Bellringer

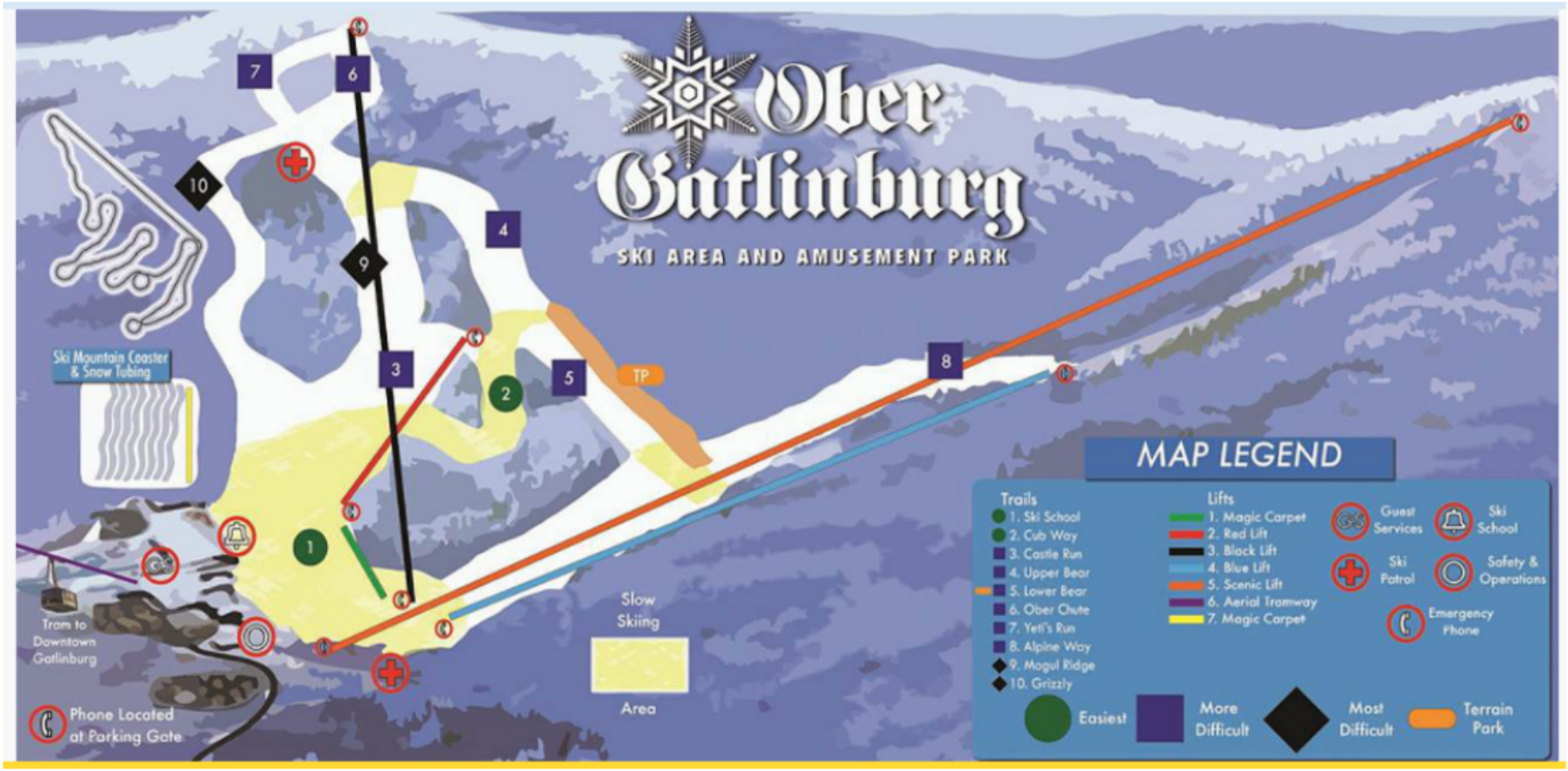
The table represents the number of computer tablets sold. Tell whether the rates of change are constant or variable.

