Released 2010 Achievement Test

Mathematics

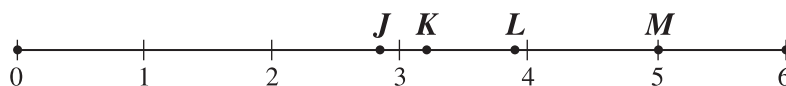**Government of Alberta** ■

Alberta

Freedom To Create. Spirit To Achieve.

The letters on the number line below represent rational numbers.

1. The approximate value of $\sqrt{15}$ is represented by the letter
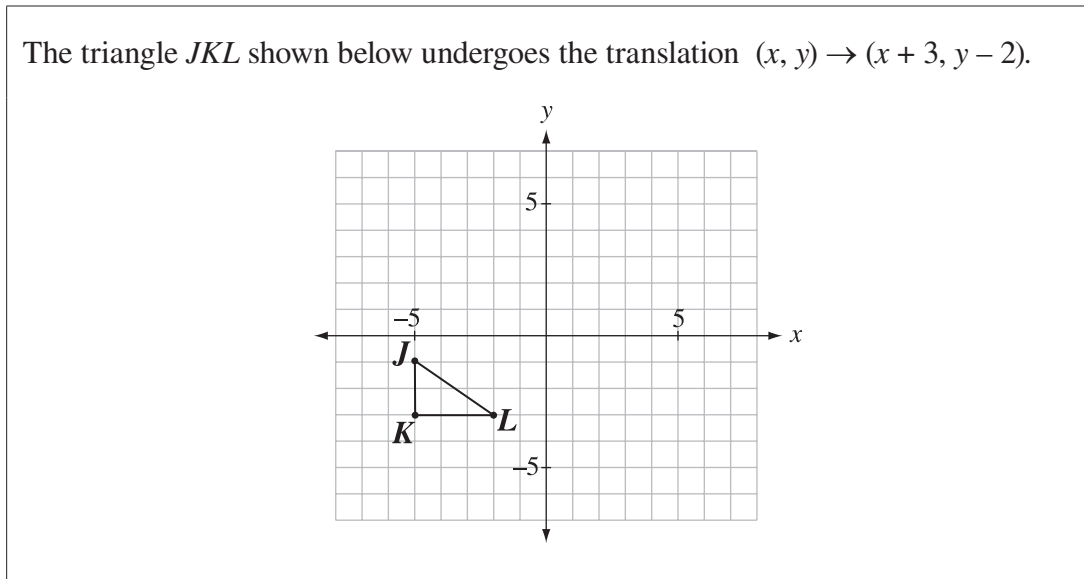
A. J
B. K
C. L
D. M

A truck heads north at a constant speed of 80 km/h. A car leaves 20 minutes later heading north along the same road and travelling at a constant speed of 90 km/h.

2. Which of the following equations could be used to determine how much time in hours, *t*, the car travels until it catches up to the truck?

A. $90t = 80\left(t - \dfrac{1}{3}\right)$

B. $90t = 80\left(t + \dfrac{1}{3}\right)$

C. $90t = 80(t - 20)$

D. $90t = 80(t + 20)$

The triangle *JKL* shown below undergoes the translation $(x, y) \rightarrow (x + 3, y - 2)$.

3. Which of the following rows represents the coordinates of the resulting image?

Row	J′	K′	L′
A.	(−2, −3)	(−2, −5)	(−1, 5)
B.	(−2, −3)	(−2, −5)	(1, −5)
C.	(−8, −3)	(−8, −1)	(−5, 1)
D.	(−8, −3)	(−8, −1)	(5, −1)

A piggy bank contains only quarters and nickels, and there is a total of 60 coins. The total value of the coins in the bank is $7.40.
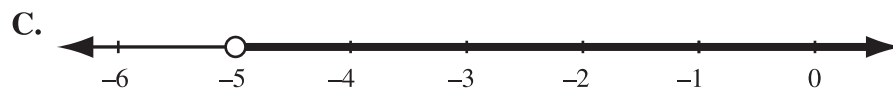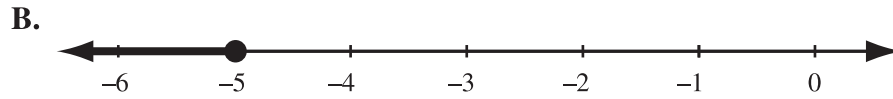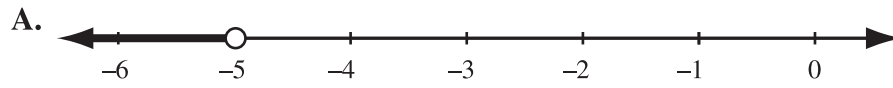
Numerical Response

1. How many quarters are in the piggy bank?

Answer: _____

(Record your answer in the numerical-response section on the answer sheet.)

4. Which of the following expressions is equivalent to $\dfrac{40 + 10}{5 \times (6 - 4)}$?

    A. $40 + 10 \div 5 \times 6 - 4$

    B. $(40 + 10) \div 5 \times (6 - 4)$

    C. $40 + 10 \div (5 \times (6 - 4))$

    D. $(40 + 10) \div (5 \times (6 - 4))$

5. If $n = 2,$ then which of the following expressions yields the largest result?

    A. $\dfrac{n^5 \times n^2}{n^4}$

    B. $\dfrac{n^2 \times n^3}{n}$

    C. $\dfrac{(n^2)^3}{n}$

    D. $\dfrac{(n^5)^2}{n^4}$

6. The solution to the inequality $6 - x > -1$ is

    A. $x < 7$

    B. $x > 7$

    C. $x < -7$

    D. $x > -7$

7. Which one of the following statements is correct?

    A. $4^5 + 4^7 = 4^{12}$

    B. $4^{12} - 4^4 = 4^8$

    C. $4^2 \times 4^5 = 4^7$

    D. $4^6 \div 4^3 = 4^2$

8. Which of the following number lines represents the solution to the inequality
$5x - 3 \le 7x + 7$?

A.

