U1B L2 Slope and Rage of Change Name: _____HR:_____

Practice

UNIT 1B Lesson 2 **Directions: Find the slope of the line passing through the given points and DRAW the direction the graph goes. If its horizontal or vertical state so.**

1. $(-5,1)$ and $(3,7)$

$(x_1, y_1)\ (x_2, y_2)$

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

$= \frac{7-1}{3-5} = \frac{6}{8} = \frac{3}{4}$

$m = \frac{3}{4}$



2. $(3, -4)$ and $(8, -4)$

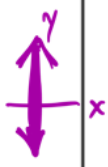
$x_1\ y_1 \quad x_2\ y_2$

$m = \frac{-4--4}{8-3} = \frac{-4+4}{5} = \frac{0}{5}$

$m = 0$ Horizontal Line

3. $(0,4)$ and $(0, -2)$

$x_1\ y_1 \quad x_2\ y_2$



$m = \frac{-2-4}{0-0} = \frac{-6}{0}$

m = undefined

Vertical Line

4. $(-3, -7)$ and $(6, -2)$

$x_1\ y_1 \quad x_2\ y_2$

$m = \frac{-2--7}{6--3} = \frac{-2+7}{6+3} = \frac{5}{9}$

$m = \frac{5}{9}$



5. $(-1, -1)$ and $(-4,3)$

$m = \frac{3--1}{-4--1} = \frac{3+1}{-4+1} = \frac{4}{-3}$

$m = \frac{-4}{3}$



6. $(4.3, -2.9)$ and $(-14.3,8)$ (answer as a fraction)

$m = \frac{8--2.9}{-14.3-4.3} = \frac{10.9}{-18.6}$

$m = \frac{-109}{186}$

Directions: Find the average rate of change of the function between the given x values.

7. $f(x) = 3x + 2$ on the interval x = 1 to x = 3.

$f(1) = 3(1)+2 = 5$

$f(3) = 3(3)+2 = 11$

$AROC = \frac{11-5}{3-1} = \frac{6}{2} = \frac{3}{1}$

8. $g(x) = -5x + 2$ on the interval x = -1 to x = 4.

$f(-1) = -5(-1)+2 = 7$

$f(4) = -5(4)+2 = -18$

$AROC = \frac{-18-7}{4-1} = \frac{-25}{5} = \frac{-5}{1}$

9. $m(x) = x^2 - 4x + 6$ on the interval x = 1 to x = 4.

$m(1) = (1)^2 - 4(1) + 6 = 1 - 4 + 6 = 3$

$m(4) = (4)^2 - 4(4) + 6 = 6$

$AROC = \frac{6-3}{4-1} = \frac{3}{3} = 1$

7. Find the average rate of change from x = -1 to x = 5

x	-4	-1	2	5
$f(x)$	10	1	-2	-5

$AROC = \frac{-5-1}{5--1} = \frac{-6}{6} = -1$

8. $g(x) = 2x - x^2$ on the interval x = 0 to x = 4.

x	-2	0	2	4
$f(x)$	-5	-1	3	9

$AROC = \frac{9-1}{4-0} = \frac{10}{4} = \frac{5}{2}$

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10. A candles height can be found by the function $h(t) = -0.3t + 12$. Where h is the height in cm and t is the time it is burning for in hours. Find the average rate of change of the candles height from t = 2 hours to t = 6 hours after lighting

$h(2) = -.3(2) + 12$
$= 11.4$ cm
$h(6) = -.3(6) + 12$
$= 10.2$ cm
$AROC = \frac{10.2 - 11.4}{6-2 \text{ hrs}} = \frac{-1.2}{4} = \frac{-.3 \text{cm}}{\text{hr}}$

11. The volume of water in a reservoir (in cubic meters) after t days is $V(t) = 5000 - 25t + 0.5t^2$. Find the average rate of change of the reservoir's volume from t = 2 to t = 10 days, and determine whether the water level is rising or falling on average over that period.

