

Released Assessment Questions, 2017

Grade 9 Assessment of Mathematics • Academic

For Use with Assistive Technology

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Listen as your teacher reads the instructions. Some key points are listed below.

Make sure you have the Formula Sheet for reference.

The diagrams in this booklet are **not** all drawn to scale.

Answering Multiple-Choice Questions

Answer all multiple-choice questions. If you fill in more than one answer to a question, or leave a question blank, the question will be scored zero. Incorrect answers will also be scored zero.

Answering Open-Response Questions

Do all of your work for each question in the space provided for the question **only**.

Write your solutions, including all calculations, clearly and completely.

ATTENTION:

The format of this document differs from that of the actual assessment booklets, as the questions are sorted by strand.

There are more multiple-choice and open-response questions in this document than in a regular booklet.

You are now ready to start.

Multiple-Choice

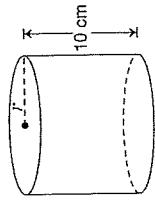
1. Which is a simplified form of this expression?

$$\frac{x^8(x^6)}{x^4} = \frac{x^{14}}{x^4} \text{ subtract}$$

$$= x^{10}$$

- a. x^8
b. x^{10}
c. x^{12}
d. x^{18}

2. The cylinder pictured below has a volume of 500 cm^3 and a height of 10 cm.



$$500 = (\pi r^2) 10$$

Which of the following represents the radius of the cylinder, r , in centimetres?

Hint:
 $V = \pi r^2 h$

- a. $\sqrt{\frac{50}{\pi}}$
b. $\frac{\sqrt{50}}{\pi}$
c. $\frac{50}{\pi}$
d. $\frac{50}{2\pi}$
- Handwritten work for question 2:

$$\frac{500}{10\pi} = r^2$$

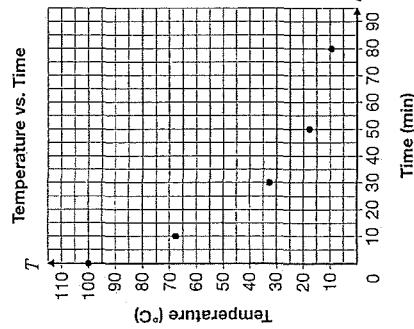
$$\frac{50}{\pi} = r^2$$

$$r = \sqrt{\frac{50}{\pi}}$$

3. Which of the following is a simplified form of

$$(-2m + 3) - (5m - 6)$$

- a. $3m - 3$
- b. $3m + 9$
- c. $-7m - 3$
- d. $-7m + 9$



5. A pot of hot soup is placed in a refrigerator to cool. Information about the temperature of the soup at five different times is shown.

4. The equation below can be used to convert between temperatures in degrees Celsius, C , and temperatures in degrees Fahrenheit, F .

$$\frac{C}{5} = \frac{F - 32}{9}$$

Which correctly completes the statement?

If the temperature in degrees Celsius is 15, the temperature in degrees Fahrenheit is

- a. less than 0.
- b. greater than 60.
- c. between 20 and 40.
- d. between 40 and 60.

$$\frac{15}{5} = \frac{F - 32}{9}$$

$$5 = \frac{F - 32}{9}$$

$$45 = F - 32$$

$$F = 45 + 32$$

Which statement below is true based on the overall trend in the data?

- a. At 90 minutes, the temperature of the soup will be 0°C .
- b. The temperature of the soup decreases at a constant rate.
- c. It takes approximately 18 minutes for the soup to cool to half its original temperature.
- d. There is a greater decrease in temperature between 50 and 80 minutes than between 10 and 30 minutes.

6. The total cost for an extra large pizza at a restaurant is \$14.50, plus \$1.25 for each topping.

Which of the following equations represents the relationship between the total cost, C , in dollars, and the number of toppings, n ?

- a. $C = 1.25n$
- b. $C = 15.75n$
- c. $C = 1.25n + 14.50$
- d. $C = 14.50n + 1.25$

$$C = 1.25n + 14.50$$

7. One of the following tables shows information about a linear relationship. Using first differences, select this table.

a.

x	y
-3	9
-2	6
-1	4
0	3

b.

x	y
0	-5
1	-3
2	0
3	3

c.

