Open Response: ***All work for each of the following must be shown in the space provided.*** **[Value = ~~32~~ 30]**

1. Given that $f(x) = -2x + 5$ and $g(x) = 2x^2 - x + 3$…

(a) Determine the value of $f(-3) + g(-3)$ [4]

$f(-3) = -2(-3) + 5$
$= 11$

$g(-3) = 2(-3)^2 - (-3) + 3$
$= 18 + 3 + 3$
$= 24$

$= 11 + 24$
$= \boxed{35}$

(b) Solve for x given that $f(x) = -9$ [3]

$-9 = -2x + 5$
$-14 = -2x$
$\boxed{7 = x}$

(c) Evaluate the following: $f\{g[f(3)]\}$ $\boxed{= -7}$ [3]

$f(3) = -2(3) + 5$
$= -1$
$g(-1) = 2(-1)^2 - (-1) + 3$
$= 2 + 1 + 3$
$= 6$
$F(6) = -2(6) + 5 = -7$

2. Given the linear relation $4x - 3y + 12 = 0$ …

(a) Determine the x and y intercepts of this relation. [4]

x-Int. $(y = 0)$
$4x + 12 = 0$
$4x = -12$
$x = -3$
$(-3, 0)$

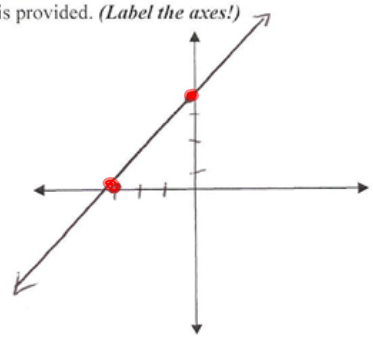
y-Int $(x = 0)$
$-3y + 12 = 0$
$-3y = -12$
$y = 4$
$(0, 4)$

(b) Determine the coordinates of any three points, other than the intercepts, that would satisfy this relation. ~~[4]~~ 2

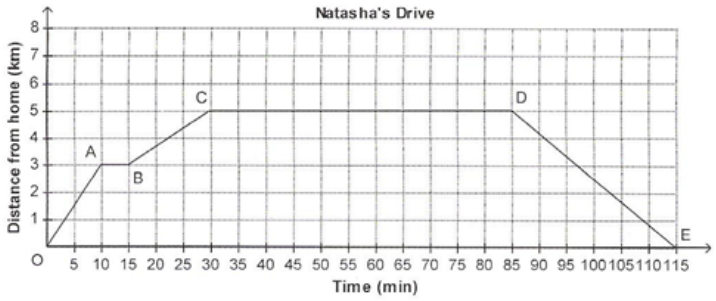
$-3y = -4x - 12$
$y = \frac{4}{3}x + 4$

x	y
3	8
~~3~~	~~0~~
6	12
9	16

(c) Sketch this linear relation on the axis provided. ***(Label the axes!)*** [3]



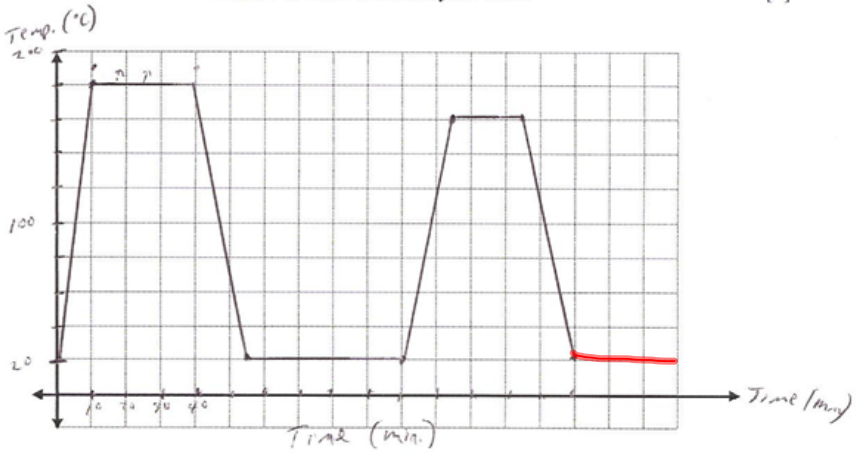
3. Natasha spent part of the afternoon running errands.
This graph shows her distance from home as a function of time. [2]