B.

C.

D.

Use the following information to answer numerical-response question 2.

The diagram below shows a circular pipe that has O as its centre. The radius of the pipe is 20 cm.
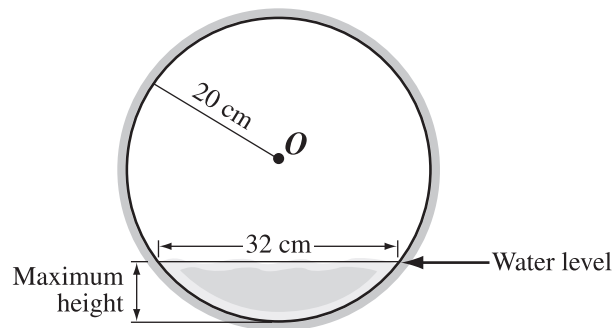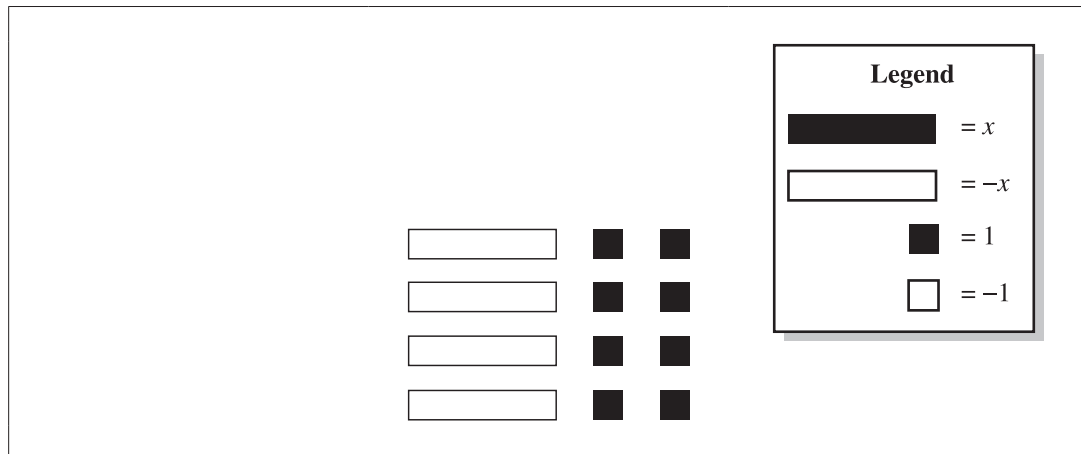

Numerical Response

2. The maximum depth of the water in the pipe is _____ cm.

(Record your answer in the numerical-response section on the answer sheet.)

9

Legend

= x

= −x

= 1

= −1

9. The algebra tile model above could represent the product of

A.   2 and $(2x + 4)$

B.   2 and $(2x − 4)$

C.   4 and $(−x − 2)$

D.   4 and $(−x + 2)$

---

10. If a cube has a surface area of 2.16 m^2, then which of the following equations represents the height, h, of the cube?

A. $h = \sqrt{\dfrac{2.16}{6}}$ m

B. $h = \sqrt{\dfrac{6}{2.16}}$ m

C. $h = \dfrac{2.16}{6}$ m

D. $h = 2.16 \times 6$ m

An art store is having a sale. The table below shows the regular price, *r*, and the sale price, *s*, of several items.

Item	Regular Price (*r*)	Sale Price (*s*)
Glue	$5.00	$4.25
Brushes	$7.00	$5.95
Paper	$10.00	$8.50
Crayons	$12.00	$10.20

11. Which of the following equations was used to calculate the sale prices?

A. $s = 0.15r$

B. $s = 0.85r$

C. $s = r - 0.75$

D. $s = r - 0.85$

Sam draws two polygons that are similar. The first polygon has a perimeter of 16 cm and the second polygon has a perimeter of 10 cm.

Numerical Response

3. If the shortest side of the first polygon has a length of 4 cm, then the corresponding side of the second polygon has a length of _____ cm.

(Record your answer in the numerical-response section on the answer sheet.)

Kristy received a speeding ticket for travelling above the posted limit.

MAXIMUM

100

km/h

12. The inequality that shows the speed, *s*, that Kristy was travelling at is

    A. $s \le 100$ km/h

    B. $s < 100$ km/h

    C. $s \ge 100$ km/h

    D. $s > 100$ km/h

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13. If the side length of a cube is tripled, then the surface area of the cube will increase by a factor of

    A.   6

    B.   9

    C.   12

    D.   27

14. The expression $(3^2 \times 2)^3$ can be simplified to

    A. $3^2 \times 2^3$

    B. $3^6 \times 2$

    C. $3^5 \times 2^3$

    D. $3^6 \times 2^3$

Use the following diagram to answer question 15.

