Released Assessment Questions, 2018

QUESTIONS

Grade 9 Assessment of Mathematics • Academic

Read the instructions below.

Along with this booklet, make sure you have the *Answer Booklet* and the Formula Sheet.

You may use any space in this book for rough work for multiple-choice questions only.

The diagrams in these booklets are **not** all drawn to scale.

ATTENTION:

Unlike in the actual assessment booklet, the questions in this booklet are sorted by strand.

There are more multiple-choice questions in this booklet than in a regular booklet.

Continue to read the directions on the cover of the *Answer Booklet.*

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Remember to write your answers in your *Answer Booklet*.

1 A ball is dropped from a cliff that is 135 m high. The relationship between the height of the ball, h, in metres, and time, t, in seconds, can be represented by the equation $h = -4.9t^2 + 135$.

Which is closest to the height of the ball after 2.1 seconds?

a 22 m

b 29 m

c 113 m

d 125 m

Let $t = 2.1$

$h = -4.9(2.1)^2 + 135$

$= -4.9(4.41) + 135$

$= -21.609 + 135$

$= 113.391$

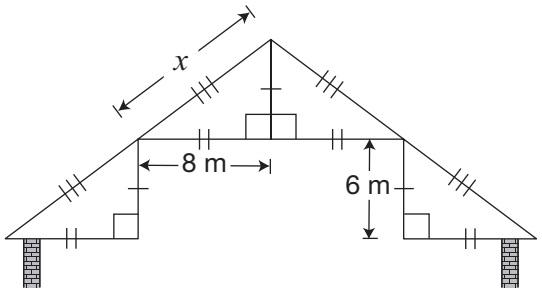
21 × 21 = 21 + 420 = 441

441 × 49 = 3969 + 17640 = 21609

135.000 − 21.609 = 113.391

MULTIPLE CHOICE STRATEGY
- when possible, work out the question fully using good mathematical form
- look at and select a response only after you have completed a full solution

2 A roof can be modelled by four congruent triangles, as pictured.



The length of x, in metres, can be determined using the formula $x^2 = 8^2 + 6^2$.

Which is closest to the total length of **both** sides of the roof, $4x$?

a 56 m

b 40 m

c 21 m

d 15 m

$x^2 = 8^2 + 6^2$

$= 64 + 36$

$= 100$

$x = \sqrt{100}$

$= 10$

$\therefore 4x = 4(10)$

$= 40$

3 Which is a simplified form of $3x(7x - 2)$?

a $21x^2 - 2x$

b $21x^2 - 2$

c $21x^2 - 6$

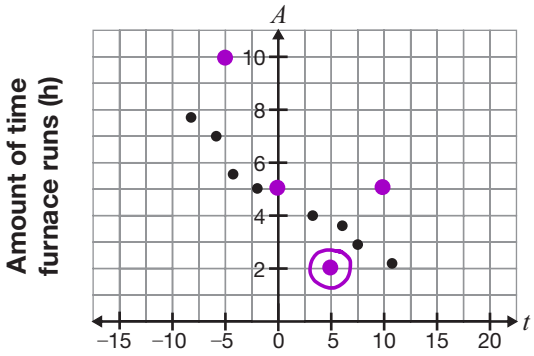
d $21x^2 - 6x$

$3x(7x - 2)$

$= 21x^2 - 6x$

4 One winter, Cassy records the total amount of time, A, in hours, that her furnace runs in a day versus the outdoor temperature, t, in degrees Celsius. She produces this scatter plot.

Amount of Time Furnace Runs vs. Outdoor Temperature



Outdoor temperature (°C)

Cassy then decides to improve the insulation in her home, which will save energy and reduce the amount of time her furnace runs.

Which point could Cassy expect to record **after** improving the insulation in her home?

a (−5, 10)

b (0, 5)

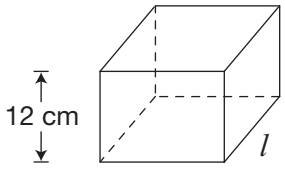
c (5, 2)

d (10, 5)

Improving the insulation will reduce the amount of time the furnace runs.

(5, 2) is the only option which shows a reduced time compared to the given data.

5 The side lengths, l, of this square-based prism can change. The height is 12 cm and **cannot** change.



$V = 12(l)(l)$
$= 12l^2$
→ equation is not of the 1st degree ∴ the relation is non-linear.