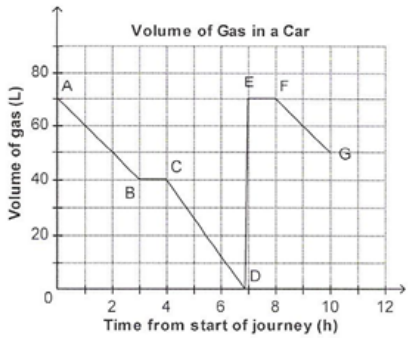
a) How far did Natasha drive in total? 10Km

b) How long was Natasha away from home? 115 minutes

4. An oven is turned on at a room temperature of 20°C and it takes 10 min to reach a temperature of 190°C. A cake is placed in the oven to bake for 30 min. The oven is then turned off and returns to room temperature after 15 min. The oven is turned on again 45 min later and it takes 15 min to reach a temperature of 160°C. Cookies are placed in the oven to bake for 20 min. The oven is then turned off and returns to room temperature after 15 min. Sketch a graph of temperature as a function of time for the situation described above.
Be sure to scale and label your axes. [5]



5. This graph shows the volume of gas in the fuel tank of Patrick's car as a function of time.



(a) Which segment of the graph would describe the time Patrick spent at a truck stop having supper after he had stopped to refuel? [1]
EF

(b) Assuming that Patrick started this trip with a full tank of fuel, what did it cost him to refuel the car if the price of gas was $1.28/Litre? 70 x $1.28 = $89.60 [2]

(c) It is a proven fact that the faster you travel with a vehicle the more fuel it will consume. During which segment of this trip was Patrick travelling the fastest?
CD [1]

Warm Up...

Find the value for x if the line segment joining the points $(x, 0)$ and $(-2, 4)$ has a slope value of $-\frac{2}{3}$

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

$$-\frac{2}{3} = \frac{4-0}{-2-x}$$

$$-\frac{2}{3} = \frac{4}{-2-x}$$

$$3(-2-x)\left(-\frac{2}{3}\right) = \frac{4}{-2-x}(3)(-2-x)$$

$$-2(-2-x) = 12$$

$$4 + 2x = 12$$

$$\frac{2x}{2} = \frac{8}{2}$$

$$x = 4$$

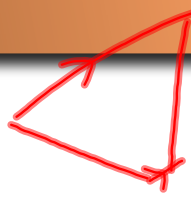
$$\frac{x}{3} = \frac{4}{7}$$

$$\frac{7x}{7} = \frac{12}{7}$$

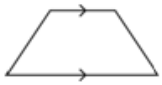
$$x = \frac{12}{7}$$

Activate Prior Learning:
Properties of Quadrilaterals

A **quadrilateral** is a polygon with 4 sides.

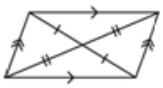


A **trapezoid** is a quadrilateral that has exactly one pair of parallel sides.



A **parallelogram** is a quadrilateral with both pairs of opposite sides parallel.
All parallelograms have:

- opposite sides equal
- opposite angles equal
- diagonals that bisect each other



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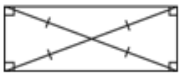
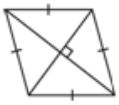
Activate Prior Learning:
Properties of Quadrilaterals

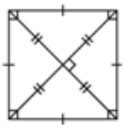
A **rectangle** is a parallelogram with 4 right angles.
It has all the properties of a parallelogram and its diagonals are equal.



A **rhombus** is a parallelogram with 4 equal sides.
It has all the properties of a parallelogram and its diagonals are perpendicular.

