

M10-C C4- Determine Equations Assignment

1. a) $m=4$ $b=-3$

$$y = 4x - 3$$

$$4x - y - 3 = 0$$

b) $m = -\frac{1}{2}$ $b=1$

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

$$2(y) = 2\left(-\frac{1}{2}x\right) + 2(1)$$

$$2y = -x + 2$$

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

c) $(5, 1)$ $(3, -7)$

$$m = \frac{-7-1}{3-5}$$

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

$$= 4$$

$$y = mx + b$$

$$1 = 4(5) + b$$

$$1 = 20 + b$$

$$-19 = b$$

$$y = 4x - 19$$

$$4x - y - 19 = 0$$

d) $(5, -8)$ $(1, 4)$

$$m = \frac{4 - (-8)}{1 - 5}$$

$$= \frac{12}{-4}$$

$$= -3$$

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

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

$$y - 4 = -3x + 3$$

$$y = -3x + 7$$

$$3x + y - 7 = 0$$

e) $m = 3$ $(4, 0)$

$$\begin{aligned} y &= mx + b \\ 0 &= 3(4) + b \\ 0 &= 12 + b \\ -12 &= b \end{aligned}$$

$$y = 3x - 12$$

$$3x - y - 12 = 0$$

f) $3x + y = 5$

$$y = -3x + 5$$

$$m = -3$$

$$(-2, 4)$$

$$y = mx + b$$

$$4 = -3(-2) + b$$

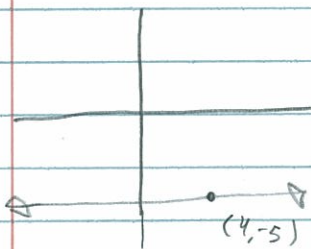
$$4 = 6 + b$$

$$-2 = b$$

$$y = -3x - 2$$

$$3x + y + 2 = 0$$

g) $m = 0$ $(4, -5)$



$$y = -5$$

$$y + 5 = 0$$

h) $(2, 0)$ $(0, -6)$

$$m = \frac{-6 - 0}{0 - 2}$$

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

$$= 3$$

$$b = -6$$

$$y = mx + b$$

$$y = 3x - 6$$

$$3x - y - 6 = 0$$

i) $x - 2y + 6 = 0$

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

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

$$m = \frac{1}{2}$$

$$3x - 2y = 24$$

$$\text{x-int (y=0)}$$

$$3x = 24$$

$$x = 8$$

$$(8, 0)$$

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

$$x = 8$$

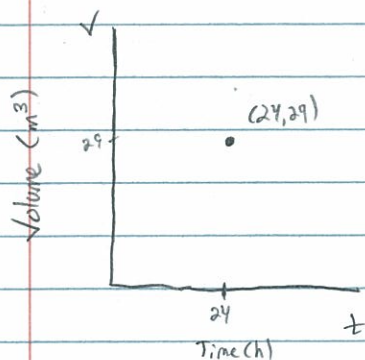
$$\frac{1}{2} = \frac{y - 0}{x - 8}$$

$$2y = x - 8$$

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

$$x - 2y - 8 = 0$$

2. a) $m = 1.2 \frac{\text{m}^3}{\text{h}}$ (24, 29)



$$V = mt + b \rightarrow \boxed{V = 1.2t + 0.2}$$

$$29 = 1.2(24) + b$$

$$29 = 28.8 + b$$

$$0.2 = b$$

b) Make $V = 155 \text{ m}^3$ and solve for t .

$$V = 1.2t + 0.2$$

$$155 = 1.2t + 0.2$$

$$154.8 = 1.2t$$

$$\frac{154.8}{1.2} = \frac{1.2t}{1.2}$$

$$\boxed{t = 129 \text{ h}}$$

It would take 129 hours to fill the tank.

c) The tank was not empty at the beginning. The y-int is 0.2 which means that at $t = 0$ the tank had 0.2 m^3 of oil in it.

3. a) (6, 335) (16, 341)

b) $m = 0.6 \frac{\text{m/s}}{^\circ\text{C}}$

$$m = \frac{341 - 335}{16 - 6}$$

$$= \frac{6}{10}$$

$$= 0.6$$

The speed of sand increases by 0.6 m/s for every change of 1°C .

c) $m = 0.6$ (6, 335)

$$y = mx + b$$

$$335 = 0.6(6) + b$$

$$335 = 3.6 + b$$

$$331.4 = b$$

$$V = 0.6t + 331.4$$

d) $t = 35^\circ\text{C}$ $V = ?$

$$V = 0.6(35) + 331.4$$

$$V = 352.4 \frac{\text{m}}{\text{s}}$$

The velocity of sand at 35°C is $352.4 \frac{\text{m}}{\text{s}}$.

e) $V = 348 \frac{\text{m}}{\text{s}}$ $t = ?$

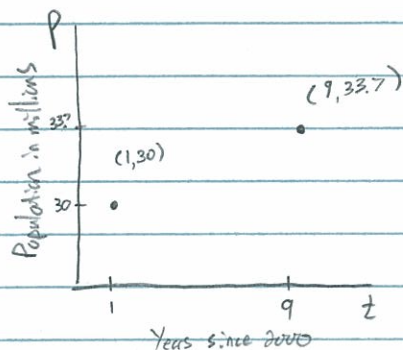
$$348 = 0.6t + 331.4$$

$$\frac{16.6}{0.6} = \frac{0.6t}{0.6}$$

$$t = 27.7^\circ\text{C}$$

The air temp. is 27.7°C when the velocity of sand is $348 \frac{\text{m}}{\text{s}}$.

$$y. a) (t, p) \rightarrow (1, 30) \quad (9, 33.7)$$



$$b) m = \frac{33.7 - 30}{9 - 1}$$

$$= \frac{3.7}{8}$$

$$m = 0.46$$

$$c) m = 0.46 \frac{\text{million}}{\text{year}}$$

The population increases by 0.46 million each year.

$$d) m = 0.46 \quad (1, 30)$$

$$y = mx + b \rightarrow p = 0.46t + 29.54$$

$$30 = 0.46(1) + b$$

$$30 = 0.46 + b$$

$$29.54 = b$$

$$e) t = 17 \quad p = ?$$

$$p = 0.46(17) + 29.54$$

$$p = 37.36$$

The predicted population of Canada in 2017 is 37.36 million.