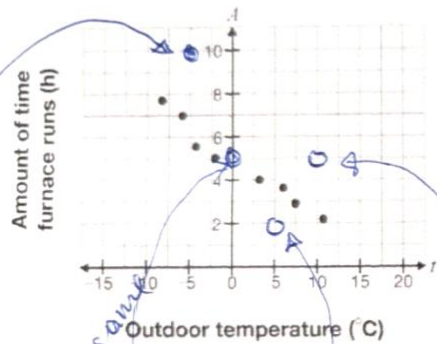


2018 sample EQAO solutions

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



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) X
- b. (0, 5) X
- c. (5, 2) ✓
- d. (10, 5) X

means that the points shown should be lower

lower

higher

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

Number of rides	Total cost (\$)
3	15
9	27

$$\begin{array}{r}
 \text{cost per ride} \quad \text{entrance fee} \\
 3x + E = 15 \quad \text{--- (1)} \\
 9x + E = 27 \quad \text{--- (2)} \\
 \hline
 6x = 12 \quad \text{--- (2) - (1)}
 \end{array}$$

$$\begin{array}{l}
 x = 2 \quad \text{cost per ride} \\
 E = 9 \quad \text{entrance fee}
 \end{array}$$

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

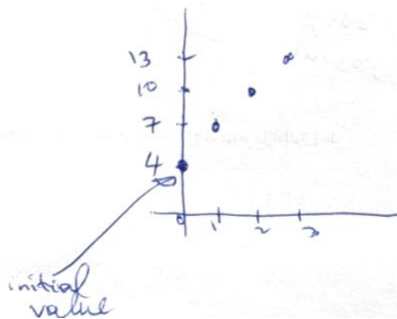
$$\begin{array}{l}
 C = 3x + 9 \\
 \boxed{C = 3x + 4}
 \end{array}$$

reduce fee by \$5

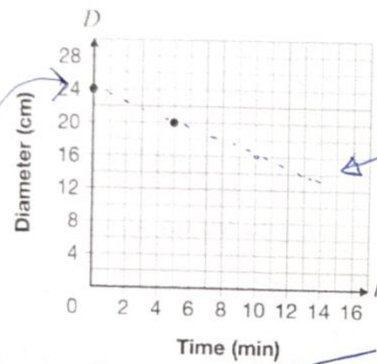
this makes it partial variation

this is direct variation

initial cost



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.



initial value = 24
slope = $\frac{\Delta D}{\Delta t} = \frac{-4}{5}$

negative
as it drops
to the right

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

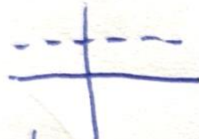
straight line

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?

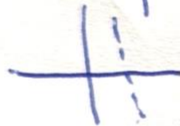
- a. 30 minutes
- b. 24 minutes ✓
- c. 20 minutes
- d. 16 minutes

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

a. $y = 2$

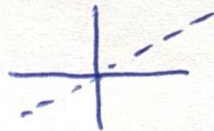


b. $x = 2$

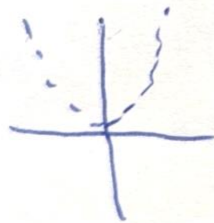


c. $x = 2y$

$\Rightarrow y = \frac{1}{2}x$

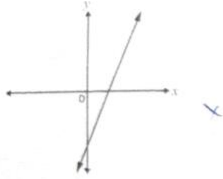


d. $y = x^2$

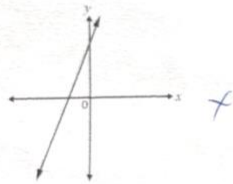


15. Which of these graphs could represent $y = 5 - 2x$?

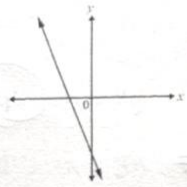
a.



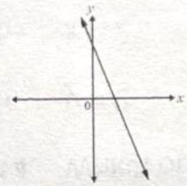
b.



c.



d.