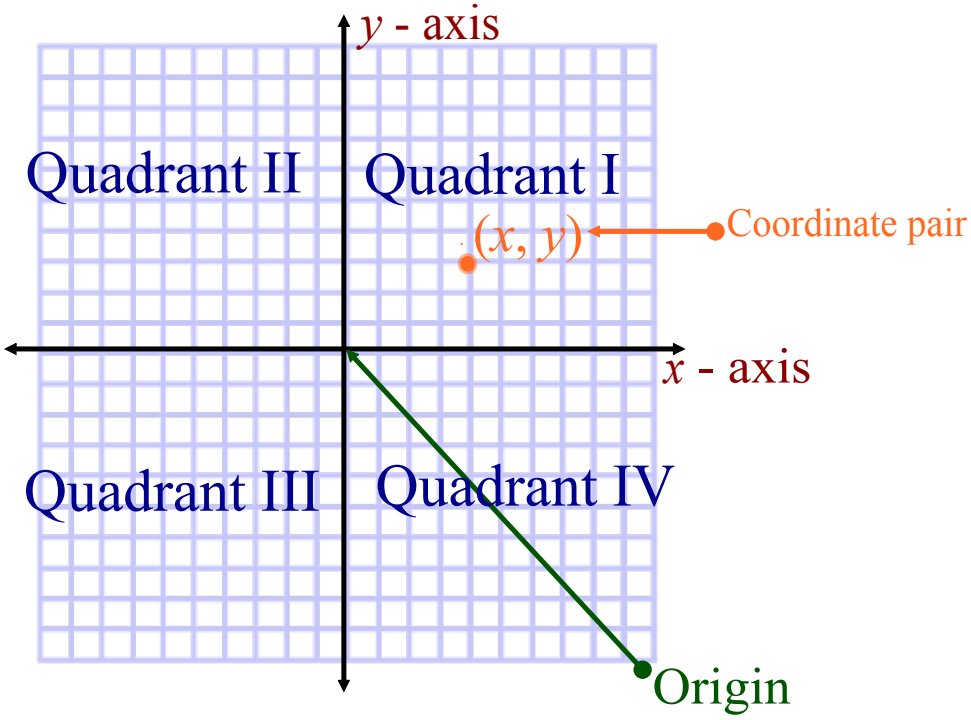


A **square** is a parallelogram with 4 equal sides and 4 right angles.
A square has all the properties of a parallelogram, a rectangle, and a rhombus.



axes

Cartesian Plane



Finding Intercepts

- ***x* - intercept**: - a point where the graph crosses the *x*-axis.

  - to find the *x*-intercept $\Rightarrow$ let $y = 0$ & solve for x.

- ***y* - intercept**: - a point where the graph crosses the *y*-axis.

  - to find the *y*-intercept $\Rightarrow$ let $x = 0$ & solve for y.

Example: Find both intercepts given the line...

$3x - 6y = 12$

x-Int. ($y = 0$)

$\frac{3x}{3} = \frac{12}{3}$

$x = 4$

$(4, 0)$

y-Int. ($x = 0$)

$-6y = 12$

$y = -2$

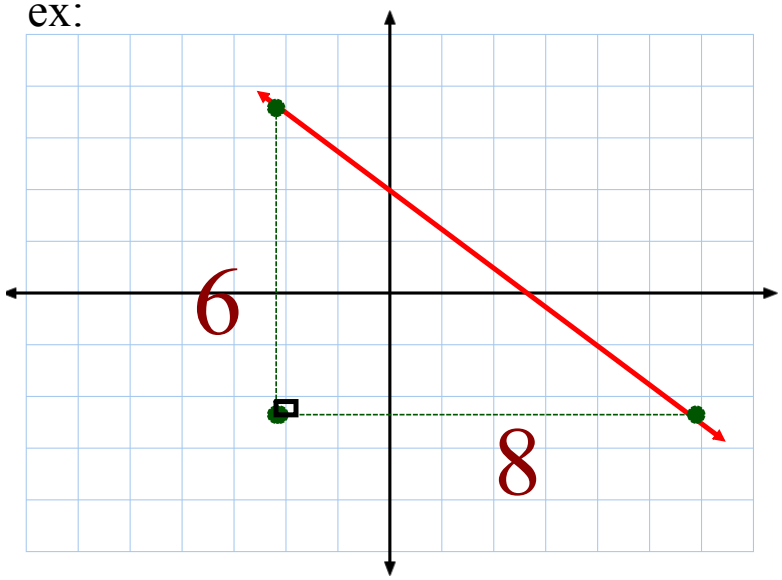
$(0, -2)$

Calculating Slope

#1. Graph

Slope = Rise / Run

ex:



$m = \frac{-6}{8} = \frac{-3}{4}$

#2. Two Points

ex: (-3, 5) & (1, -7)

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

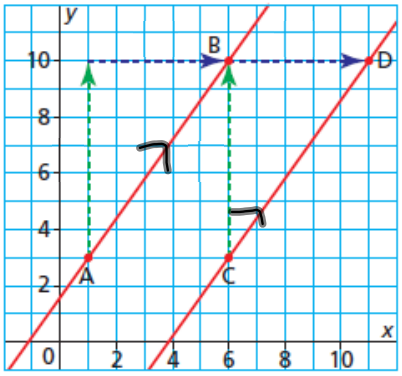
$m = \frac{-7-5}{1-(-3)} = -\frac{12}{4} = -3$

6.2 Slopes of Parallel and Perpendicular Lines

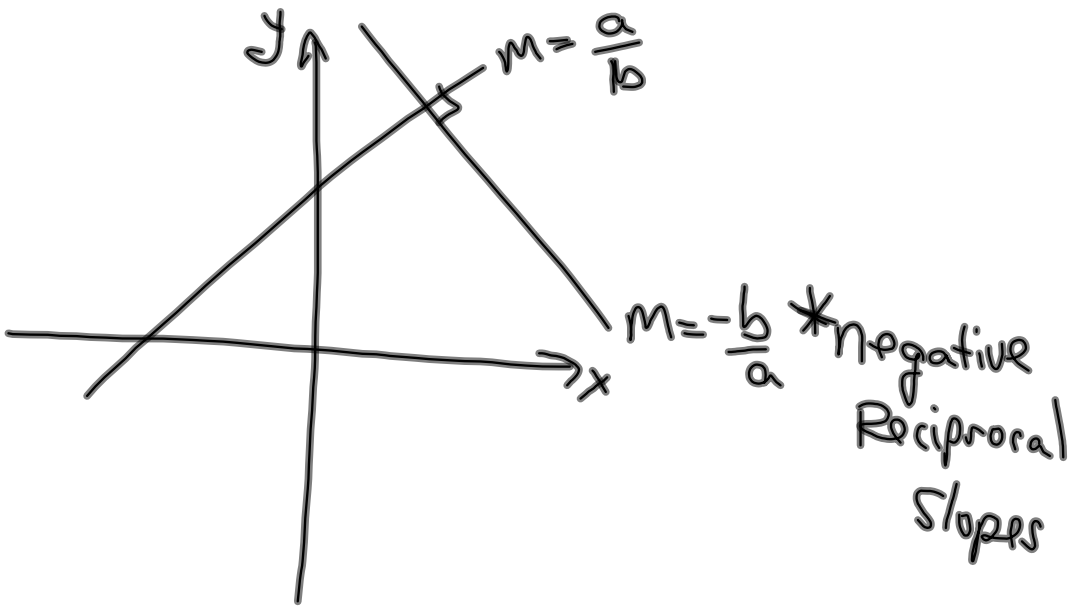
When two lines have the same slope, congruent triangles can be drawn to show the rise and the run.
Lines that have the some slope are parallel.

Slope of AB = ?

Slope of CD = ?



?


y
x
$m = \frac{a}{b}$
$m = -\frac{b}{a}$ *negative Reciprocal Slopes

The relationship between the slopes of AB and CD is true for any two oblique perpendicular lines. Horizontal and vertical lines are an exception.

The slope of a horizontal line is 0. The slope of a vertical line is $\frac{1}{0}$, which is not defined. So, the slopes of horizontal and vertical lines are not negative reciprocals.

Slopes of Perpendicular Lines

The slopes of two oblique perpendicular lines are negative reciprocals; that is, a line with slope a, $a \neq 0$, is perpendicular to a line with slope $-\frac{1}{a}$.