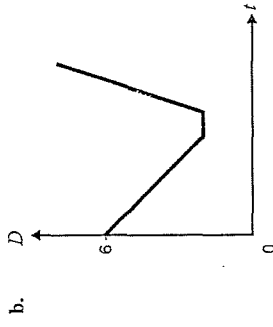
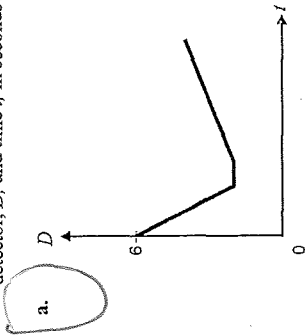
x	y
2	0
3	-2
4	-4
5	-6

d.

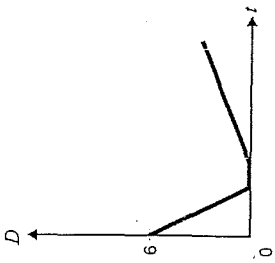
x	y
-1	10
0	15
1	25
2	40

8. Raven starts 6 m away from a motion detector. She walks quickly toward it, stops 2 m from the detector for a moment and then backs away from it slowly.

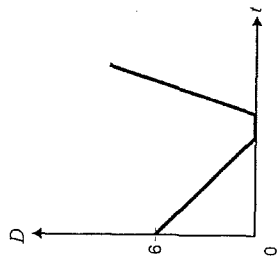
Which of the following graphs could represent the relationship between her distance from the detector, D , and time t , in seconds?



c.



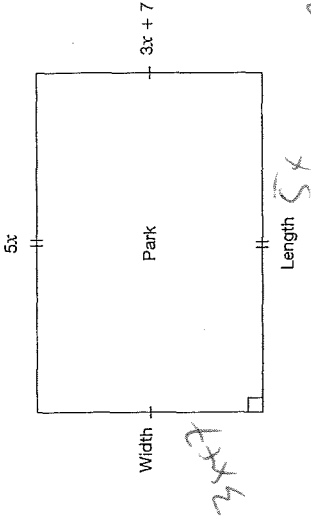
d.



Open-Response

9. Walking Around the Park

A park in the shape of a rectangle is pictured with algebraic expressions representing its length and width, in metres.



The perimeter of the park, P , can be determined using the equation

$$P = 2l + 2w.$$

Determine an equation to represent the perimeter of the park using the given sides.

$$P = 2(3x+7) + 2(5x) = 24x + 14$$

The perimeter of the park is 350 m.

Determine the length of the park. Show your work.

$$3x + 7 + 3x + 7 + 5x + 5x = 350$$

$$24x + 14 = 350$$

$$24x = 350 - 14$$

$$24x = 336$$

$$x = 14$$

The length of the park is 5(14) = 70 m.

10. Fabric Purchase

Two companies sell fabric online. The total cost, C , in dollars, for n metres of fabric for each company is given below.

- Fabric Fun: $C = 4.25n + 3.00$
- Sew-a-Lot: $C = 6.50n$

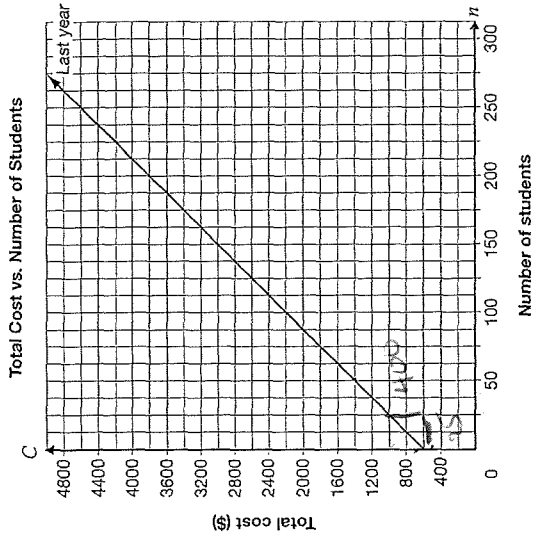
Complete the chart below by determining the initial value, rate of change and type of variation for the relationship for each company.

