ALBERT

Name _____ Date _____

# Average Rate of Change Worksheet

Algebra 1 · Common Core HSF-IF.B.6

> Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

## Practice

Builds the skill step by step.

1. f(x) = 3x + 2. What is the average rate of change from x = 1 to x = 4?

2. Use the table. What is the average rate of change from x = 0 to x = 4?

| x | 0 | 2 | 4 |
|---|---|---|---|
| y | 5 | 9 | 13 |

3. f(x) = $x^2$. What is the average rate of change from x = 1 to x = 3?

4. A car has gone 60 miles at hour 1 and 180 miles at hour 3. What is its average speed over that time?

5. A savings account's balance is in dollars and time is in days. What is the unit of the average rate of change?

   A. dollars

   B. days

   C. dollars per day

   D. days per dollar

6. $f(x) = x^2$. What is the average rate of change from $x = 0$ to $x = 2$?

7. A plant is 5 cm tall on day 2 and 13 cm tall on day 6. What is its average growth rate?

8. $f(x) = 10 - 2x$. What is the average rate of change from $x = 0$ to $x = 5$?

9. It is 50°F at 8 a.m. and 62°F at noon. What is the average rate of change in degrees per hour?

10. What does a negative average rate of change mean?

    A. The function increased.

    B. The function decreased over the interval.

    C. The function is constant.

    D. There is no change.

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## On Level

Grade-level practice.

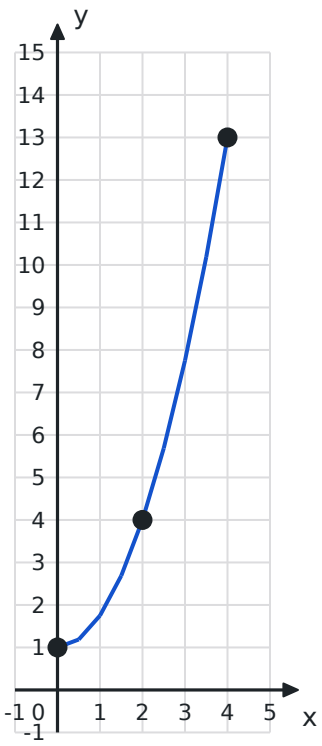
1. $f(x) = x^2 - 4x$. What is the average rate of change from $x = 1$ to $x = 5$?

2. $f(x) = 2^x$. What is the average rate of change from $x = 1$ to $x = 4$?

3. $h(t) = -16t^2 + 64t$ is a ball's height in feet. What is its average rate of change from $t = 0$ to $t = 2$?

4. For $h(t) = -16t^2 + 64t$, what is the average rate of change from $t = 2$ to $t = 4$?

5. Estimate from the graph: what is the average rate of change from x = 0 to x = 4?




6. A tank's water level changes at an average rate of −4 gallons per minute from minute 2 to minute 10. Explain what that means and how much water was lost.

7. A town had 12,000 people in 2010 and 15,000 in 2020. What was the average rate of change?

8. $f(x) = x^3$. What is the average rate of change from x = −1 to x = 2?

9. For $f(x) = x^2$, which interval has the greatest average rate of change?

   A. from $x = -1$ to $x = 1$

   B. from $x = 1$ to $x = 2$

   C. from $x = 0$ to $x = 1$

   D. from $x = 3$ to $x = 4$

10. Use the table. What is the average rate of change of d from $t = 1$ to $t = 3$?

| t | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| d | 0 | 3 | 12 | 27 | 48 |

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## Challenge

Multi-step and word problems that stretch it.

1. $f(x) = x^2$. The average rate of change from $x = a$ to $x = a + 2$ is 10. What is a?

2. $f(x) = 3 \cdot 2^x$. What is the average rate of change from $x = 0$ to $x = 3$?

3. $g(x) = 5x + 1$ and $f(x) = x^2$. On the interval from $x = 1$ to $x = 5$, how much greater is f's average rate of change than g's?

4. Lea had 120 dollars saved at week 4 and 300 dollars at week 10. What was her average rate of saving?

5. $f(x) = 1 \div x$. What is the average rate of change from $x = 1$ to $x = 4$?

6. The average rate of change of f from $x = a$ to $x = b$ is 0. What must be true?

   A. $f(a) = f(b)$

   B. f is constant everywhere

   C. $f(a) = 0$

   D. $a = b$

7. $f(x) = \sqrt{x}$. What is the average rate of change from $x = 4$ to $x = 9$?

8. Explain why a linear function has the same average rate of change on every interval.

9. The average rate of change of f from $x = 2$ to $x = 6$ is 3, and $f(2) = 10$. What is $f(6)$?

10. $h(t) = -5t^2 + 30t$. What is the average rate of change from $t = 1$ to $t = 5$?