1. 1. Sketch this number line.

$$+\quad+\quad+\quad+\quad+\quad+\quad+\quad+\quad+\quad+\quad+$$
0 1 2 3 4 5 6 7 8 9 10
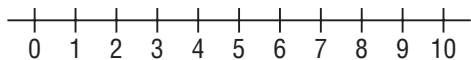
Do *not* use a calculator. Determine or estimate each square root. Where necessary, write the square root to the nearest tenth. Place each square root on the number line.

a) $\sqrt{0.64}$ b) $\sqrt{\dfrac{36}{25}}$ c) $\sqrt{79.7}$ d) $\sqrt{4.41}$

e) $\sqrt{\dfrac{100}{9}}$ f) $\sqrt{\dfrac{89}{90}}$ g) $\sqrt{30.25}$ h) $\sqrt{\dfrac{17}{4}}$

2. Here is a floor plan for a building that is 5 m tall. It has a flat roof. What is the surface area of the building, including its roof, but excluding its floor?

28 m

15 m

19 m

6 m
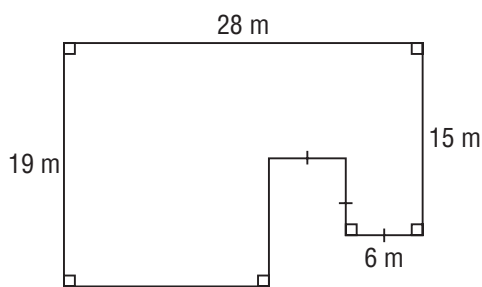
2. 3. A student answered the following skill-testing question to try to win a prize:
$(-4)^3 - (-2)^4 \div 2^2 + 5^2 \times 7^0$

The student's answer was 5. Did the student win the prize? Show your work.

4. Express as a single power, then evaluate.
$$\left(\dfrac{6^7 \times 6^3}{6^5 \times 6^2}\right)^2$$

3. 5. During the month of July, Bruce earned $225 cutting lawns and $89.25 weeding flower beds. He spent $223.94 on an MP3 player and purchased 3 DVDs at $22.39 each.

a) Write each amount as a rational number. Justify your choice of sign for each number.

b) Write an addition statement for Bruce's balance at the end of July.

c) What is Bruce's balance?

6. Use a calculator. Evaluate to the nearest hundredth.
$$\dfrac{-17.8 - (-9.6) \div 1.2 + 31.4}{7.6 \times (-4.1) - 2.9}$$

4. 7. Marcie is rowing at an average speed of 3 m/s. She travels a distance d metres in t seconds.

a) Create a table of values for this relation.

b) Graph the data. Will you join the points on the graph? Explain.

c) Is the relation linear? How do you know?

d) Write an equation that relates d to t.

e) How far does Marcie row in 15 s?

f) How long does it take Marcie to travel 1 km?

8. Colton works for 8 h each week at a sporting goods store. This graph shows how his pay in dollars relates to the number of weeks he works.

Colton's Pay

300

Pay ($)
200

100

0   2   4
Time (weeks)
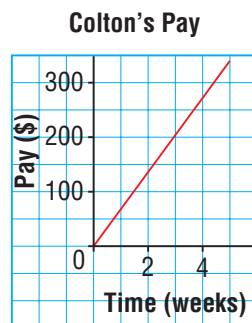
a) Estimate how much Colton earns after 2 weeks.

b) Estimate how long it will take Colton to earn $1000. What assumptions do you make?

c) What conditions could change that would make this graph no longer valid?

9. The difference of two polynomials is $4n^2 - 2n + 5$. One polynomial is $-6n^2 - 7n + 8$.

a) What is the other polynomial? Show your work.

b) Why are there two possible answers to part a?

10. This diagram shows one rectangle inside another.

$4x + 3$

$3x + 1$

$3x$ $2x$
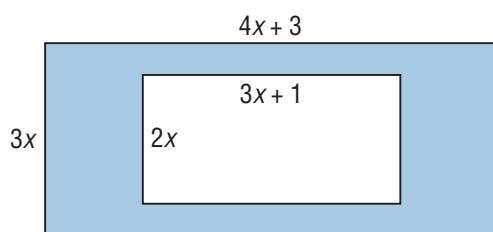
a) Determine the area of the shaded region. Justify your answer.

b) Determine the area of the shaded region when $x = 1.5$ cm.

11. Mountain bikes can be rented from two stores near the entrance to Stanley Park. Store A charges $6.00 per hour, plus $3.50 for a helmet and lock. Store B charges $6.70 per hour and provides a helmet and lock free. Determine the time in hours for which the rental charges in both stores are equal.

a) Write an equation to solve this problem.

b) Solve the equation.

c) Verify the solution.

12. Jerry hires a pedicab to tour a city. He is charged $2.75 plus $0.60 per minute of travel. He has $12.00. How long can he ride in the pedicab?

a) Choose a variable and write an inequality to solve this problem.

b) Solve the inequality. Explain the solution in words.

c) Verify the solution.

d) Graph the solution.

**13.** This photo is to be enlarged. Determine the dimensions of an enlargement with each scale factor.

a) 2   **b)** $\frac{7}{4}$ **c)** 3.5

14. A hockey rink measures 60 m by 26 m. A model of a hockey rink measures 1.5 m by 0.65 m.

a) What is the scale factor for this reduction?

b) A hockey goal is 1.8 m high and 1.2 m high. What are the dimensions of a goal on the model hockey rink?

15. Bobbi wants to determine the height of a building. When Bobbi's shadow is 2.5 m long, the shadow of the building is 12 m long. Bobbi is 1.7 m tall. What is the height of the building, to the nearest tenth of a metre? Show your work.