Justify the type of variation you have selected.

Fabric Fun	Sew-a-Lot
Initial value: <u>3</u>	Initial value: <u>0</u>
Rate of change: <u>\$4.25/m</u>	Rate of change: <u>\$6.50/m</u>
Type of variation Circle one: <u>Partial</u> Direct	Type of variation Circle one: Partial Direct
Justification Initial value is not zero. So cost is not directly related to n .	Justification Initial value is 0.

11. What's the New Price?

This graph shows information about last year's total cost for a banquet for n students.



This year the cost per person has decreased by \$5, but the initial fee has doubled.

Determine an equation to represent total cost, C , for this year.

$$C = 16n + 1200$$

Show your work.

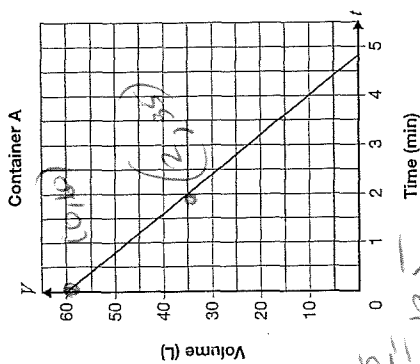
Describe two ways the graph for total cost for this year will be different from the graph for total cost for last year.

Justify your answer.

Initial fee is higher. (y-int different)

12. Draining Away

Water drains out of two different containers at constant rates. Information about the volume of water in the containers over time is given below.



Container B

Time (min)	Volume (L)
1	54
3	32
5	10

$$m = -\frac{25}{2} = -12.5$$

$$(1, 54) (3, 32)$$

$$m = \frac{32 - 54}{3 - 1} = -\frac{22}{2}$$

Out of which container is the water draining at a faster rate?

Circle one: Container A Container B

Justify your answer.

Steeper line. drains
at a faster
rate.

13. Related Relations

A new line

- is perpendicular to the line represented by $3x - y = 5$ and
- has the same y-intercept as the line represented by $4x - 3y - 12 = 0$.

Determine the equation of the new line.

Justify your answer.

$$4x - 12 = 3y$$

$$3y = 4x - 12$$

$$y = \frac{4}{3}x - 4$$

$$b = -4$$

$$3x - y = 5$$

$$y = 3x - 5$$

$$m = 3$$

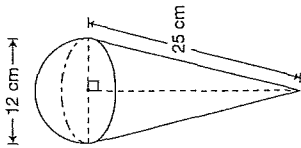
$$m_{\perp} = -\frac{1}{3}$$

The equation of the new line is

$$y = -\frac{1}{3}x - 4$$

14. Don't Let It Melt!

A model of an ice cream cone made up of a cone and a hemisphere is pictured below.



The total surface area of the model will be painted at a cost of \$0.0035/cm².

Determine the total cost of painting the model.

Show your work.

$$\begin{aligned}
 SA &= \pi r(s) + \frac{4\pi r^2}{2} \\
 &= \pi(12)(25) + \frac{4\pi(12)^2}{2} \\
 &= 697.08 \text{ cm}^2
 \end{aligned}$$

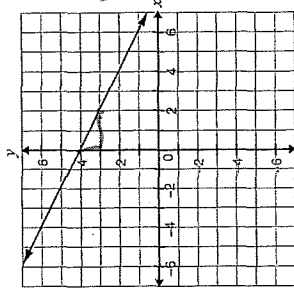
Multiple-Choice

15. What are the slope and the y-intercept of the line represented by $3x - 2y + 6 = 0$?

- a. $\frac{2}{3}, 3$
- b. $\frac{3}{2}, 6$
- c. $\frac{2}{3}, 2$
- d. $\frac{2}{3}, 3$

$$\begin{aligned}
 3x + 6 &= 2y \\
 y &= \frac{3}{2}x + 3
 \end{aligned}$$

16. A line is shown on the grid below.



Which of the following equations represents a line that is perpendicular to the line on the grid?