Week	1	3	4	8
Number sold	32	96	128	224

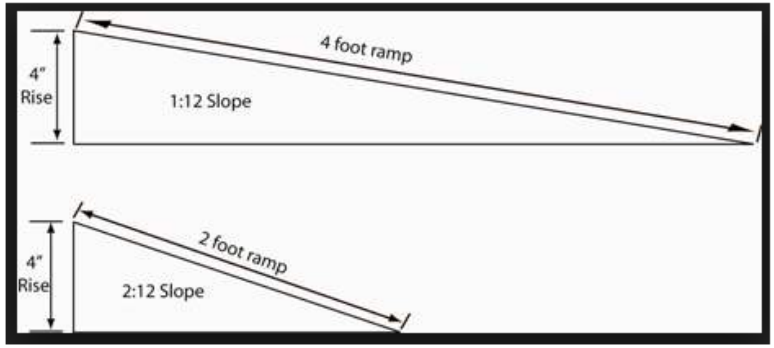
To answer this question, log on to www.socrative.com.
Select: *Student Login*
Room Name: *PAYNE1869*

3.3 Interpreting the Unit Rate as Slope

8.EE.5
Graph proportional relationships, interpreting the unit rate as the slope of the graph.
Compare two different proportional relationships represented in two different ways


Ober Gatlinburg
SKI AREA AND AMUSEMENT PARK
Ski Mountain Coaster & Snow Tubing
Tram to Downtown Gatlinburg
Phone Located at Parking Gate
Slow Skiing Area
TP
MAP LEGEND
Trails
1. Ski School
2. Cub Way
3. Castle Run
4. Upper Bear
5. Lower Bear
6. Ober Chute
7. Yeti's Run
8. Alpine Way
9. Mogul Ridge
10. Grizzly
Lifts
1. Magic Carpet
2. Red Lift
3. Black Lift
4. Blue Lift
5. Scenic Lift
6. Aerial Tramway
7. Magic Carpet
Guest Services
Ski School
Ski Patrol
Safety & Operations
Emergency Phone
Easiest
More Difficult
Most Difficult
Terrain Park

Which ramp is up to code?



Ripley's Aquarium of the Smokies

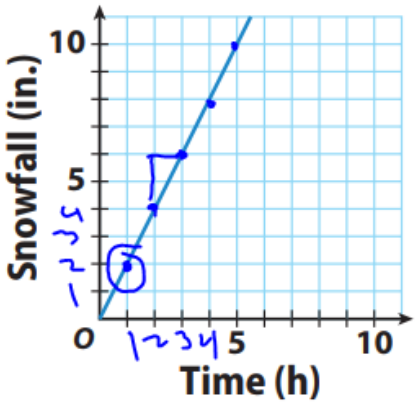
Vocabulary

Unit rate

- is a rate in which the second quantity in the comparison is one unit

ex: mph → miles per hour

Misty Mountain Storm



Rise / Run 2/1

EXPLORE ACTIVITY

Real World

A storm is raging on Misty Mountain. The graph shows the constant rate of change of the snow level on the mountain.

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

$x_1\ y_1 \quad x_2\ y_2$

$(1, 2) \quad (5, 10)$

A Find the slope of the graph using the points (1, 2) and (5, 10). Remember that the slope is the constant rate of change.

$m = \frac{10 - 2}{5 - 1} = \frac{8}{4} = \frac{2 \text{ inches}}{1 \text{ hours}}$

8/4

B Find the unit rate of snowfall in inches per hour. Explain your method.

2 inches/hour

C Compare the slope of the graph and the unit rate of change in the snow level. What do you notice?

