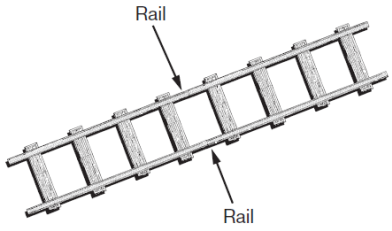
Review and EQAO Practice for Chapter 6 – Analyze Linear Relations

2018 **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?

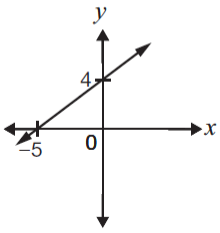
a $y = -\frac{3}{2}x + 3$

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

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

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

2018 **17** Using the x- and y-intercepts, select the graph that represents $4x - 5y = -20$.

a


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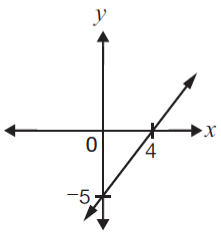

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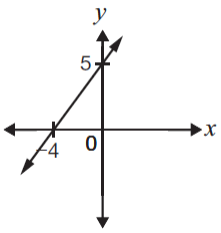

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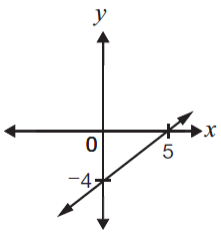


2017 **15** What are the slope and the y-intercept of the line represented by $3x - 2y + 6 = 0$?

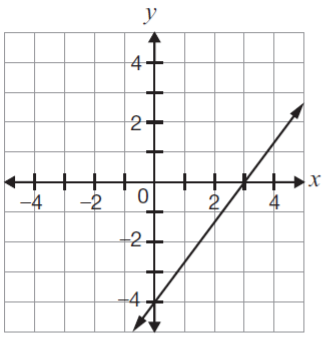
a $\frac{3}{2}, 3$

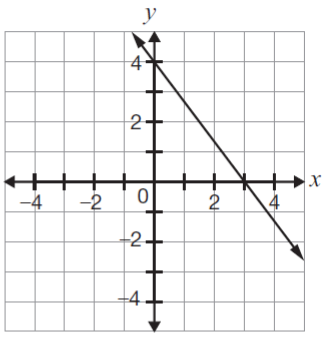
b $\frac{3}{2}, 6$

c $\frac{2}{3}, 2$

d $\frac{2}{3}, 3$

2016 **16** Which graph shows a line that is perpendicular to the line $y = \frac{4}{3}x - 4$?

a


c


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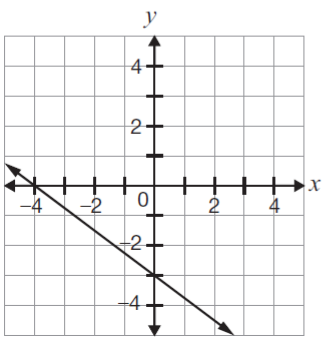

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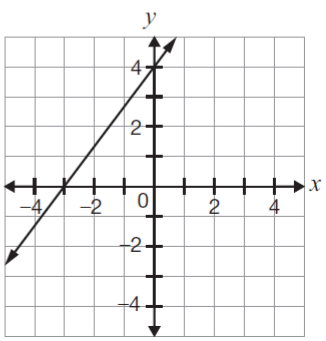
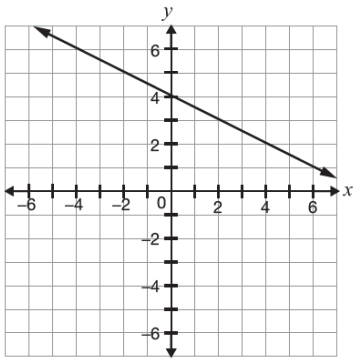


2017 **16** A line is shown on the grid below.



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 $y = \frac{1}{2}x + 4$

2016 **17** What is an equation of the line

- perpendicular to the line represented by $y = -\frac{3}{2}x + 1$ and
- with the same y-intercept as the line represented by $y = 7 + 5x$?

(a) $y = \frac{2}{3}x + 7$

b $y = \frac{2}{3}x + 5$

c $y = -\frac{2}{3}x + 7$

d $y = -\frac{2}{3}x + 5$

2015 **19** Which equation does **not** represent a linear relation?

a $y = 0$

b $x = 5$

(c) $x^2 + y = 9$

d $2x + y - 5 = 0$

2015 **20** What is the slope of the line represented by the equation below?

$$0 = 2x - 10y + 7$$

a 5

(b) $\frac{1}{5}$

c $-\frac{1}{5}$

d -5

2014 **15** The equation of a line is $5x - 2y + 10 = 0$.

Which of the following expresses this equation in the form $y = mx + b$?