- a. $y = -2x - 4$
- b. $y = 2x + 4$
- c. $y = -\frac{1}{2}x - 4$
- d. $y = \frac{1}{2}x + 4$

17. The relationship between the total cost, C , of holding a dance and the number of guests, n , is represented by the equation $C = 25 + 15n$.

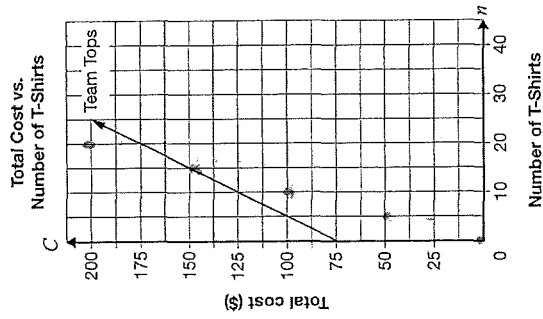
Due to fire codes, the number of guests cannot exceed 150.

What are all the possible values of the total cost for this situation?

The total cost can range from

- a. \$25 to \$2275.
- b. \$25 to \$3765.
- c. \$15 to \$2275.
- d. \$15 to \$3765.

18. The total cost for T-shirts at Team Tops is made up of a set-up fee and a charge for each T-shirt as represented by the graph.

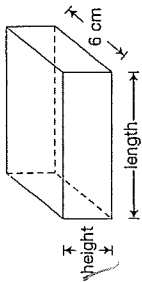


Super Shirts has no set-up fee but charges twice as much for each T-shirt as Team Tops.

Which of the following statements is true?

- a. It is always cheaper to order from Super Shirts.
- b. It is the same price to order 150 T-shirts from either company.
- c. It is cheaper to order 10 T-shirts from Team Tops than from Super Shirts.
- d. It is more expensive to order 20 T-shirts from Super Shirts than from Team Tops.

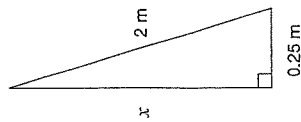
19. The rectangular prism pictured below has a volume of 216 cm^3 .



Which of the following lengths produces the prism with the smallest height?

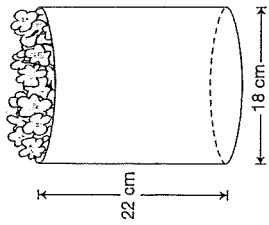
- a. 3 cm
- b. 6 cm
- c. 12 cm
- d. 18 cm

20. Which equation correctly uses the Pythagorean theorem to determine the value of x in the diagram?



- a. $x = \sqrt{2 + 0.25}$
- b. $x = \sqrt{2 - 0.25}$
- c. $x = \sqrt{2^2 + 0.25^2}$
- d. $x = \sqrt{2^2 - 0.25^2}$

21. Paper is used to make a popcorn container in the shape of an open-topped cylinder, as pictured.

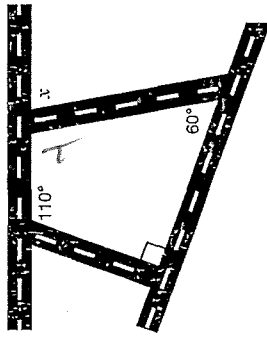


Which of the following calculations would correctly determine the least amount of paper required to make the container?

- a. $\pi(9)^2(22)$
- b. $\pi(18)^2(22)$
- c. $\pi(9)^2 + 2\pi(9)(22)$
- d. $\pi(18)^2 + 2\pi(18)(22)$

NO
 $2\pi r h$
 since top is not included

22. Four streets are pictured.



What is the value of x ?

- a. 60°
- b. 80°
- c. 100°
- d. 110°

$$\begin{aligned} 2) &= 360 - 110 - 90 - 60 \\ &= 360 - 260 \\ &= 100 \\ \therefore x &= 100^\circ \end{aligned}$$