They are the same

Graphing Proportional Relationships

- You can use a table and a graph to find the unit rate and slope that describe proportional relationships

- The constant for proportional relationships is the same as slope

EXAMPLE 1

Real World

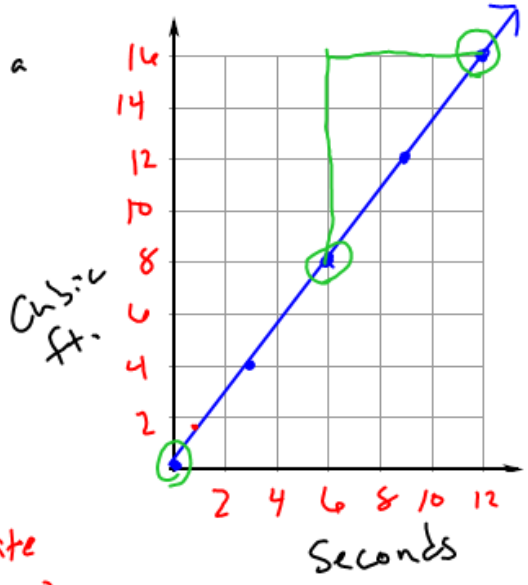
COMMON CORE 8.EE.5

Every 3 seconds, 4 cubic feet of water pass over a dam. Draw a graph of the situation. Find the unit rate of this proportional relationship.

STEP 1 Make a table

x	Sec.	3	6	9	12
y	ft^3	4	8	12	16

STEP 2 Draw a graph



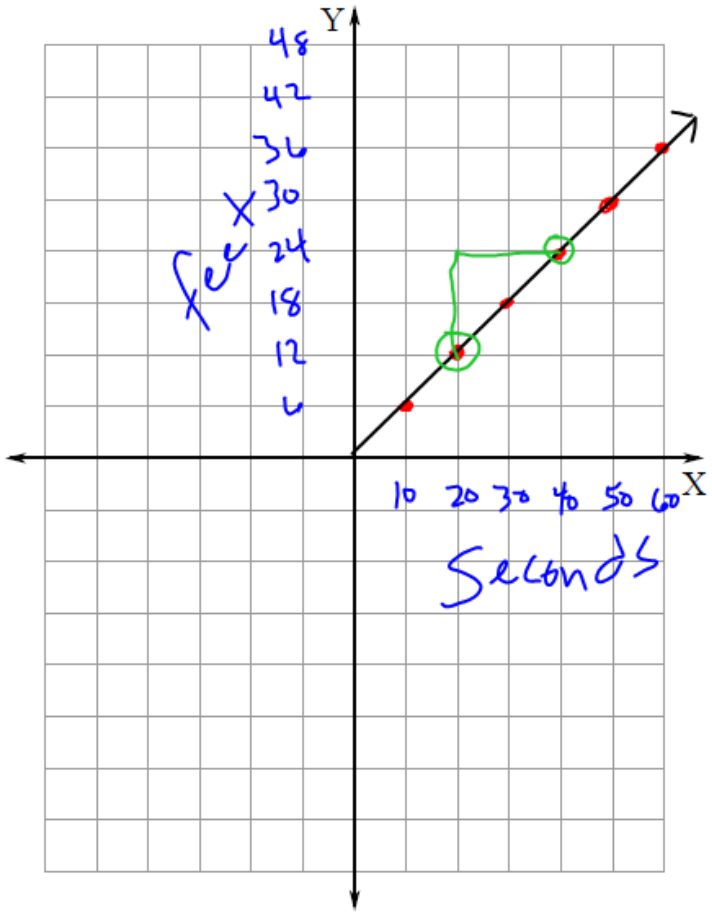
STEP 3 Find Slope

$\frac{8}{6} = \frac{4}{3}\ \frac{ft^3}{sec.}$ $\Rightarrow$ unit rate $\frac{4/3\ ft^3}{1\ sec.}$

ADDITIONAL EXAMPLE 1

Every 10 seconds an escalator step rises 6 feet. Draw a graph of the situation. Find the unit rate of this proportional relationship.