A ladder with equally spaced rungs is shown below.
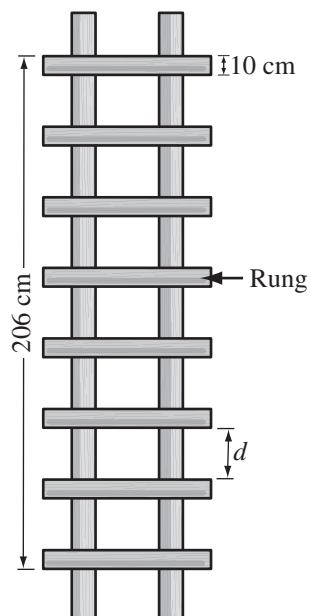
* d represents distance
  between rungs

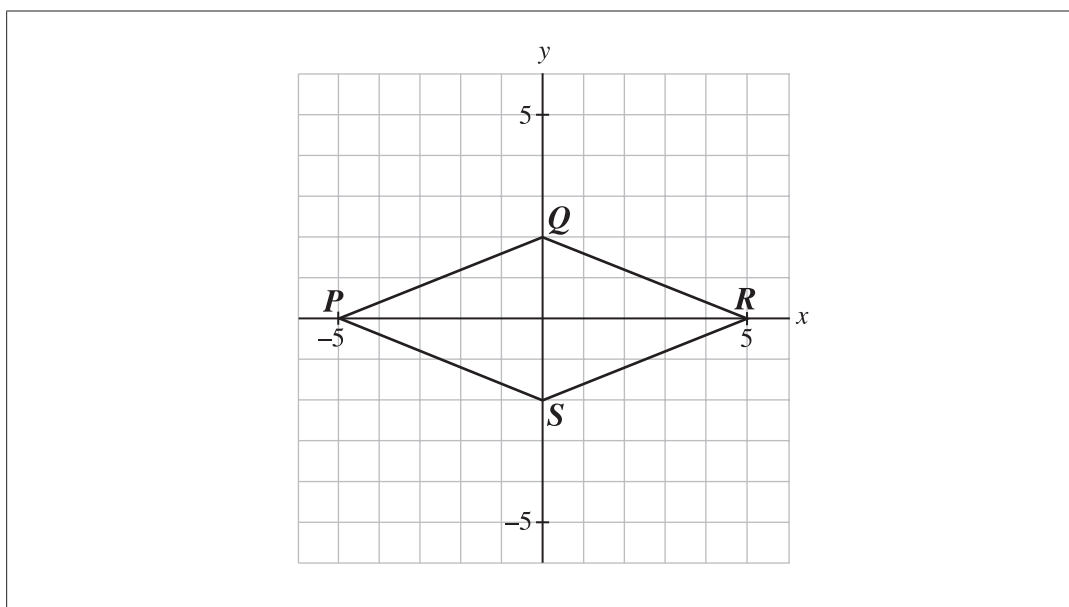**15.** Which of the following equations can be used to calculate the distance, d, between each ladder rung?

A. $d = 206 - 8(10) \div 7$

B. $d = 206 - 8(10) \times 7$

C. $d = \dfrac{7}{206 - 8(10)}$

D. $d = \dfrac{206 - 8(10)}{7}$

16. If the shape shown above is rotated 90 degrees clockwise about the origin to form the quadrilateral *P′ Q′ R′ S′*, then *P′* would be located at

A. (5, 0)
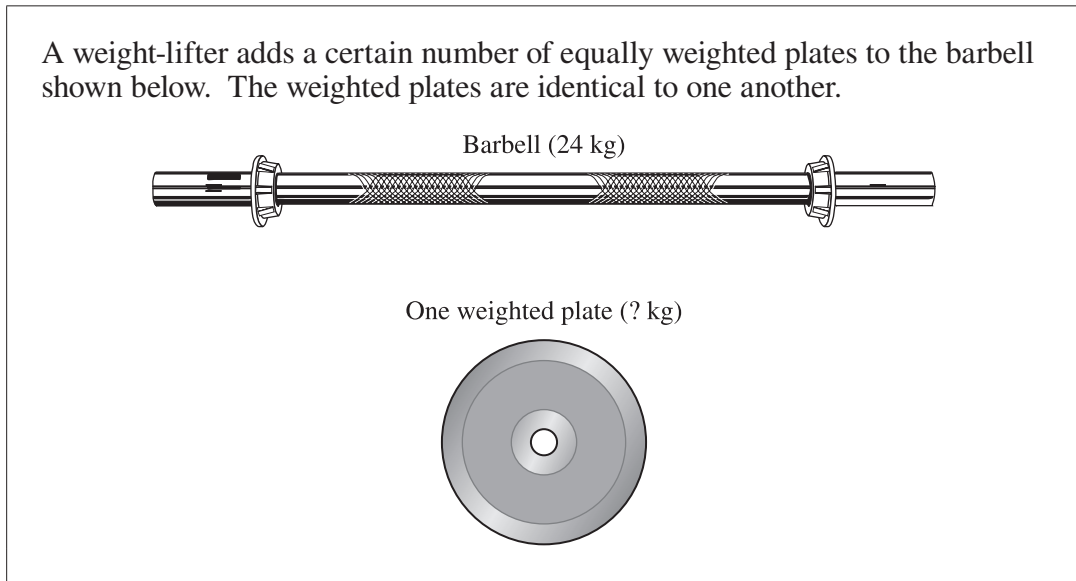**B.** (0, 5)
C. (0, −5)
D. (−5, 0)

When a square piece of paper is folded in half, the resulting figure has a perimeter of 24 cm.

