

7th Grade
April 21, 2021

Today we will:

- Review HW
- Work on ALEKS assignment

HOMEWORK:

- Video notes
- ALEKS homework on functions due FRIDAY
- ALEKS time and topics assignment due Monday



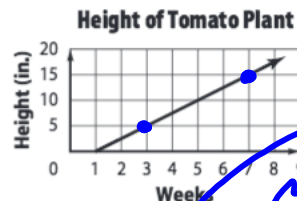
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Lesson 3 Reteach

Constant Rate of Change and Slope

A **rate of change** is a rate that describes how one quantity changes in relation to another quantity. A **linear relationship** has a constant rate of change, which means that the rates of change between any two data points is the same.

Example Gina recorded the height of a tomato plant in her garden. Find the constant rate of change for the plant's growth in the graph shown. Then interpret its meaning.



Step 1 Choose any two points on the line, such as (3, 5) and (7, 15).

Step 2 Find the rate of change between the points.

$$\text{rate of change} = \frac{\text{change in height}}{\text{change in time}} = \frac{15 \text{ in.} - 5 \text{ in.}}{7 \text{ wk} - 3 \text{ wk}} = \frac{10 \text{ in.}}{4 \text{ wk}} = 2.5 \text{ in./wk}$$

$$\frac{5-15}{3-7} = \frac{-10}{-4} = 2.5$$

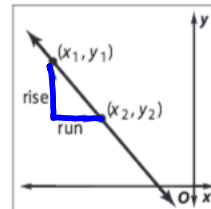
The rate of change 2.5 in./wk means the plant is growing at a rate of 2.5 inches per week.

Note that the **slope** is the same for any two points on a straight line. It represents a constant rate of change.

Words The slope m of a line passing through points (x_1, y_1) and (x_2, y_2) is the ratio of the difference in the y -coordinates to the corresponding difference in x -coordinates.

Symbols $m = \frac{y_2 - y_1}{x_2 - x_1}$, where $x_2 \neq x_1$ $m = \frac{\text{rise}}{\text{run}}$

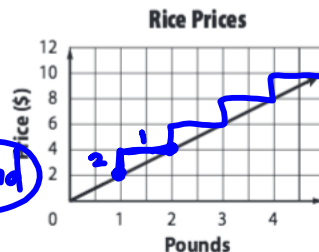
Model



Exercises

1. Find the constant rate of change for the linear function at the right and interpret its meaning.

$\begin{pmatrix} 1, 2 \\ 2, 4 \end{pmatrix}$ $\frac{4-2}{2-1} = \frac{2}{1} = 2$ dollars per pound
The price goes up \$2 for each pound.



Find the slope of the line that passes through each pair of points.

2. $A(2, 2), B(-5, 4)$

$$\frac{\Delta y}{\Delta x} = \frac{4-2}{-5-2} = \frac{2}{-7}$$

3. $L(5, 5), M(4, 2)$

$$\frac{\Delta y}{\Delta x} = \frac{5-2}{5-4} = \frac{3}{1} = 3$$

4. $R(7, -4), S(7, 3)$

$$\frac{\Delta y}{\Delta x} = \frac{-4-3}{7-7} = \frac{-7}{0}$$

undefined

5. $Q(3, 9), R(-5, 3)$

$$\frac{9-3}{3-(-5)} = \frac{6}{8} = \frac{3}{4}$$

6. $G(5, 7), H(2, 7)$

$$\frac{7-7}{5-2} = \frac{0}{3} = 0$$

7. $S(-8, -2), T(1, 4)$

$$\frac{\Delta y}{\Delta x} = \frac{-2-4}{-8-1} = \frac{-6}{-9} = \frac{2}{3}$$

= 0

$\frac{2}{3}$

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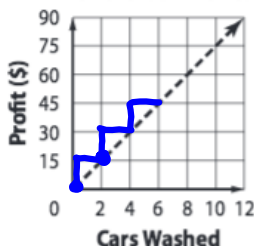
Lesson 3 Homework Practice

Constant Rate of Change and Slope

UNITS!

Find the constant rate of change for each linear function and interpret its meaning.

1. Fundraiser Profits



$(0,0)$
 $(2,15)$
 $\frac{\Delta y}{\Delta x} = \frac{15-0}{2-0}$
 $= \frac{15}{2} = \$7.50/\text{car}$

$\frac{\text{Rise}}{\text{Run}} = \frac{15}{2} = 7.5 \Rightarrow \7.50 per car

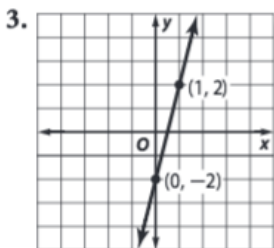
2.

Time (seconds)	Distance (yards)
x	y
1.2	6
2.4	8
3.6	10
4.8	12

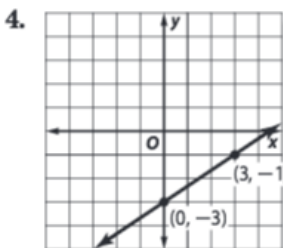
$(1.2, 6)$
 $(2.4, 8)$

$\frac{\Delta y}{\Delta x} = \frac{8-6}{2.4-1.2} = \frac{2}{1.2} = 1\frac{1}{3}$
 $1\frac{1}{3} \text{ yd/sec}$

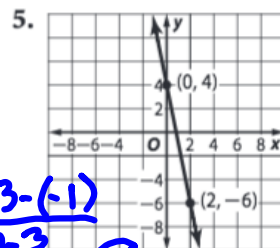
Find the slope of each line.



$\frac{\text{Rise}}{\text{Run}} = \frac{2-(-2)}{1-0} = \frac{4}{1} = 4$



$\frac{\text{rise}}{\text{run}} = \frac{2}{3}$



$\Delta y = -3 - (-1) = -2$
 $\frac{-2}{3} = -\frac{2}{3}$

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

Find the slope of the line that passes through each pair of points.

6. A(-10, 6), B(-5, 8)

$\frac{2}{5} \quad \frac{\Delta y}{\Delta x} = \frac{6-8}{-10-(-5)} = \frac{-2}{-5} = \frac{2}{5}$

7. C(7, -3), D(11, -4)

$\frac{-3-(-4)}{7-11} = \frac{1}{-4} = -\frac{1}{4}$

8. E(5, 2), F(12, -3)

$-\frac{5}{7} \quad \frac{-3-2}{12-5} = \frac{-5}{7}$

9. P(12, 2), Q(18, -2)

$-\frac{2}{3} \quad \frac{-2-2}{18-12} = \frac{-4}{6} = -\frac{2}{3}$

10. R(-2, -3), S(-2, -5)

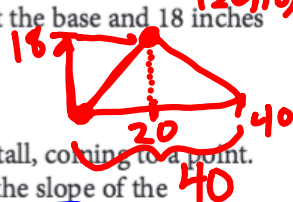
Undefined $\frac{-5-(-3)}{-2-(-2)} = \frac{-2}{0}$

11. T(-13, 8), U(21, 8)

$0 \quad \frac{8-8}{21-(-13)} = \frac{0}{34} = 0$

12. One particularly large ant hill found in 1997 measured 40 inches wide at the base and 18 inches high. What was the slope of the ant hill?

$m = \frac{18}{40} = \frac{9}{20}$



13. Today, the Great Pyramid at Giza near Cairo, Egypt, stands 137 meters tall, coming to a point. Its base is a square with each side measuring 230 meters wide. What is the slope of the pyramid?