y	ft	6	12	18	24	30
x	5	10	20	30	40	50



$\frac{\uparrow 12}{\rightarrow 20} = \frac{6}{10} = \frac{3 \text{ ft}}{5 \text{ sec}}$

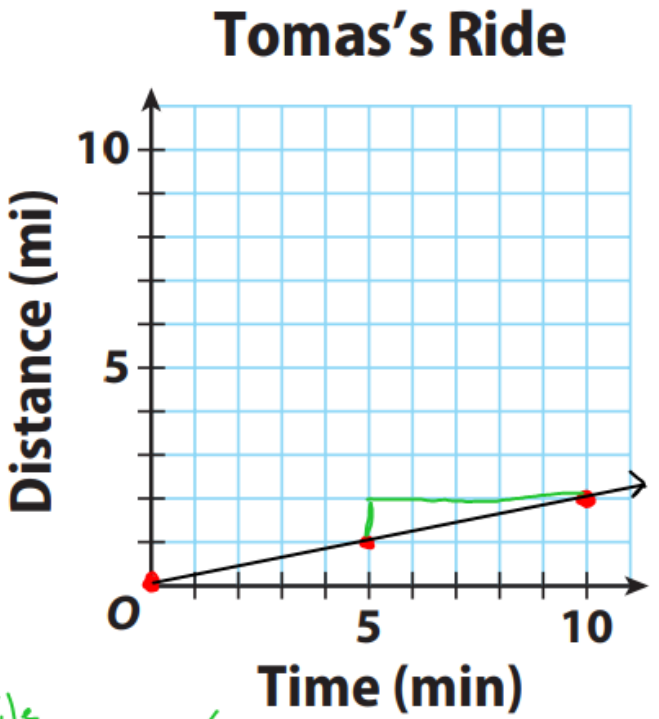
U.R. $\frac{3/5}{1}$

3/5 ft per second

YOUR TURN

2. Tomas rides his bike at a steady rate of 2 miles every 10 minutes. Graph the situation. Find the unit rate of this proportional relationship.

$\frac{1}{5}$ mile per minute



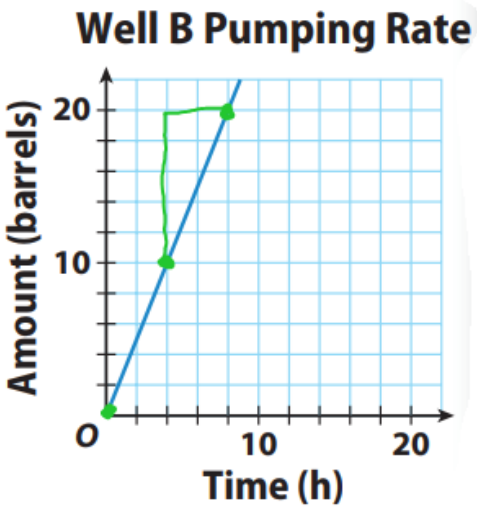
miles	1	2	4	6
min.	5	10	20	30

$\frac{\text{Rise}}{\text{Run}} = \frac{1 \text{ mile}}{5 \text{ minutes}}$

EXAMPLE 2 Real World

$y = kx$

The equation $y = 2.75x$ represents the rate, in barrels per hour, that oil is pumped from Well A. The graph represents the rate that oil is pumped from Well B. Which well pumped oil at a faster rate?



