Edgenuity

Warm-Up | Comparing Functions in the Real World

Lesson Question

Lesson Goals

Examine real-world scenarios.

Compare rates of change and _____ value.

Explore changing the _____ and *y*-intercept.

Words to Know

Fill in this table as you work through the lesson. You may also use the glossary to help you.

Slope	in a function, the ratio of the change in the dependent value with respect to the change in the independent value
Y-intercept	the *y*-coordinate of the point where the graph of a line crosses the *y*-axis
Compare and contrast	to explain or show the similarities or differences between items or ideas
Rate of Change	the ratio of the change in the dependent values (outputs) to the change in the independent values (inputs) between two points on a line

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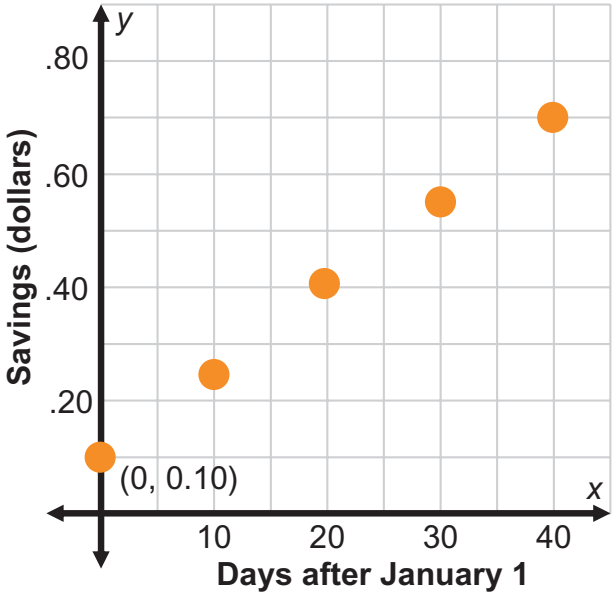
Find and Compare Initial Values of Linear Functions

Fala's Total Savings after January 1



Fai's Total Savings after January 1

Days after 1/1: *x*	Savings ($): *y*	
5	.32	
10	.44	+.12
15	.56	+.12
20	.68	+.12

- ***y*-intercept**

First find the rate of change of the *y*-values: +0.12.

$.32 - .12 =$ ☐

On January 1st, Fala had $☐ savings.

Fai's initial value is $☐.

Meaning that ☐ had the highest initial value at $0.20, because $0.20 is more than $0.10.

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Comparing Rates of Change

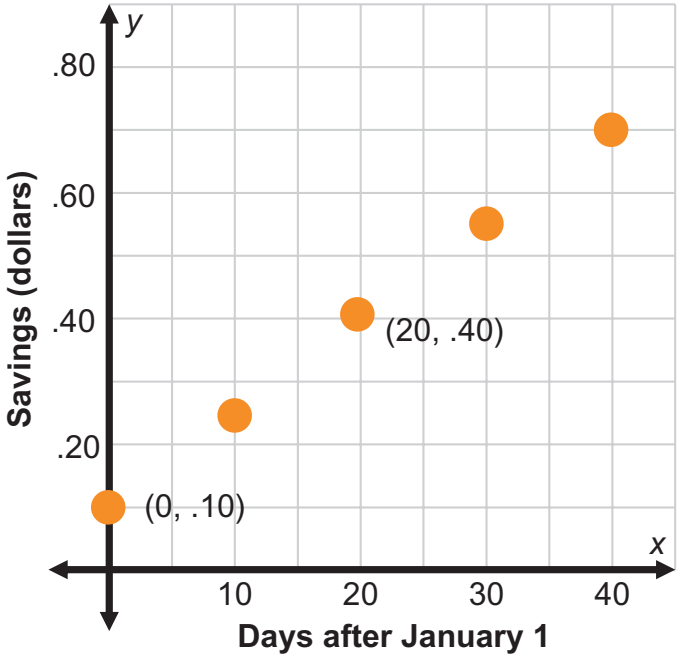
Rate of change, or [ ], is the ratio of the change in [ ] to the change in *x*.