16. Trapezoid ABCD is part of a larger shape.
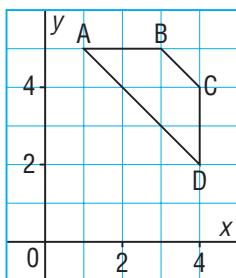
After each reflection below:
- Draw the image of ABCD.
- Describe any symmetry in the shape and its image.

a) a reflection in the horizontal line through 5 on the *y*-axis

b) a reflection in the vertical line through 4 on the *x*-axis

**c)** a reflection in the oblique line through $(0, 6)$ and $(6, 0)$

17. a) Does rectangle MNPQ below have rotational symmetry about its centre? If it does, state the order and the angle of rotation symmetry.
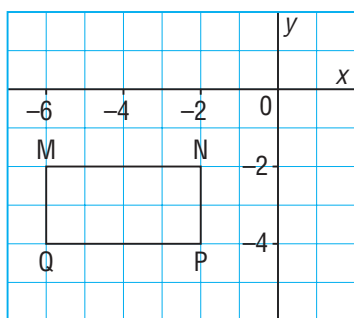

b) Rectangle MNPQ is part of a larger shape. It is to be completed in three different ways, by each rotation below:
- 90° clockwise about the point $(-2, -3)$
- 180° about vertex Q
- 270° clockwise about the point $(-4, -4)$

i) Draw each rotation image.

ii) List the coordinates of the larger shape formed by the rectangle and its image each time. Describe any rotational symmetry in this shape.
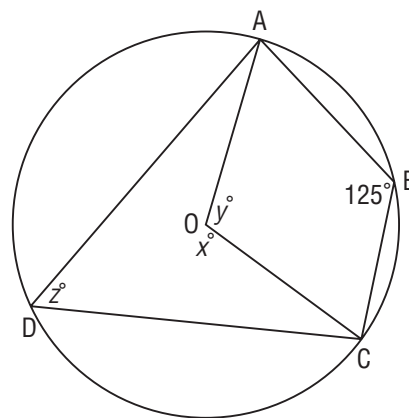
8 **18.** Point G is a point of tangency and O is the centre of the circle. Determine the length of GH to the nearest tenth of a centimetre.
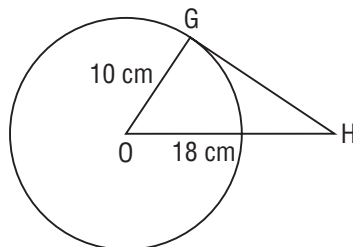

19. A circle has diameter 27 cm. How far from the centre of this circle is a chord 18 cm long? Give your answer to the nearest tenth of a centimetre.
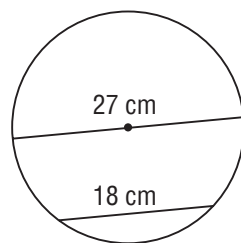

20. Point O is the centre of a circle. Determine the values of $x°$, $y°$, and $z°$.

21. A rectangle is inscribed in a circle with radius 14 cm. The length of the rectangle is 21 cm. Determine the width of the rectangle to the nearest tenth of a centimetre.

22. A regular decagon is inscribed in a circle with radius 20 cm and centre O. The distance from O to each side of the decagon is about 19 cm. What is the perimeter of the decagon to the nearest centimetre?
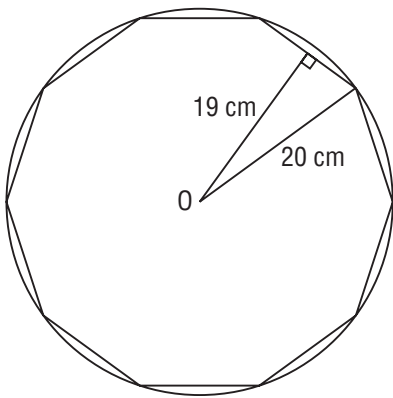
23. Point O is the centre of a circle. Determine the values of $x°$, $y°$, and $z°$.
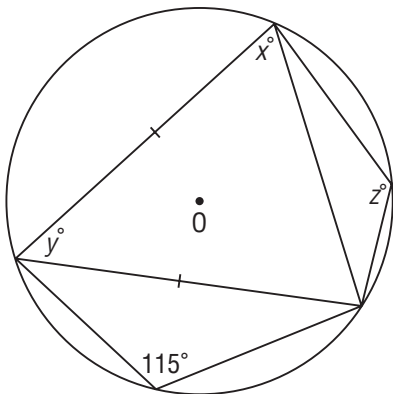
24. A baseball team won 58 of its first 100 games of the season. Bao concludes that there is a 58% probability of the team winning its next game.
a) What assumptions is Bao making?
b) For each assumption, explain how the probability might change if the assumption is not true.

25. Zahara is planning a telephone survey to discover how much weekly allowance parents give their children.
a) Identify potential problems she may encounter related to 3 of these factors: bias, timing, privacy, cultural sensitivity, ethics, time
b) For each potential problem in part a, explain how Zahara could avoid the problem.

26. An on-line fashion magazine for teens concludes that high school students spend on average $200 per month on clothes.
a) How do you think the magazine may have conducted the survey?
b) Do you think the conclusion is valid? Explain.

27. For each situation, explain why data are collected from a sample and not a census.
a) to determine the mean cost of hockey equipment for teenagers in Canada
b) to determine the number of Canadian families with at least one cell phone

28. Should a census or sample be used to collect data about each topic? Explain your choice.
a) to determine the popularity of a new television show
b) to determine the condition of an airplane's seatbelts

29. Discuss whether each sampling method would lead to valid conclusions.
a) To determine if the prices of items in a grocery store are appropriate, you survey every 12th customer leaving the store on a given day.
b) To determine the favourite video game of students in a school, you survey 20 randomly selected students from each grade in the school.