

NAME: _____

UNIT 3 • LINEAR AND EXPONENTIAL FUNCTIONS

Lesson 3: Interpreting Graphs of Functions

Practice 3.3.2: Proving Average Rate of Change

Calculate the rate of change for each scenario described.

1. The Beechcraft 1900D is a commuter airplane with a fuel capacity of 665 gallons. The function for this situation is $f(x) = -0.9x + 665$, where x represents miles flown and $f(x)$ represents the amount of fuel remaining. What is the rate of change for this scenario?
2. The velocity of a ball thrown directly upward can be modeled by the function $f(x) = -32x + 96$, where x represents time in seconds and $f(x)$ represents the height of the ball in feet. What is the rate of change for this scenario?
3. An investment of \$900 is invested monthly at a rate of 4%. The function that models this situation is $f(x) = 900 \left(1 + \frac{0.04}{12} \right)^{12x}$, where x represents time in years. What is the rate of change for the interval $[3, 10]$?
4. The price of a stock started out at \$150 per share and has declined to 75% of its value every 2 weeks. The function that models this decline is $f(x) = 150(0.75)^{\frac{x}{2}}$, where x represents time in weeks. What is the rate of change for the interval $[1, 4]$?
5. The table below lists common Celsius to Fahrenheit degree conversions. What is the rate of change for this function?

$C^{\circ} (x)$	$F^{\circ} (f(x))$
0	32
10	50
20	68
30	86
40	104

continued

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The table below represents the total cost for a cell phone plan. Use the table to answer questions 6 and 7.

Number of minutes (x)	Total cost in dollars ($f(x)$)
0	35
250	55
500	75
750	95
1000	115

6. What is the rate of change for this function over the interval $[250, 1000]$?
7. What is the rate of change for this function over the interval $[250, 750]$?
8. A Petri dish starts out with 15 bacteria. The number of bacteria doubles every 12 minutes. Use the table below to calculate the rate of change for the interval $[24, 48]$.

Minutes (x)	Number of bacteria ($f(x)$)
0	15
12	30
24	60
36	120
48	240

The table below represents the worth every two years of an initial investment of \$500 that earns 2.6% interest, compounded quarterly. Use the table to answer questions 9 and 10.

Years (x)	Investment value in dollars ($f(x)$)
0	500.00
2	613.97
4	753.92
6	925.78
8	1136.80

9. What is the rate of change for this function over the interval $[0, 4]$?
10. What is the rate of change for this function over the interval $[2, 8]$?