Fala:

$$m = \frac{.40 - .10}{20 - 0}$$

$$m = \frac{.30}{\square}$$

$$m = \$\square$$



Fai:

$$\frac{.12}{5} = \square$$

[ ]

+5

Days after 1/1: *X*	Savings ($): *Y*	
10	.44	
15	.56	+.12
20	.68	+.12

- **Compare** to determine who will save $1.00 first.

  Fala saves about $0.015 each day. Fai saves about $0.024 each day.

  Since Fai is saving at a greater rate, we can conclude that [ ] will save $1 first.

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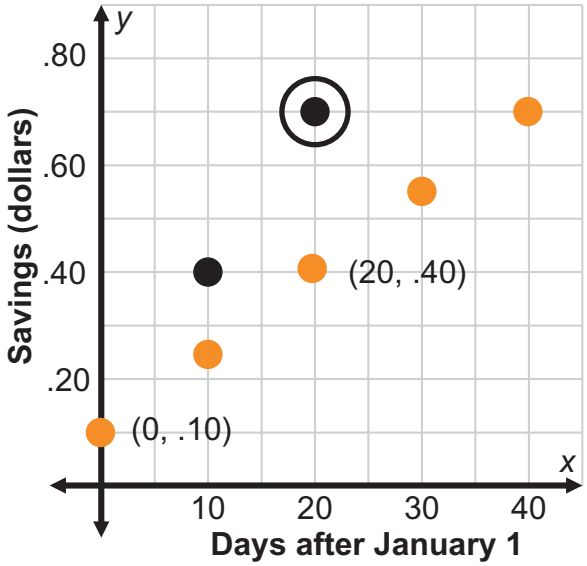
Changing Slope

Fala:

$m = 0.015$

$m =$ ☐



Fai:

$m = 0.024$

Days after 1/1: x	Savings ($): y
10	.44
20	.68
30	.92

What happens when there is a change of slope in one function compared to the other?

- What if Fala's savings increased at a rate of .03 each day instead of .015?

$y =$ ☐ $+ 0.10$

$x = 10$ $y =$ ☐

$x = 20$ $y =$ ☐

- Who will save $1.00 first? ☐

Now, we can see that changing the ☐ can change the outcome.

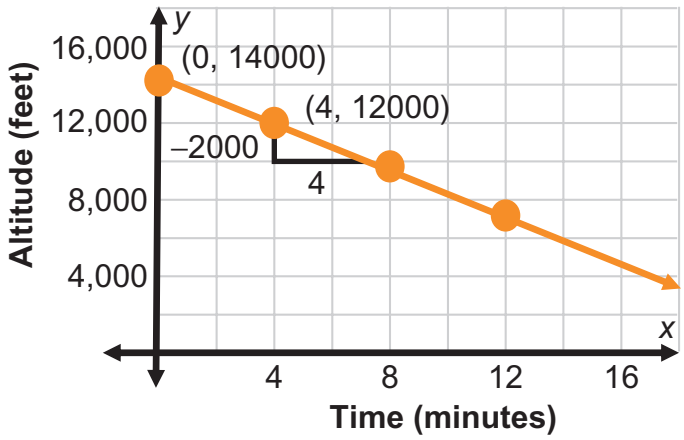
Comparing Initial Value and Rate of Change

REAL-WORLD CONNECTION

Tracy's plane started at 12,000 feet. After 10 minutes, she was at an altitude of 7,500 feet.

Tracy: (0, 12000) (10, 7500)

Colette:



Tracy and Colette are on separate planes that are each making the descent to an airport.