Numerical Response

4. The **area** of the square piece of paper before it is folded is _____ cm².

(Record your answer in the numerical-response section on the answer sheet.)

A weight-lifter adds a certain number of equally weighted plates to the barbell shown below. The weighted plates are identical to one another.

Barbell (24 kg)

One weighted plate (? kg)

17. If the total mass of the barbell and plates equals 60 kg, and if each side of the barbell has the same number of plates, then one weighted plate could have a mass of

    A.   36 kg

    B.   12 kg

    C.   6 kg

    D.   4 kg

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18. Marc has a certain number of coins that are dimes, *d*, and quarters, *q*. Which of the following expressions represents the value of Marc's money in cents?

    A. $10d + 25q$

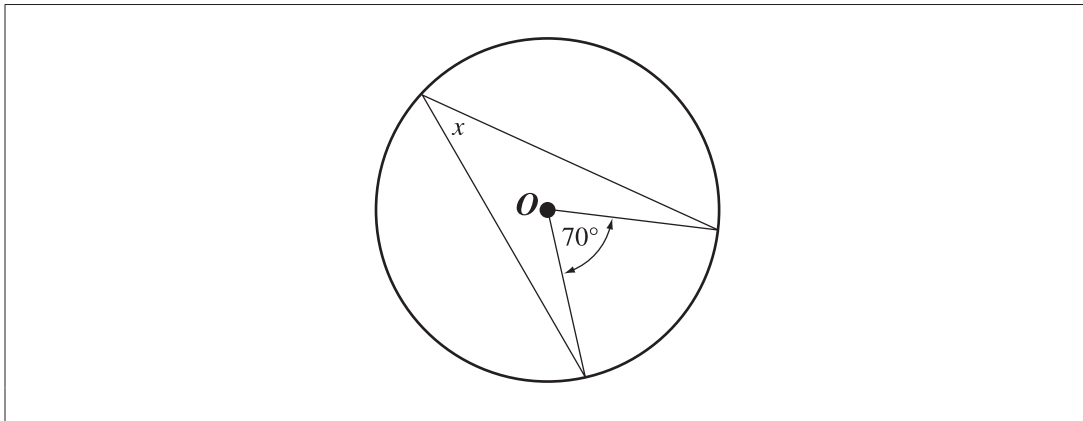   **B.** $35(d + q)$

    C. $35d + q$

    D. $d + q$

$$3x^2 - 4$$

19. Which row correctly shows the degree, the coefficient, and the constant term in the expression shown above?

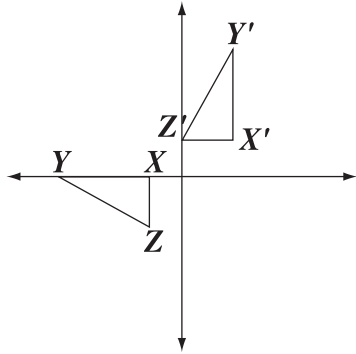| Row	Degree	Coefficient	Constant Term
A.	2	3	-4
B.	3	2	4
C.	2	-4	3
D.	3	4	2

Numerical Response

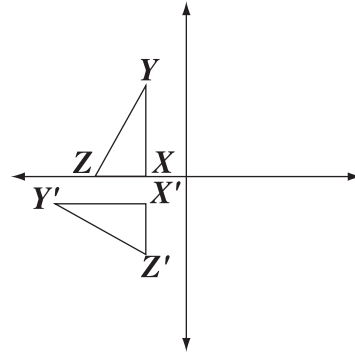**5.** If O is the centre of the circle, the measure of x is _____ °.

(Record your answer in the numerical-response section on the answer sheet.)

16

20. Which of the following diagrams illustrates a 90° rotation of triangle XYZ counter-clockwise about the origin?
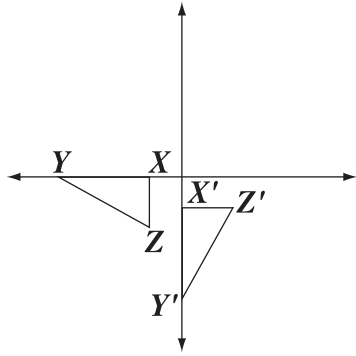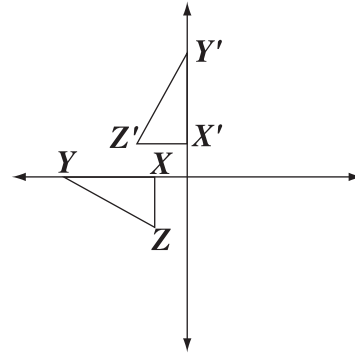
A.

B.

C.

D.