The volume of the prism for one possible side length is given in this chart.

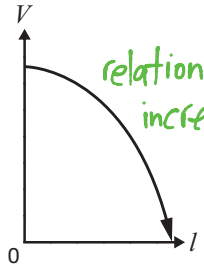
l	V	ΔV
1	12	36
2	48	60
3	108	

$V = 12(2)^2 = 12(4) = 48$
$V = 12(3)^2 = 12(9) = 108$

First differences are not constant ∴ relation is non-linear.

Which graph could represent the relationship between the volume, V, in cm^3, of this square-based prism and the length of a side of its square base, l, in cm?

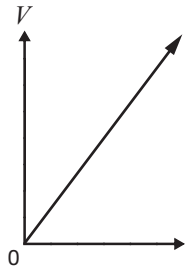
a



relation is increasing

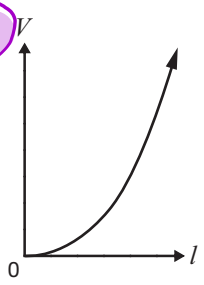
As l increases, V increases.

b



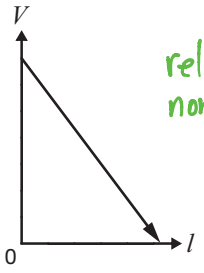
relation is non-linear

c



✓ relation is non-linear and increasing

d



relation is non-linear

6 An amusement park charges an entrance fee and a cost per ride as shown in the table.

Number of rides, x	Total cost ($), y
3	15
9	27

Δx: $9 - 3 = 6$
Δy: $27 - 15 = 12$

The park decides to reduce its entrance fee by $5.

What type of variation is this **new** relationship, and what is its initial value?

a a partial variation with an initial value of $4

b a direct variation with an initial value of $2

c a partial variation with an initial value of $9

d a direct variation with an initial value of $0

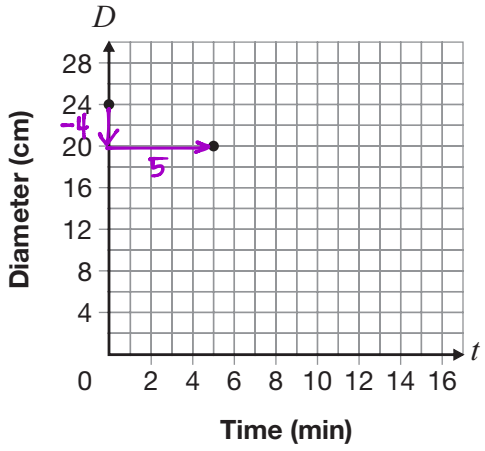
Step 1: Find m
$m = \frac{\Delta y}{\Delta x} = \frac{12}{6} = 2$

Step 2: Find b
$y = mx + b$
$15 = 2(3) + b$
$15 = 6 + b$
$9 = b$

$\therefore y = 2x + 9$ models this relation
(2 → cost per ride; 9 → entrance fee)

Reducing the entrance fee by $5 would result in a $4 initial value

7 A class measures the diameter of a snowball as it melts. Information about the diameter at two different times is shown on the grid below.



If this situation is modelled as a linear relationship using the two points, what is the **total time** it will take the snowball to melt completely?

a 30 minutes

b 24 minutes

c 20 minutes

d 16 minutes

$m = -\frac{4}{5}$ $b = 24$

$D = -\frac{4}{5}t + 24$

Let $D = 0$

$0 = -\frac{4}{5}t + 24$

$-24 = -\frac{4}{5}t$

$5(-24) = \cancel{5}\left(-\frac{4}{\cancel{5}_1}\right)t$

$-120 = -4t$

$30 = t$

Go to the *Answer Booklet* and complete the six open-response questions before continuing with question 14.