- Initial values

Tracy $b =$ [ ] ft

Colette $b =$ [ ] ft

- Rate of change

Tracy:

$$m = \frac{7{,}500 - 12{,}000}{10 - 0}$$

$$m = \frac{-4{,}500}{10}$$

$m =$ [ ]

Colette:

$$m = \frac{-2000}{4}$$

$m =$ [ ]

So this means that Colette's plane is descending at a rate of [ ] feet per minute, which is a greater rate than Tracy's rate.

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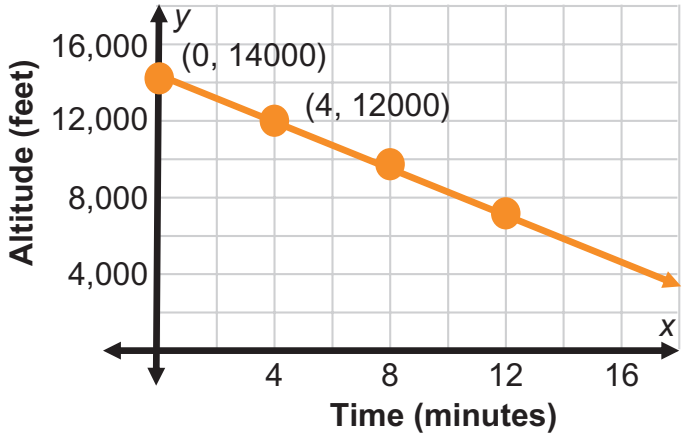
Comparing Linear Functions

Tracy:

Tracy's plane started at 12,000 feet. After 10 minutes, she was at an altitude of 7,500 feet.

Colette:



Who is closer to the ground after 16 minutes?

- Tracy:

  $y = -450x + 12{,}000$

  $y = -450(16) + 12{,}000$

  $y = -7200 + 12{,}000$

  $y =$ [ ] ft

- Colette:

  $y = -500x + 14{,}000$

  $y = -500(16) + 14{,}000$

  $y = -8000 + 14{,}000$

  $y =$ [ ] ft

[ ] is closer to the ground after 16 minutes, at an altitude of 4,800 [ ].

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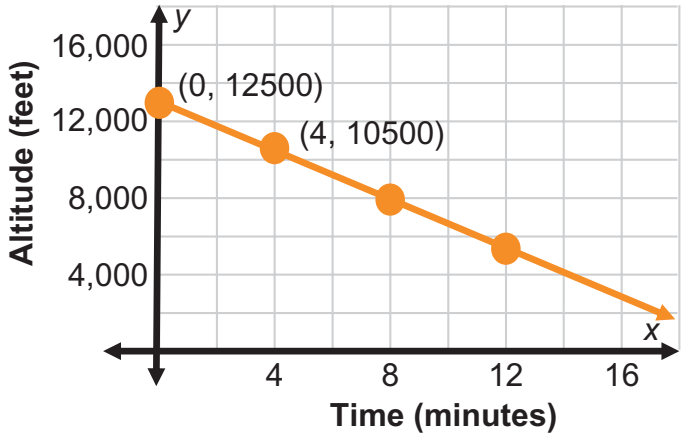
Changing the *y*-Intercept

What happens when the *y*-intercept of one function changes?

Tracy:

Tracy's plane started at 12,000 feet. After 10 minutes, she was at an altitude of 7,500 feet.

Colette:



- What if Colette started from 12,500 feet instead of 14,000 feet?
- Who will be closest to the ground after 16 minutes?

Tracy:

$y = -450(16) + 12000$

$y =$ _____ ft

Colette:

$y = -500(16) + 12500$

$y = -8000 + 12500$

$y =$ _____ ft

Colette is now closer to the ground, at an altitude of _____ feet, than Tracy.

So changing the *y*-intercept can affect the _____ of two linear function comparisons.

Summary | Comparing Functions in the Real World

Lesson Question	How can you use linear relationships to compare real-world situations?

Answer

Use this space to write any questions or thoughts about this lesson.