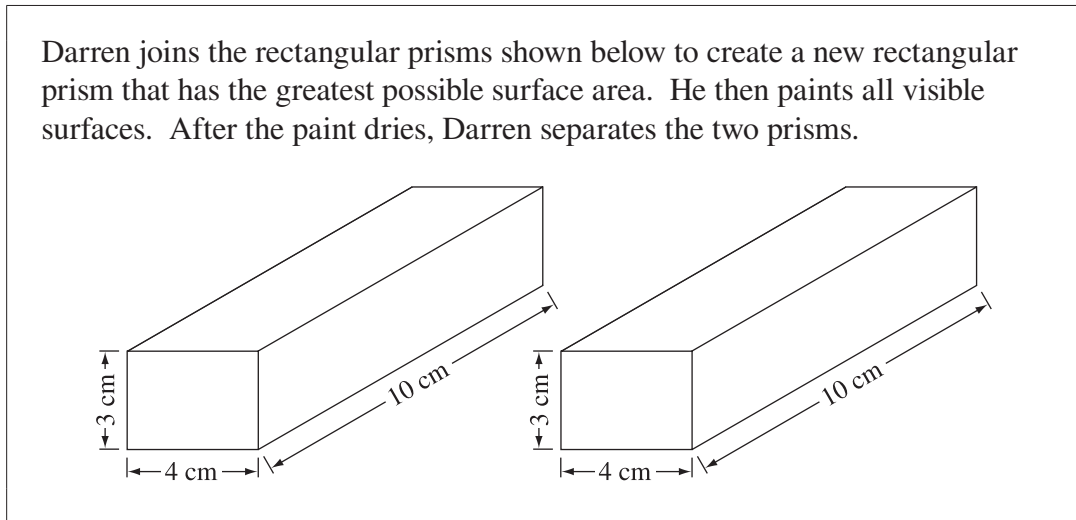**21.** When $x^2 - 9x - 4$ is subtracted from the sum of $5x^2 - 8x + 2$ and $2x^2 - 3x - 7$, the result is

A. $x^2 - 20x - 9$

B. $2x^2 + 4x + 13$

C. $6x^2 - 2x - 1$

D. $8x^2 - 20x - 9$

22. In estimating $\sqrt{70}$, which two perfect square numbers provide the **best** two benchmarks to estimate your answer?

    A. 49 and 64

    B. 64 and 100

    C. 49 and 81

    D. 64 and 81

Use the following information to answer numerical-response question 6.

Darren joins the rectangular prisms shown below to create a new rectangular prism that has the greatest possible surface area. He then paints all visible surfaces. After the paint dries, Darren separates the two prisms.
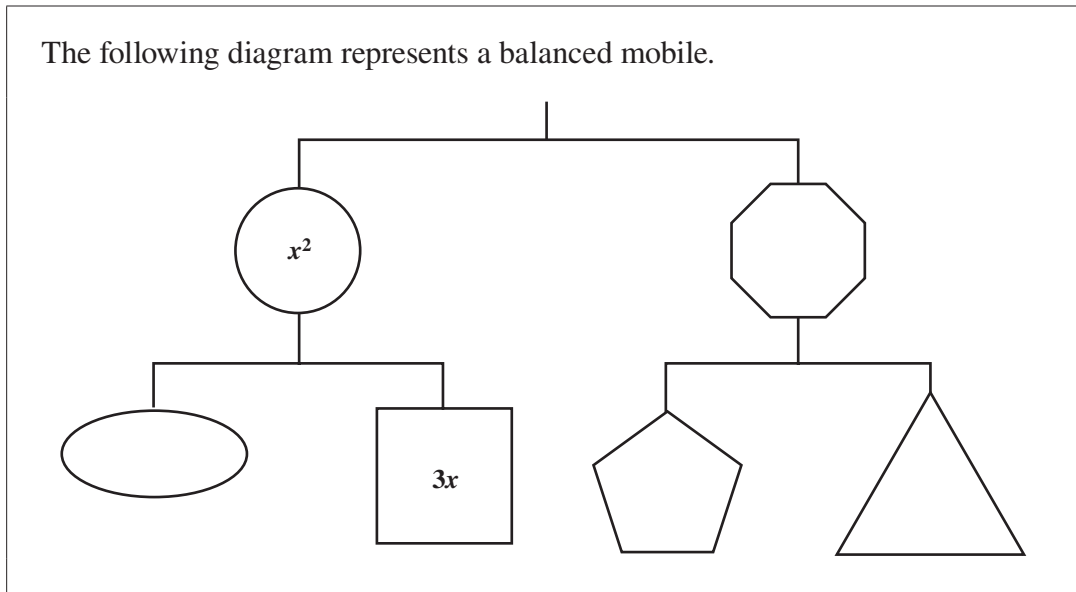

Numerical Response

6. The total area of both prisms that has **not** been painted is _____ cm^2.

(Record your answer in the numerical-response section on the answer sheet.)

18

The following diagram represents a balanced mobile.