8 Open-Response

9 Open-Response

10 Open-Response

11 Open-Response

12 Open-Response

13 Open-Response

14 Which of the following does **not** represent a straight line?

a $y = 2$ horizontal line

b $x = 2$ vertical line

c $x = 2y \rightarrow y = \frac{1}{2}x \rightarrow$ linear relation
$m = \frac{1}{2}$ $b = 0$

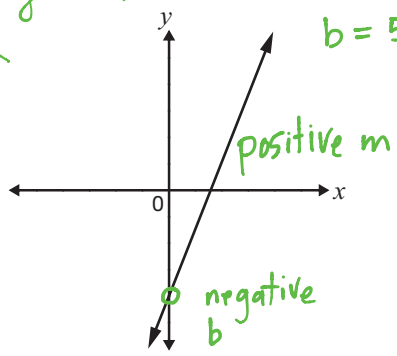
d $y = x^2$ ✓ equation is not of the first degree
∴ the relation is non-linear

MULTIPLE CHOICE STRATEGY
- eliminate incorrect answers
- give each option the "true/false" test
  i.e. #14 refers to a straight line
  So...
  Straight line?
  a) T
  b) T
  c) T
  d) F → ∴ NOT a straight line

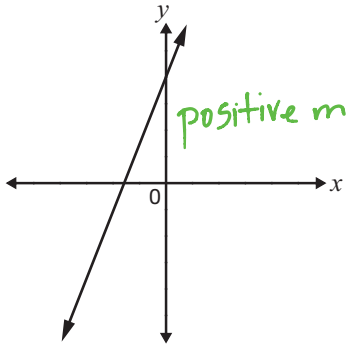
15 Which of these graphs could represent $y = 5 - 2x$?

$y = -2x + 5 \rightarrow m = -2$, $b = 5$

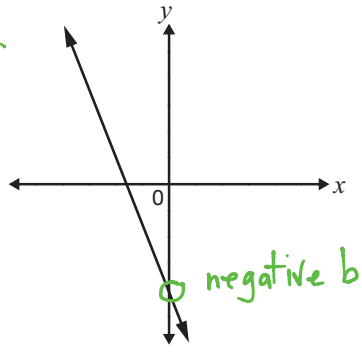
a



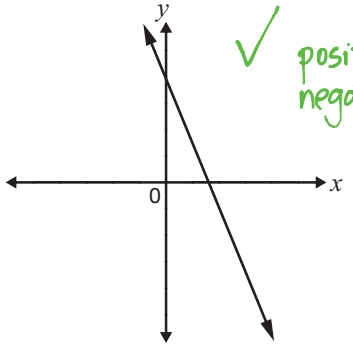
b



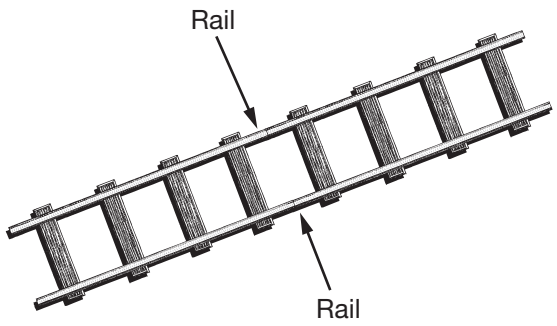
c



d ✓ positive b, negative m



16 The path of one of the rails of a train track can be represented by the equation $y = \frac{2}{3}x + 1$.



Which equation could represent the path of the second rail?

a $y = -\frac{3}{2}x + 3$

b $y = -\frac{2}{3}x + 3$

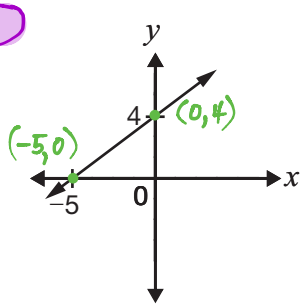
c $y = \frac{2}{3}x + 3$

d $y = \frac{3}{2}x + 3$

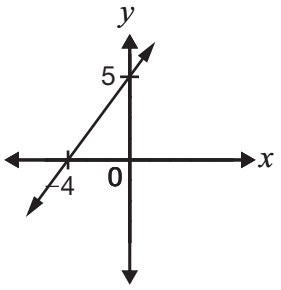
∵ the second rail is parallel to the first, the second line will have the same slope. i.e. $m = \frac{2}{3}$.