(a) $y = \frac{5}{2}x + 5$

b $y = \frac{5}{2}x + 10$

c $y = -\frac{5}{2}x + 5$

d $y = -\frac{5}{2}x + 10$

2013 **15** Which of the following equations is equivalent to $3x - 5y = 45$?

(a) $y = \frac{3}{5}x - 9$

b $y = -\frac{3}{5}x + 9$

c $y = 3x - 45$

d $y = -3x + 45$

2013 **18** Which equation below represents a line that is perpendicular to the line represented by $y = 3x - 5$?

a $y = 3x + \frac{1}{5}$

b $y = -3x - \frac{1}{5}$

(c) $y = -\frac{1}{3}x + 7$

d $y = \frac{1}{3}x - 7$

2017 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.

$3x - y = 5$

$-y = -3x + 5$

$y = 3x - 5$

perpendicular to this slope

$\therefore$ the slope is $-\frac{1}{3}$

(opposite reciprocal)

$4x - 3y - 12 = 0$

$-3y = -4x + 12$

$\frac{-3y}{-3} = \frac{-4x}{-3} + \frac{12}{-3}$

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

$\therefore$ y-intercept is -4

equation of the new line $\rightarrow$ $y = mx + b$

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

2016 **12** **Standard Lines**

Two lines are represented by the equations below.

Line 1: $x - 2y + 6 = 0$ Line 2: $3x + 6y - 18 = 0$

Determine which line could be represented by $y = -\frac{1}{2}x + 3$.

Circle one: Line 1 Line 2 Both

Justify your answer. Include information for both Line 1 and Line 2.

Line 1

$x - 2y + 6 = 0$

$-2y = -x - 6$

$\frac{-2y}{-2} = \frac{-x}{-2} - \frac{6}{-2}$

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

or

$y = \frac{1}{2}x + 3$

Line 2

$3x + 6y - 18 = 0$

$6y = -3x + 18$

$\frac{6y}{6} = \frac{-3x}{6} + \frac{18}{6}$

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

or

$y = -\frac{1}{2}x + 3$

$\therefore$ Line 2's equation represents the equation

$y = -\frac{1}{2}x + 3$

2015 **13 Getting Fit**

Maddie enrols in a fitness program. Her total cost is made up of a sign-up fee and a cost per class.

The table below shows information about her total cost, C, in dollars, when she attends n classes.

Number of classes, n	Total cost, C ($)
12	67
14	74

2 < 7

What is the sign-up fee?

Sign-up fee: $25

method 1

Show your work.

2 < 0	25 > 7
2 < 2	32 > 7
2 < 4	39 > 7
2 < 6	46 > 7
2 < 8	53 > 7
2 < 10	60 > 7
2 < 12	67 > 7
2 < 14	74 > 7

Is the relationship between the number of classes Maddie attends and her total cost a partial variation or direct variation?

Circle one: Partial variation Direct variation

Justify your answer.

Before she attends any of her classes, she has to pay a sign-up fee first, the graph does not start at her paying zero dollars, she has to pay $25 before she begins

method 2:

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{74 - 67}{14 - 12} = \frac{7}{2}$$

$m = 3.5$

$y = mx + b$

$y = 3.5x + b$

∴ choose either (12,67) or (14,74) to substitute

$67 = 3.5(12) + b$

$67 = 42 + b$

$67 - 42 = b$

$\boxed{25 = b}$

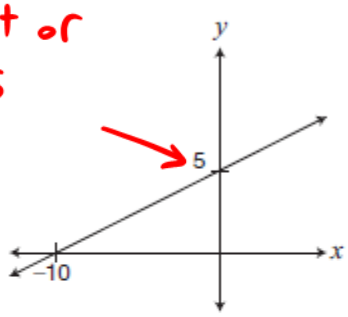
b is the y-intercept or initial / start-up cost

2015 15 Comparing Relationships

Information about three linear relationships is given below.

Relationship 1

y-intercept or b is = 5



$m = \frac{\text{rise}}{\text{run}} = \frac{5}{10} = \frac{1}{2}$

$y = mx + b$

$y = \frac{1}{2}x + 5$

Relationship 2

$3x + 6y + 1 = 0$

$6y = -3x - 1$

$\frac{6y}{6} = \frac{-3x}{6} - \frac{1}{6}$

$y = -\frac{1}{2}x - \frac{1}{6}$

Relationship 3

x	y
−2	−3
0	−2
2	−1
4	0

+2 < , > +1 ; +2 < , > +1 ; +2 < , > +1

$m = \frac{\text{rise}}{\text{run}} = \frac{1}{2}$

$y = mx + b$

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

this is the y-intercept (0, -2)

Circle the relationships that have the same rate of change.