23. The sum of all parts of the mobile is

    A. $2x^2 + 12x$

    B. $2x^2 + 9x$
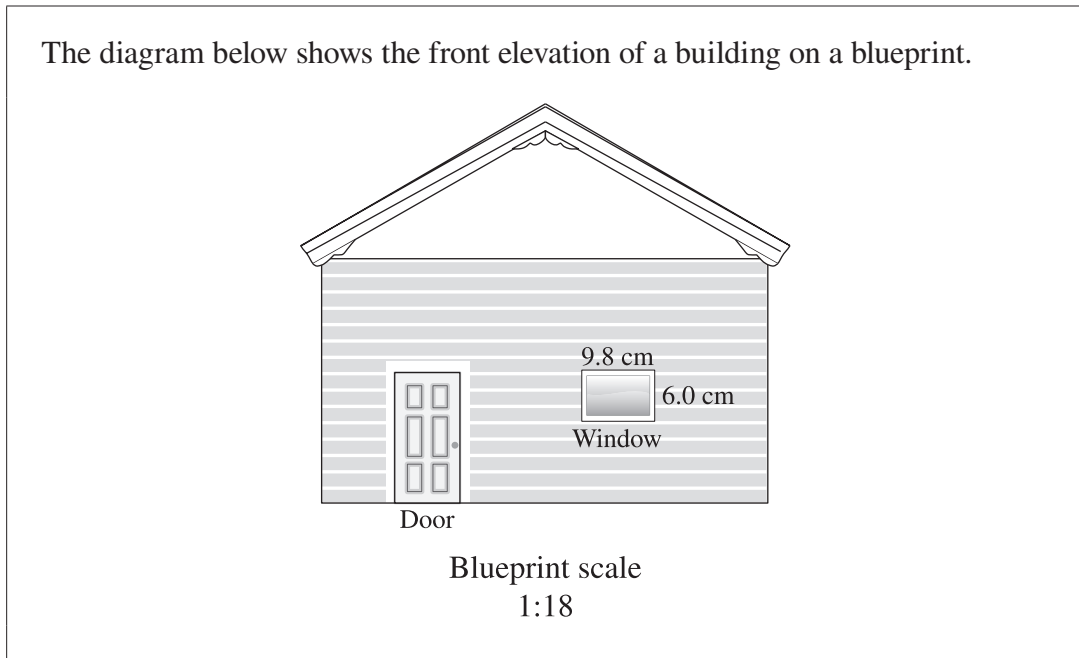
    C. $x^2 + 6x$

    D. $x^2 + 3x$

Use the following equation to answer question 24.

$$2.15x + 7.8 = 25$$

24. Which of the following equations is equivalent to the equation shown above?

    A. $215x + 780 = 2\ 500$

    B. $215x + 780 = 250$

    C. $215x + 78 = 2\ 500$

    D. $215x + 78 = 25$

The diagram below shows the front elevation of a building on a blueprint.

9.8 cm

6.0 cm

Window

Door

Blueprint scale
1:18

25. Based on the dimensions shown on the blueprint, the actual dimensions of the window, to the nearest tenth of a metre, will be

A. 0.5 m × 0.3 m

B. 1.0 m × 0.6 m

C. 1.8 m × 1.1 m

D. 1.8 m × 3.0 m

Use the following information to answer question 26.

The following survey question was given to a sample of Grade 9 students:

Do you prefer to use your television to play childish video games or to watch educational programs?

26. Data collected by this survey may be **most** influenced by a problem related to

A. ethics

B. privacy

C. use of language

D. cultural sensitivity

Jim simplifies the expression $\dfrac{5(x + 2) - (8 - x)}{2}$ as shown below.

Step 1 $\dfrac{5x + 10 - 8 - x}{2}$

Step 2 $\dfrac{4x + 2}{2}$

Step 3 $\dfrac{4x}{2} + \dfrac{2}{2}$

Step 4 $2x + 1$

27. In which step did Jim make an error when simplifying the expression?

    A.   Step 1
    B.   Step 2
    C.   Step 3
    D.   Step 4

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28. Tim buys 2 kg of almonds at $5.49/kg and 4 kg of cashews at a store that includes GST in its prices. If the cost of his purchase is $25.50, then the price of 1 kg of cashews is

    A. $3.63
    B. $7.26
    C. $10.98
    D. $14.52

Sandy has a budget of $100 to spend on back-to-school clothes. The shirts she wants to buy are $12 each, and the pants she wants to buy are $25 each. All prices include tax.

29. Which of the following inequalities could be used to determine the maximum number of shirts, n, Sandy can buy if she also buys 2 pairs of pants?

    A. $12n - 2(25) \leq 100$

    B. $12n + 2(25) \leq 100$

    C. $2(25) - 12n \geq 100$

    D. $2(25) + 12n \geq 100$

Alan, Bob, and Charles worked together on a job and earned a combined total of $380. Alan earned $40 less than Bob. Charles earned twice as much as Alan.

Numerical Response

7. How much did Alan earn?

Answer: $ _____

(Record your answer in the numerical-response section on the answer sheet.)

In a survey, 500 people were asked to name their favourite sport. The results of the survey are shown below.

Favourite Sport

Hockey	174
Football	122
Baseball	55
Soccer	19
Other	130

30. If the data results were displayed on a circle graph, then the measure of the angle that would represent how many people selected football would be approximately

A. 33°

B. 88°

C. 122°

D. 244°

Ben was earning a monthly salary of $5 000 before he changed jobs. At his new job he earns 10% less than he did at his old job.

31. If after one year at his new job Ben receives a pay increase of 15%, how much will he then be earning per month?

    A. $4 725

    B. $4 750

    C. $5 175

    D. $5 250

32. Jenny notices that a music store is having a "No GST and 40% off the regular price" sale. If the regular price of a CD is $15.99, then what is the maximum number of sale-priced CDs that Jenny can buy with her $80 gift card?