17 Using the x- and y-intercepts, select the graph that represents $4x - 5y = -20$.

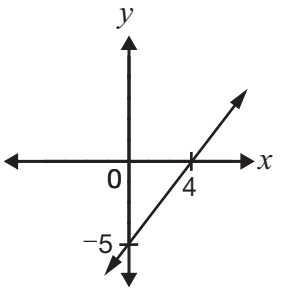
a



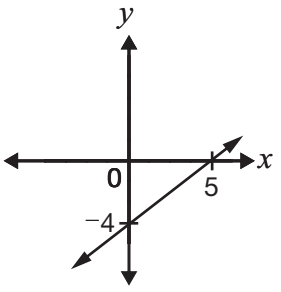
b



c



d



For x-intercept, let $y = 0$.

$4x = -20$

$x = -5$

$[(-5, 0)]$

For y-intercept, let $x = 0$.

$-5y = -20$

$y = 4$

$[(0, 4)]$

18 Fresh Springs Water Company delivers bottled water.

The total cost of the water, C, in dollars, is represented by $C = 8 + 1.5n$, where n is the number of litres.

flat fee i.e. delivery charge ($8)

rate of change i.e. cost/litre ($1.50/L)

Which of the following statements could be true?

Customers who order more than 1 L of water will pay

a $1 for every 9.5 L of water.

b $9.50 for each litre of water.

c an $8 delivery charge and $1.50 per litre of water.

d a $1.50 delivery charge and $8.00 per litre of water.

19 Which of the following dimensions produces a rectangle with the smallest perimeter?

a 10 m × 120 m $P = 2(10) + 2(120) = 260$

b 30 m × 40 m $P = 2(30) + 2(40) = 140$

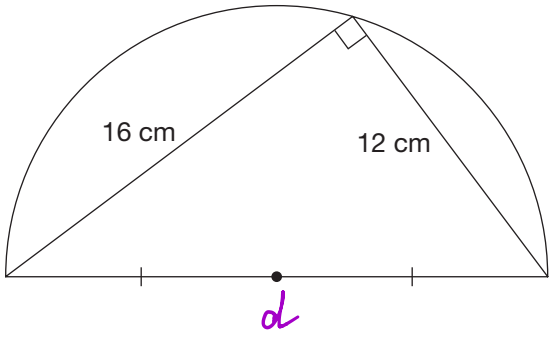
c 50 m × 24 m $P = 2(50) + 2(24) = 148$

d 60 m × 20 m $P = 2(60) + 2(20) = 160$

$P = 2l + 2w$

MULTIPLE CHOICE STRATEGY
- sometimes it will be necessary to work out / develop each option then make your selection

20 A semicircle with a right triangle in it is shown.



What is the radius of the semicircle?

Hint:
Use the Pythagorean theorem.

a 28 cm

b 20 cm

c 14 cm

d 10 cm

∴ the diameter is the hypotenuse,

$d^2 = 16^2 + 12^2$

$= 256 + 144$

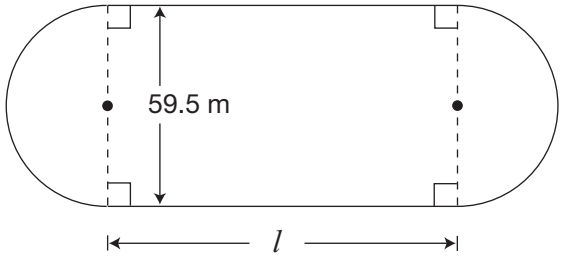
$= 400$

$d = \sqrt{400}$

$= 20$

∴ $r = 10$

21 A diagram of a track with a perimeter of 475 m is shown below.



Which of the following is closest to the length of a side of the rectangular part of the track, l?

a 51 m

b 144 m

c 288 m

d 356 m

$P = 2l + \pi d$

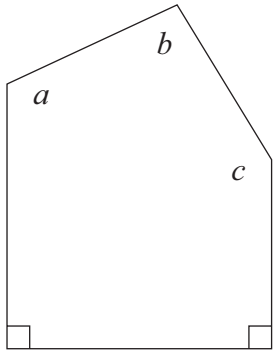
$475 = 2l + 59.5\pi$

$2l = 475 - 59.5\pi$

$l = \frac{475 - 59.5\pi}{2}$

$\doteq 144$

22 Which of the following is true for this diagram?



a $a + b + c + 90° + 90° = 180°$

b $a + b + c + 90° + 90° = 360°$

c $a + b + c + 90° + 90° = 540°$

d $a + b + c + 90° + 90° = 720°$

interior angles of a pentagon $= 180(5 - 2)$

$= 180(3)$

$= 540$