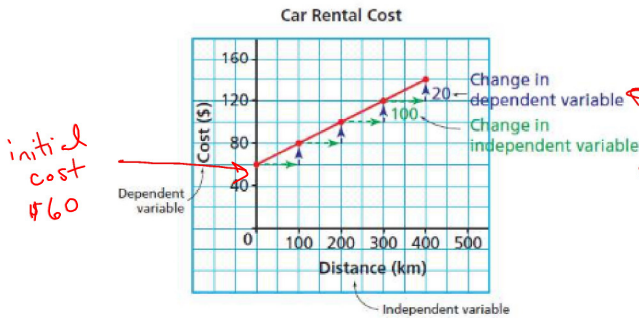


Lesson 6 Rate of Change

The cost for a car rental is \$60, plus \$20 for every 100 km driven. The independent variable is the distance driven and the dependent variable is the cost.

In the following graph, the change in the independent variable (run is always 100) and change in the dependent variable (rise) is always 20).



Rate of Change: $\frac{\text{change in the dependent variable } (y)}{\text{change in the independent variable } (x)}$

$$= \frac{\$20}{100\text{km}}$$

$$= \$0.20/\text{km}$$

Equation: $\text{Dependent variable } (y) = \text{rate of change} \cdot \text{independent var } (x) + \text{initial cost}$

$$C = 0.2d + 60$$

ex cost for 100 km

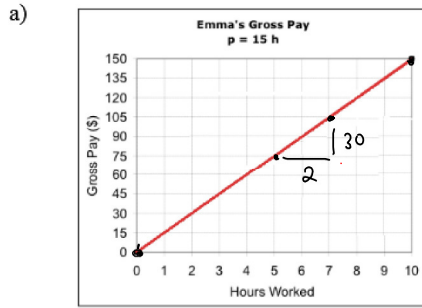
$$C = 0.2(100) + 60$$

$$= 20 + 60$$

$$= \$80$$

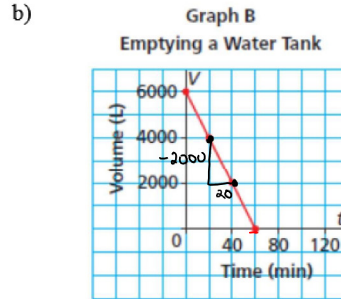
Example 1 – Determining Rate of Change of a Linear Relation from its Graph

- Choose 2 points on the line
- Calculate the change in the dependent variable (rise)
- Calculate the change in the independent variable (run)
- Use the formula to calculate slope



$$\begin{aligned} \text{rate of change} &= \frac{\text{change in } y}{\text{change in } x} \\ \text{(slope)} &= \frac{\$30}{2\text{h}} \\ &= \$15/\text{h} \end{aligned}$$

$$P = 15h$$

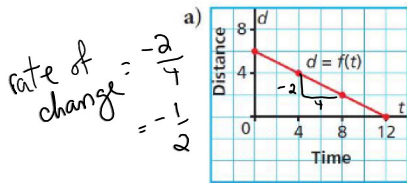


$$\begin{aligned} \text{rate of change} &= \frac{-2000\text{L}}{20\text{min}} \\ &= -100\text{L/min} \end{aligned}$$

$$V = -100m + 6000$$

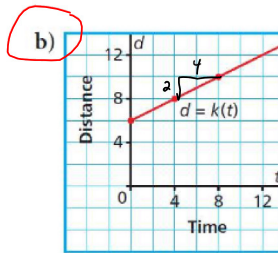
Example 2 – Matching a graph to a given Rate of Change and Vertical Intercept.

Determine which graph has a rate of change of $\frac{1}{2}$ and a vertical intercept of 6. Justify your answer.



$$\begin{aligned} \text{rate of change} &= \frac{-2}{4} \\ &= -\frac{1}{2} \end{aligned}$$

y-int is 6
rate of change is negative



$$\begin{aligned} \text{rate of change} &= \frac{2}{4} \\ &= \frac{1}{2} \end{aligned}$$

$$y\text{-int} = 6$$

Assignment: Pg. 309 #14, 15
Pg. 319 #4, 5, 8

Review pg. 326
Practice Test pg. 329