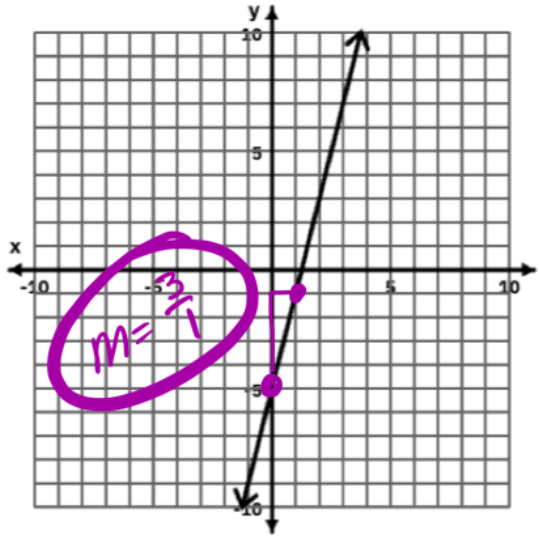
$V(2) = 5000 - 25(2) + .5(2)^2$ (Days)
$= 4952\ m^3$
$V(10) = 5000 - 25(10) + .5(10)^2$
$= 4800\ m^3$
$AROC = \frac{4800 - 4952}{10-2} = \frac{-152}{8} = -19 \frac{\text{gal}}{\text{day}}$

12. A city's population is modeled by $P(t) = 120000 + 600t - 5t^2$, where t represents the number of years since 2020. Calculate the average rate of change of the population between t = 2 and t = 6 years, and interpret whether the population is increasing or decreasing on average over that period.

$P(2) = 120000 + 600(2) - 5(2)^2$ (2022)
$= 121180$ people
$P(6) = 120000 + 600(6) - 5(6)^2$ (2026)
$= 123420$
$AROC = \frac{123420 - 121180}{6-2}$
$= \frac{560 \text{ people}}{\text{year}}$

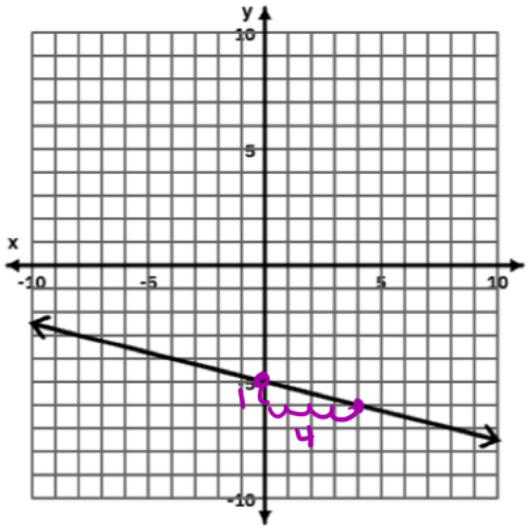
Directions: Determine the average rate of change (slope) of the graphs.

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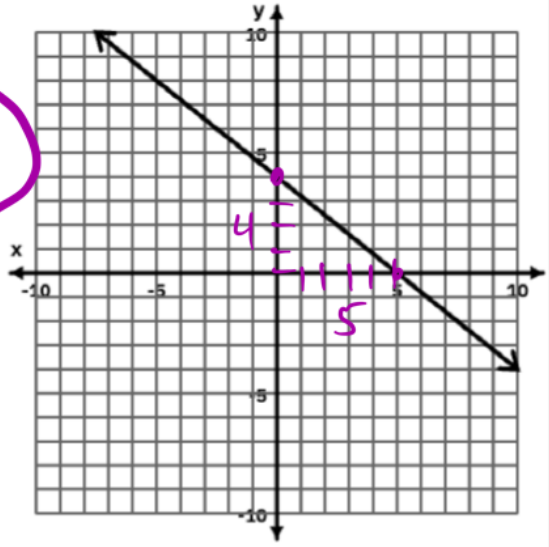
$m = 3$

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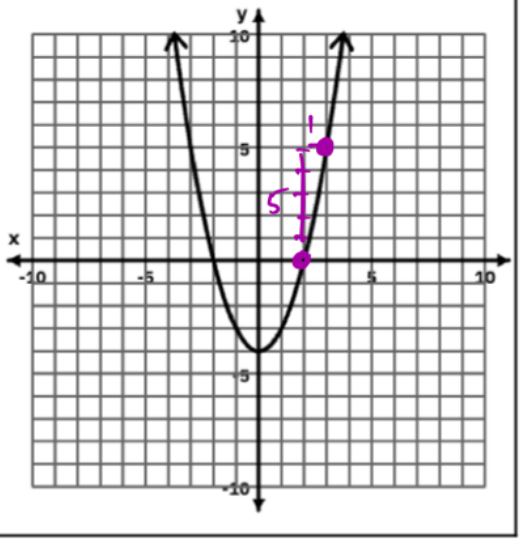
$m = -\frac{1}{4}$

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$m = -\frac{4}{5}$

16. Find the rate of change between x = 2 and x = 3



$m = \frac{5}{1}$
or
$m = 5$