| **Left Pan** | | **Right Pan** |
| **Unknown Mass** | **Known Mass** | **Known Mass** |
| 1 kg |  |  |
| 2 kg |  |  |
| 3 kg |  |  |
| 4 kg |  |  |
| 5 kg |  |  |
| 6 kg |  |  |
| 7 kg |  |  |
| 8 kg |  |  |
| 9 kg |  |  |

230. You have 5 *x*-tiles, 12 positive unit tiles and 12 negative unit tiles.

Model the expression 5*x*  5 at least 3 different ways.

231. Solve this equation: 

Show your steps.

232. A set of data has these numbers: 28, 38, 42, 35

What number has to be added to the set of data to change the mean to 35? Show your work.

233. The mean of a set of 7 numbers is 32. When an outlier is removed, the mean is 24.

What is the outlier? Show your work.

234. A small company has 4 employees. Their salaries are: $27 000, $27 000, $27 000, $31 000

The employer pays himself a salary of $125 000.

The employees want to request a salary raise.

|  |  |
| --- | --- |
| a) | Should the employees use the mean, median, or mode to support their request? Explain. |
| b) | How should the employer respond to avoid giving a big raise? |

235. The ages in years of the houses on Kelly’s street block are: 22, 25, 13, 2, 26, 17, 2, 24

|  |  |
| --- | --- |
| a) | Find the mean, median, and mode of the ages of the houses. |
| b) | Which measure(s) should Kelly use to represent the ages of the houses? Explain. |

236. This spinner has 5 equal sectors. The pointer on the spinner is spun once.



|  |  |
| --- | --- |
| a) | What is the probability of getting a 5? |
| b) | Is the pointer more likely to land on an even number than on an odd number? Explain. |

237. Marissa is researching information about martial arts students.

She has found that 5 out of 8 martial artists practise every day.

There are 136 martial arts students at a school.

Based on Marissa’s result, how many of these students would practise every day?

Show your work.

238. Two identical 4-sided dice are each labelled 1 to 4.

|  |  |
| --- | --- |
| a) | List all possible outcomes when the 2 dice are rolled and the numbers on the dice added. |
| b) | What is the probability of a sum greater than 5? |

239. Suppose you randomly connect 2 of these 4 points with a straight line.

What is the probability that the sum of the numbers for the 2 points is odd?

Show your work.



240. The diagram is made up of 3 squares. Is line segment PQ parallel to line segment BA?

Describe how you know.



241. Draw a circle with centre at O. Mark any 3 points A, B, and C on the circle. Join AB and BC.

|  |  |
| --- | --- |
| a) | Construct a line segment OP perpendicular to AB with point P on AB. |
| b) | Use a different method to construct a line segment OQ perpendicular to BC with point Q on BC. |
| c) | Measure the lengths of AP and AB. What do you notice? |
| d) | Measure the lengths of BQ and QC. What do you notice? |

242. Draw a large obtuse triangle, PQR, with the length of side PQ equal to length of side PR.

|  |  |
| --- | --- |
| a) | Construct a line segment PK perpendicular to side QR with point K on QR. |
| b) | Construct line segment AK parallel to side PQ with point A on PR. |
| c) | Construct line segment AB perpendicular to side KR with point B on QR. |
| d) | Name pairs of parallel lines in the diagram. |
| e) | Name as many isosceles triangles as you can. |

243. Draw a large triangle ABC.

|  |  |
| --- | --- |
| a) | Construct the bisectors of ABC and ACB.  Label the point K at where the 2 bisectors intersect.  Join KA. Is line segment KA the bisector of BAC? Explain. |
| b) | Construct a perpendicular to line segment BC through point K.  Label the point L at where the perpendicular crosses line segment BC.  Place the compass point on point K and draw a circle with radius KL.  What do you notice about the circle? |

244. Points A(–4, –6) and C(5, 3) are opposite vertices of square ABCD.

What are the coordinates of the other 2 vertices B and D?

245. Plot these 2 points A(–2, 2) and B(–2, 7) on a coordinate grid.

Join the points to form a line segment AB.

How many different locations can you find for points C and D such that rectangle ABCD has area 30 square units?

246. The 3 vertices of a right-angled ABC are in Quadrant 3.

The coordinates of point B are (–4, –9) and for point C are (–4, 1).

What are the coordinates of point A?

Find at least 3 different answers.

247.  has vertices A(2, 1), B(2, 1), and C(2, 5).

Draw and label the triangle on a coordinate grid.

|  |  |
| --- | --- |
| a) | Draw and label , the image of  after a rotation of  about the point (0, 0). |
| b) | Draw and label , the image of  after a rotation of  about the point (0, 3). |
| c) | Draw and label , the image of  after a rotation of  about the point (2, 2). |

Describe .

248. Is the combination of a rotation followed by a translation the same as the combination of the same translation followed by the same rotation? Use  in this diagram to investigate. Explain your results.

|  |  |
| --- | --- |
| a) | Rotate   about the origin. Then translate the image 1 unit right and 2 units down. |
| b) | Translate  1 unit right and 2 units down. Then rotate the image  about the origin. |



249. Start with .

Describe a transformation such that the combination of  and its image is:

|  |  |
| --- | --- |
| a) | an isosceles triangle |
| b) | a rectangle |
| c) | a parallelogram |



250. Describe the transformation that moves:

|  |  |
| --- | --- |
| a) | shape A to shape B |
| b) | shape A to shape C |
| c) | shape A to shape D |