    A.   8

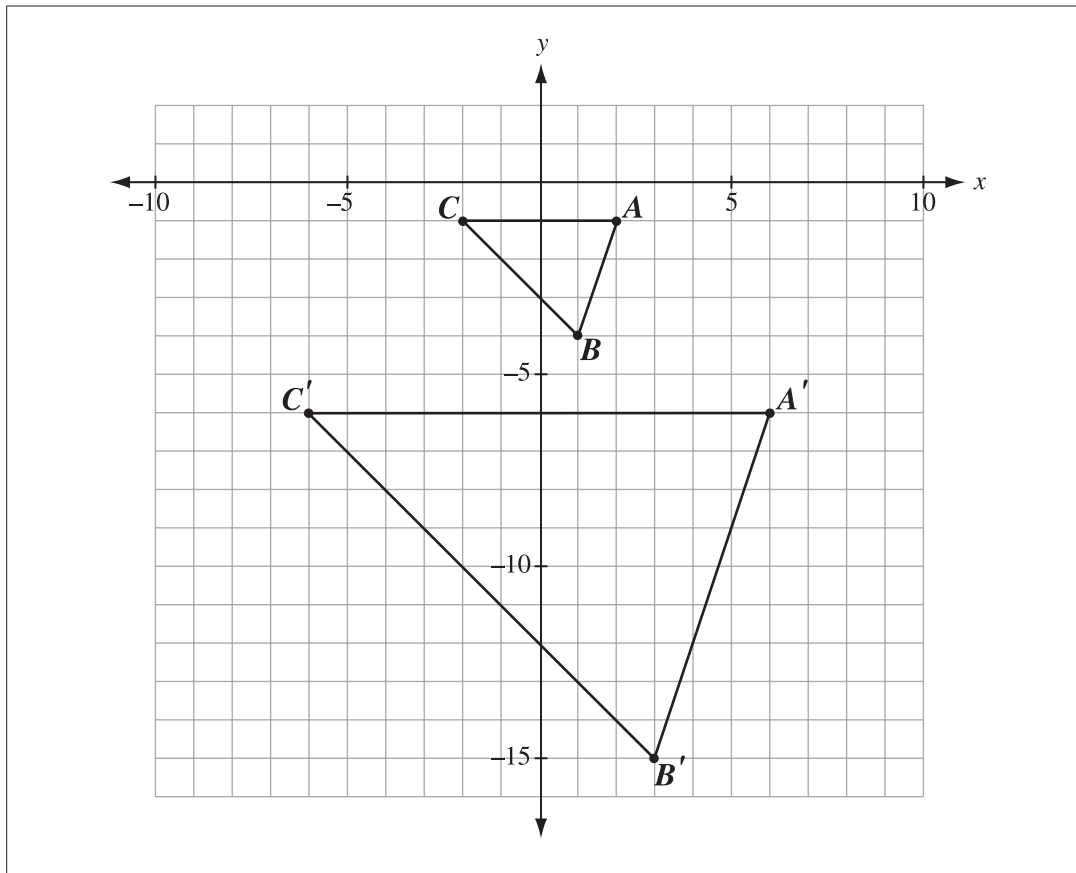   **B.**   9

    C.   11

    D.   13

Numerical Response

8. At a picnic for 49 people, 4 families each brought an equal number of lawn chairs. If 5 more lawn chairs were still needed, then how many chairs did each family bring?

Answer: _____

(Record your answer in the numerical-response section on the answer sheet.)

Use the following information to answer numerical-response question 9.

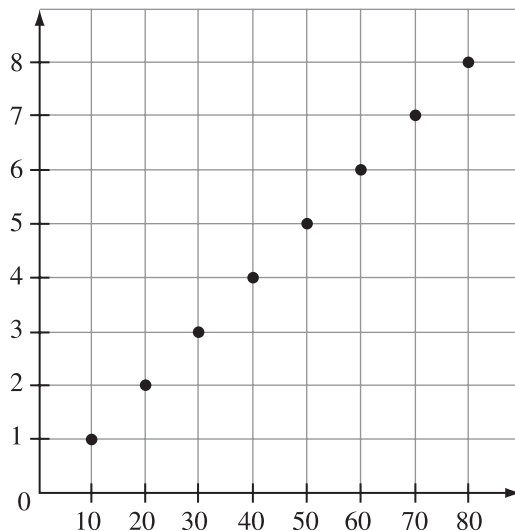**9.** What is the scale factor of the enlargement?

Answer: _____

(Record your answer in the numerical-response section on the answer sheet.)

Various points have been plotted on the graph below. The title of the graph and the labels of the axes have been omitted.


33. Which of the following statements is a possible interpretation of the graph above?

A. Nicole earns $20 for each hour she works.

B. For every 10 swimmers, 2 lifeguards are needed.

C. For every 10 pieces of candy Simone buys, she pays $1.

D. A runner runs at a constant speed of 2 km every 30 minutes.

Multiple-choice question 34 is not being released at this time.

In a science experiment, a solution has an initial temperature of 20 °C, as shown below.
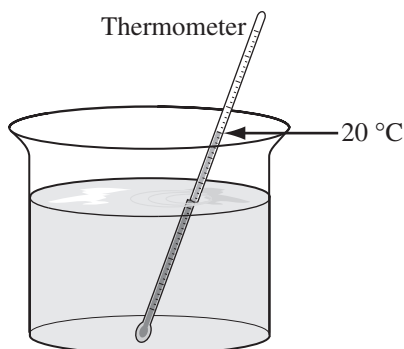
35. If the temperature, *T*, of the solution drops 2.8 °C/h, then which of the following equations can be used to calculate the temperature of the solution after 4 hours?