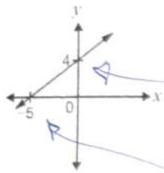
negative slope → drops to the right
(c or d)
y-intercept = 5
y-intercept is negative
X

X

✓

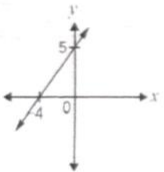
17. Using the x- and y-intercepts, select the graph that represents $4x - 5y = -20$.

a.



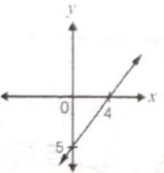
$$\begin{aligned} \text{y-intercept when } x=0: \\ 4(0) - 5y &= -20 \\ -5y &= -20 \\ y &= 4 \end{aligned}$$

b.

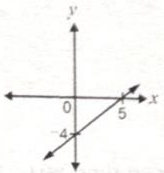


$$\begin{aligned} \text{x-intercept when } y=0: \\ 4x - 5(0) &= -20 \\ 4x &= -20 \\ x &= -5 \end{aligned}$$

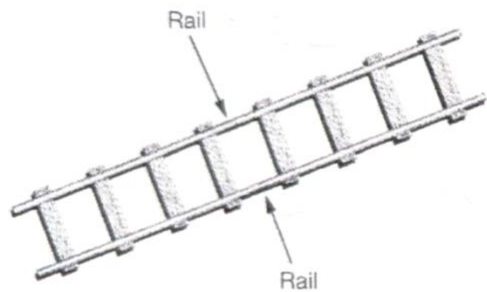
c.



d.



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



← rails are parallel

→ they have the same slope

slope = $\frac{2}{3}$

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

this is a constant

delivery charge

\$1.50 / litre

this means cost varies depending on # of litres delivered

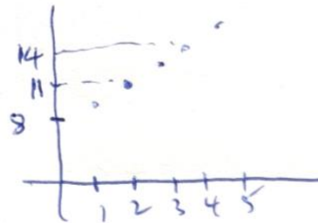
18. Fresh Springs Water Company delivers bottled water.

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

Which of the following statements could be true?

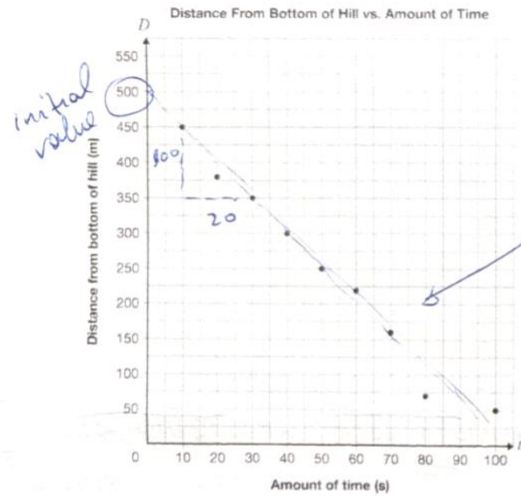
Customers who order more than 1 L of water will pay

- 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.



9. How Fast Can You Ski?

This scatter plot shows the relationship between the distance a downhill skier is from the bottom of a ski hill and the amount of time the skier has been on the hill.



initial value

drops to the right
so slope is negative

slope = $\frac{100}{-20} = -5$

$$D = -5t + 500$$

Draw an appropriate line of best fit for the data.

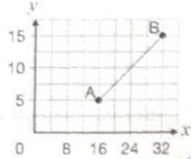
Determine an equation for your line of best fit.

Show your work. If using technology, provide support to show why your answer is correct.

D = _____

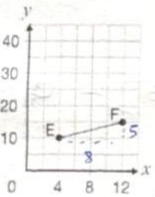
11. Comparisons

Line segment AB has a slope of $\frac{5}{8}$.

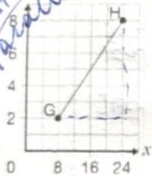


Slope of $\overline{AB} = \frac{5}{8}$

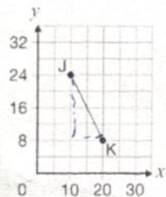
Determine the slope of line segments \overline{EF} , \overline{GH} and \overline{JK} below.