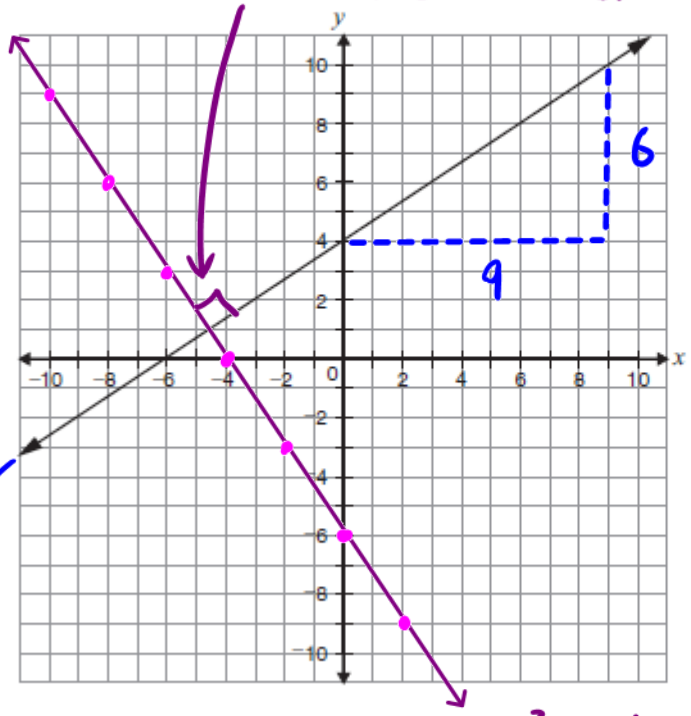
Justify your answer. Include information about all three relationships.

Both relationship 1 & 3 are positive correlations with the same slope or m-value or rate of change

2015 16 **Making Equations!**

Determine the equation of the line that has the same y-intercept as $2x + y + 6 = 0$ and is perpendicular to the line shown on the grid.

Should be 90° to each other



$y = -\frac{3}{2}x - 6$

Show your work.

step 1

$2x+y+6=0$

$y = -2x - 6$

has to have the same y-intercept,

∴ the y-intercept or b value is $\boxed{-6}$

$(0, -6)$

step 2

has to be perpendicular to this line, so you need to find the slope of this line

slope triangle → $m = \frac{\text{rise}}{\text{run}} = \frac{6}{9} = \frac{2}{3}$

perpendicular to this slope, so opposite reciprocal gives us $-\frac{3}{2}$

step 3

equation of new line

$y = mx + b$

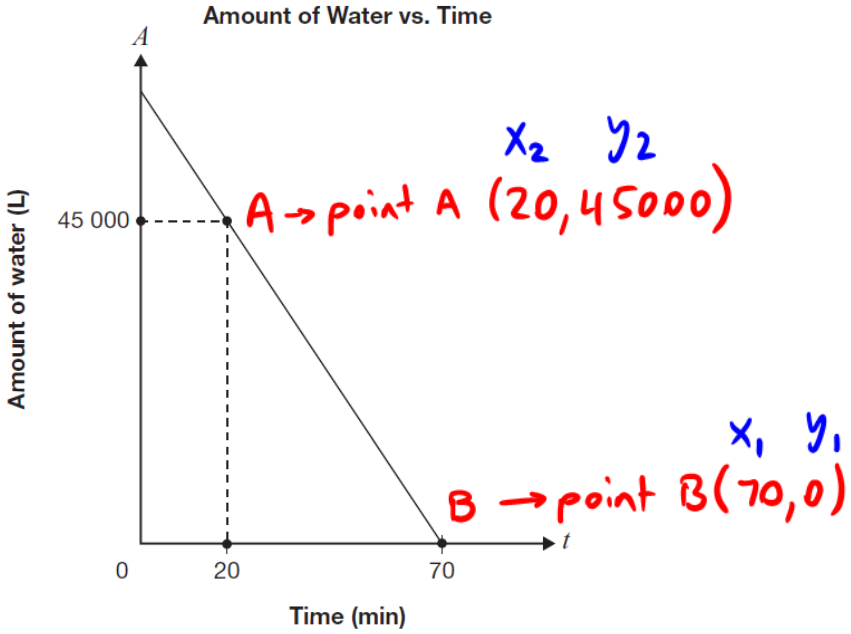
$\boxed{y = -\frac{3}{2}x - 6}$

* now plot the new line

2013

14 Water in a Pool

The graph below represents the relationship between the amount of water, A, in a pool as it drains and time, t.



x_2 y_2

A → point A (20, 45000)

x_1 y_1

B → point B (70, 0)

Determine the initial amount of water in the pool and the rate of change of this relation.

Show your work.

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{45000 - 0}{20 - 70}$$

$$m = \frac{45000}{-50}$$

$$\boxed{m = -900}$$

$y = mx + b$

$y = -900x + b$

sub in point A or B, I will choose point B (70, 0)

x y

$0 = -900(70) + b$

$0 = -63{,}000 + b$

$\boxed{63000 = b}$

∴ The y-intercept or initial amount in the pool is 63,000 L