    A. $T = 20 \text{ °C} - (2.8 \text{ °C/h} \times 4 \text{ h})$

    B. $T = 20 \text{ °C} + (2.8 \text{ °C/h} \times 4 \text{ h})$

    C. $T = (20 \text{ °C} - 2.8 \text{ °C/h}) \times 4 \text{ h}$

    D. $T = (20 \text{ °C} + 2.8 \text{ °C/h}) \times 4 \text{ h}$
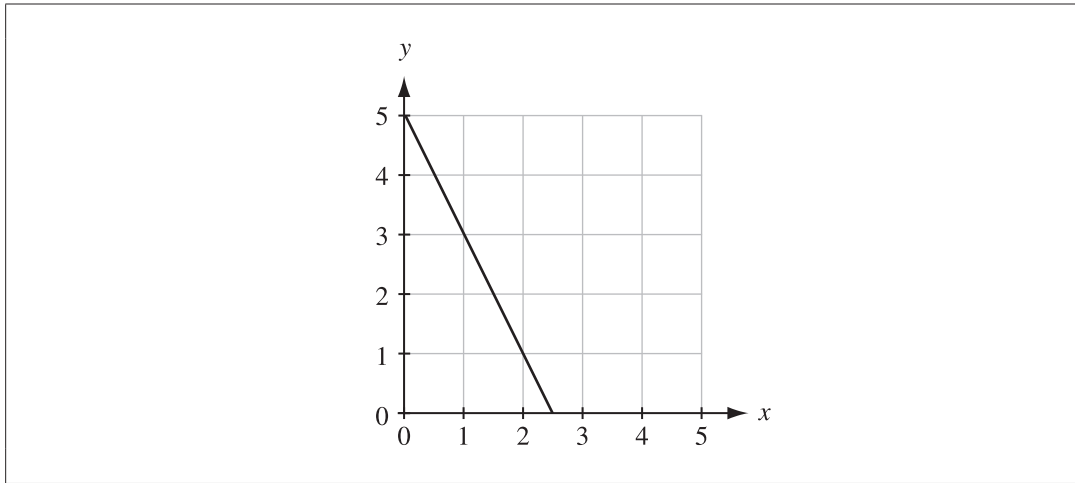
A person who is 200 cm tall casts a shadow that is 40 cm long. At the same time of day, a nearby post casts a shadow that is 16 cm long.

Numerical Response

10. The height of the post is _____ cm.

(Record your answer in the numerical-response section on the answer sheet.)

36. Which of the following equations represents the relationship between the variables *x* and *y* in the graph shown above?

    A. $y = 5 - 2x$

    B. $y = 2x - 5$

    C. $y = 5 - x$

    D. $y = x - 5$

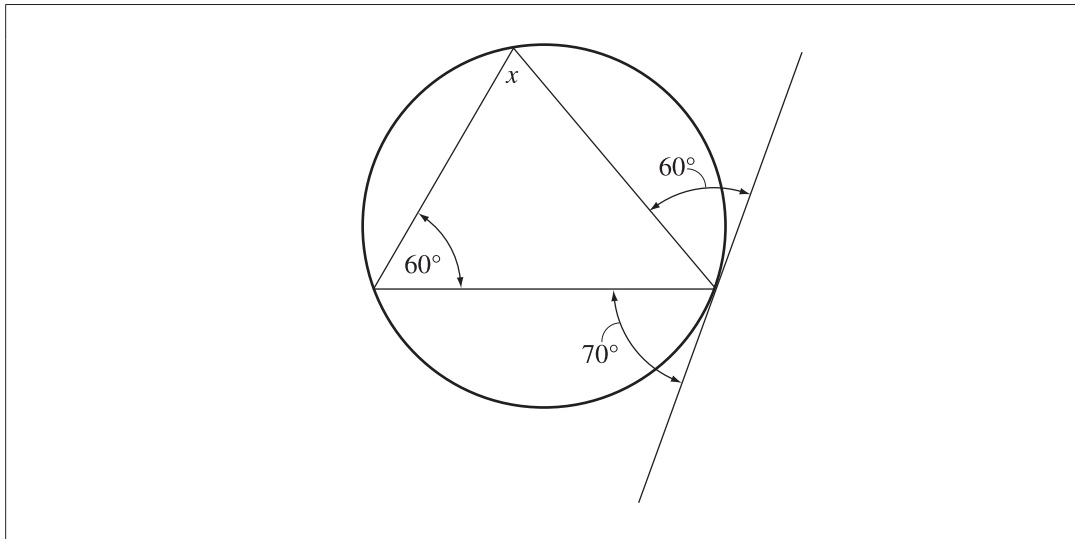*Use the following information to answer question 37.*

A school principal asks every student and staff member in the school if they like the idea of school uniforms. The school has 450 students and 30 staff members.

37. *The survey above uses a* ____**i**____ *, and* ____**ii**____ *would have the most influence on the data.*

The statement above is completed by the information in row

Row	i	ii
A.	sample	students
B.	sample	staff
C.	population	students
D.	population	staff

38. The measure of *x* in the diagram above is

    A. 50°

    B. 60°

    C. 65°

    D. 70°

Jennifer wants to buy a computer that costs $2 000, including all taxes. She will make a down payment of $500 and arrange to make 5 equal payments for the balance owing.

39. Which of the following expressions can Jennifer use to determine the amount of each of the 5 equal payments?

A. ($2 000 – 500) ÷ 5

B. ($2 000 – 500) × 5

C. ($2 000 × 5) – 500

D. ($2 000 ÷ 5) – 500

The following list shows Rick's yearly vehicle expenses.

- Insurance: $1 200
- Gasoline: $1 300
- Repairs: $850

40. If Rick works 8 hours/day, 5 days/week, and takes home $10/hour, then what is the **least** number of complete weeks he must work in order to pay for all his yearly vehicle expenses?

A. 6 weeks

B. 7 weeks

C. 8 weeks

D. 9 weeks

You have now completed the test.
If you have time, you may wish to check your answers.