Slope of $\overline{EF} = \frac{5}{8}$



Slope of $\overline{GH} = \frac{6}{16} = \frac{3}{8}$



Slope of $\overline{JK} = \frac{-16}{10} = -\frac{8}{5}$

same steepness or parallel

less steep

negative reciprocal \Rightarrow perpendicular

Complete the chart by comparing the slope of each of line segments \overline{EF} , \overline{GH} and \overline{JK} to the slope of line segment \overline{AB} if all the line segments were graphed on the same grid.

	Line segment EF	Line segment GH	Line segment JK
Comparison to line segment AB	Circle one: parallel perpendicular neither	Circle one: less steep more steep same steepness	Circle one: parallel perpendicular neither

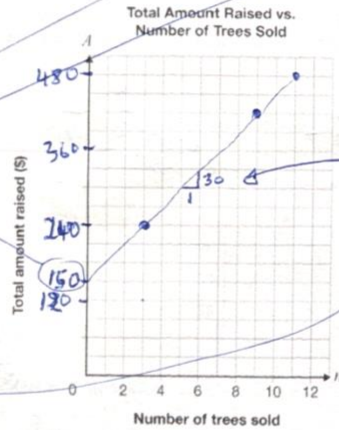
10. Tree Planting

A high school's environmental club is selling trees to raise money. The club starts with a donation from the principal and then collects money for each tree it sells.

Information about the linear relationship between the total amount raised and the number of trees sold is given.

Graph all the data from the table on the grid. Include an appropriate scale on the vertical axis.

Number of trees sold, n	Total amount raised, A (\$)
3	240
9	420
11	480



$A = 30n + 150$

METHOD #1
graphical solution

METHOD #2
algebraic

$$\begin{aligned} 3n + D &= 240 \quad (1) \\ 9n + D &= 420 \quad (2) \\ \hline 6n &= 180 \quad (2) - (1) \\ n &= 30 \end{aligned}$$

substitute in (1)

$$\begin{aligned} 3(30) + D &= 240 \\ 90 + D &= 240 \\ D &= 150 \end{aligned}$$

$A = 30n + 150$

Determine an equation to represent the relationship between the total amount raised, A , and the number of trees sold, n .

Show your work.

$A = 30n + 150$

12. The Better Choice

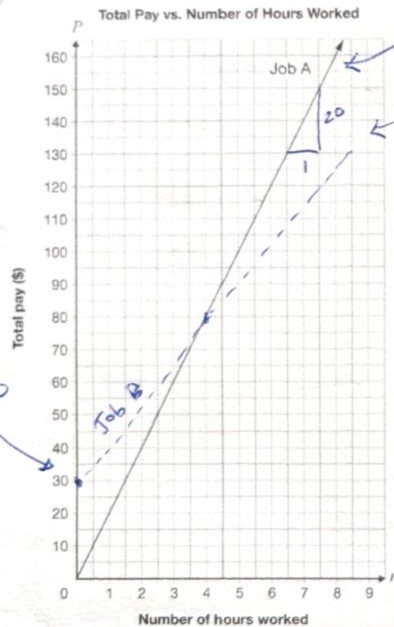
Shane has a choice between two jobs helping people around his neighbourhood.

• **Job A:** Shane's total pay is shown on the grid below.

• **Job B:** Shane will receive base pay of \$30, plus \$12.50 per hour.

Determine the conditions under which Shane should select Job A and the conditions under which he should select Job B.

Justify your answer.



total pay
 $P_A = 20h$
 slope = $\frac{20}{1} = 20$
 rate = \$20/h
 hours worked

$P_B = 12.50h + 30$

SOLUTION ① - graphical

Job B is a better deal for working less than 4 hours.
 Jobs A & B have the same total pay for 4 hours work.
 Job A is a better deal for working more than 4 hours.

SOLUTION ② - algebraic

when the total pay is the same for jobs A & B:

$$12.50h + 30 = 20h$$

$$30 = 7.50h$$