Well A

Unit Rate

2.75 barrel/hour

Well A

Well B

Unit Rate

5/2 barrel/hour

2.5 barrel/hour

$\frac{\text{Rise}}{\text{Run}} = \frac{10}{4}$

$= \frac{5}{2}$

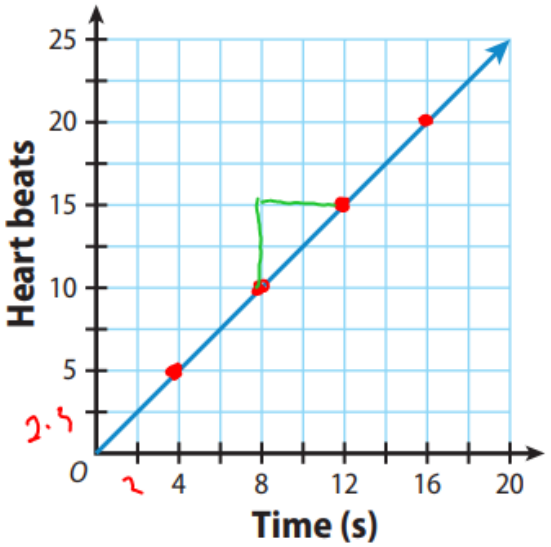
U.R. = 5/2 B/h

ADDITIONAL EXAMPLE 2

The equation $y = 1.2x$ represents the rate, in beats per second, that Lee's heart beats. The graph represents the rate that Nancy's heart beats.

Determine whose heart is being at a faster rate.

$y = kx$



Lee

1.2 beats/sec.

Nancy

1.25 beats/sec

$\frac{5 \text{ beats}}{4 \text{ sec}}$

$\frac{5}{4}$ beats/sec

Nancy

YOUR TURN

4. The equation $y = 375x$ represents the relationship between x, the time that a plane flies in hours, and y, the distance the plane flies in miles for Plane A. The table represents the relationship for Plane B. Find the slope of the graph for each plane and the plane's rate of speed. Determine which plane is flying at a faster rate of speed.

Time (h)	1	2	3	4
Distance (mi)	425	850	1275	1700

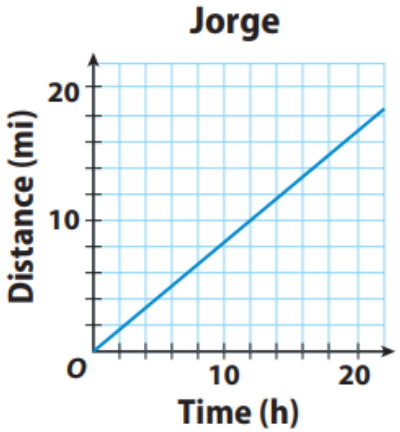
Plane A: $\frac{375}{1}$, 375 mph Plane B: $\frac{425}{1}$, 425 mph

Plane B

Guided Practice

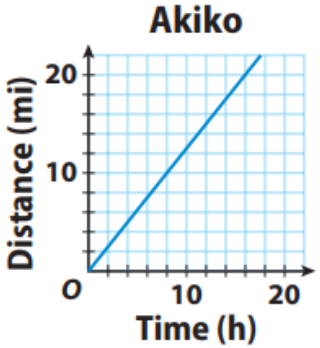
Give the slope of the graph and the unit rate.

1. Jorge: 5 miles every 6 hours

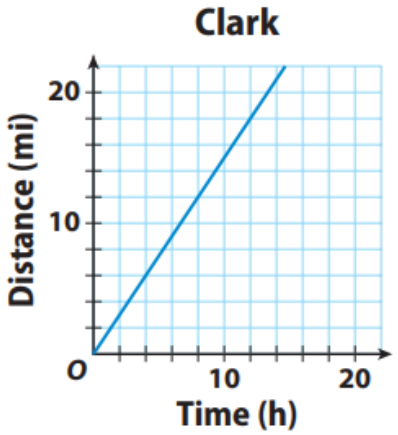


2. Akiko

Time (h)	4	8	12	16
Distance (mi)	5	10	15	20



3. The equation $y = 0.5x$ represents the distance Henry hikes, in miles, over time, in hours. The graph represents the rate that Clark hikes. Determine which hiker is faster. Explain. (Example 2)



Write an equation relating the variables in each table.

4.

Time (x)	1	2	4	6
Distance (y)	15	30	60	90

_____

5.

Time (x)	16	32	48	64
Distance (y)	6	12	18	24

_____

GP 1-6

IP 7-13

p 86-88