

**Lesson 1.7 Notes (Constant Rate of Change)**

- **Rate of Change** – a rate that describes how one quantity changes in relation to another
  - usually expressed as a **unit rate**
- **Constant Rate of Change** – rate of change between any two quantities is the *same*
  - describes a **linear** relationship

$$\text{Rate of Change} = \frac{\text{Change in first quantity}}{\text{Change in second quantity}}$$

Practice:

1. A computer programmer charges customers per line of code written. Fill in the blanks with the amount of change between consecutive numbers. Then, find the rate of change.
- 2.

Lines of Code	50	100	150	200
Cost (\$)	1,000	2,000	3,000	4,000

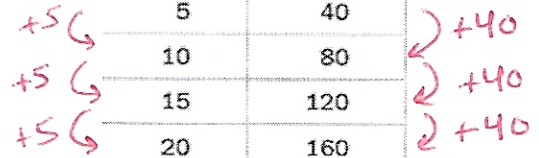
$+50$     $+50$     $+50$   
 $+1000$     $+1000$     $+1000$

Rate of Change =  $\frac{\$1,000}{50 \text{ lines}} = \boxed{\$20/\text{line}}$

2. The table shows the amount of money a booster club makes washing cars for a fundraiser. Use the information to find the constant rate of change (in dollars per car).

Cars Washed	
Number	Money (\$)
5	40
10	80
15	120
20	160

$\frac{\$40}{5 \text{ cars}} = \boxed{\$8 \text{ per car}}$



3. The table shows the number of miles a plane traveled while in flight. Use the information to find the constant rate of change.

Time (min)	30	60	90	120
Distance (mi)	290	580	870	1,160

$+30$     $+30$     $+30$   
 $+290$     $+290$     $+290$

$\frac{290 \text{ mi}}{30 \text{ min}} = \boxed{9.6 \text{ mi/min}}$

4. The table shows the number of students that buses can transport. Use the table to find the constant rate of change (in students per school bus).

$\frac{72 \text{ students}}{1 \text{ bus}} = \boxed{72 \text{ students per bus}}$

Number of Buses	2	3	4	5
Number of Students	144	216	288	360

$+1$     $+1$     $+1$   
 $+72$     $+72$     $+72$

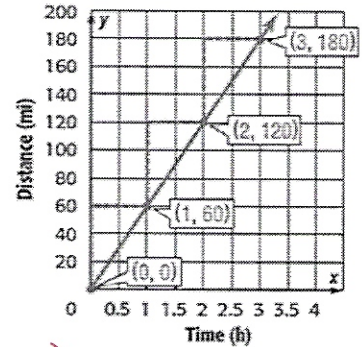
Finding Rate of Change from a Graph:

$$\text{Rate of Change} = \frac{\text{Change in } y}{\text{Change in } x} = \frac{y_2 - y_1}{x_2 - x_1}$$

5. The graph represents the distance traveled while driving on a highway.

a. Find the constant rate of change.

$$\frac{\text{change in miles}}{\text{change in hours}} = \frac{60-0}{1-0} = \frac{60}{1} = \boxed{60 \text{ mph}}$$



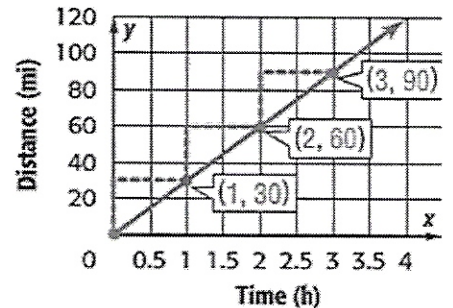
b. Explain what the point (1, 60) represents.

travel 60 miles in 1 hour  
(represents constant rate of change)

6. The graph represents the distance traveled by a bus.

a. Find the constant rate of change.

$$\frac{60-30}{2-1} = \frac{30}{1} = \boxed{30 \text{ mph}}$$



b. Explain what the point (0, 0) represents.

travel 0 miles in 0 hours

c. Explain what the point (1, 30) represents.

travel 30 miles in 1 hour  
(represents the constant rate of change)

7. The table and graph show the hourly charge to rent a bicycle at two different stores.

Which store charges more per hour? Explain.

→ Pedals Rentals

Pedals Rentals	
Time (hour)	Cost (\$)
2	24
3	36
4	48

+1  
+1

Pedals Rentals:

$$\text{Rate of Change} = \frac{36-24}{3-2} = \frac{12}{1} = \boxed{\$12/\text{hr}}$$

Super Cycles:

$$\text{Rate of Change} = \frac{8-0}{1-0} = \boxed{\$8/\text{hr}}$$

**Super Cycles**

