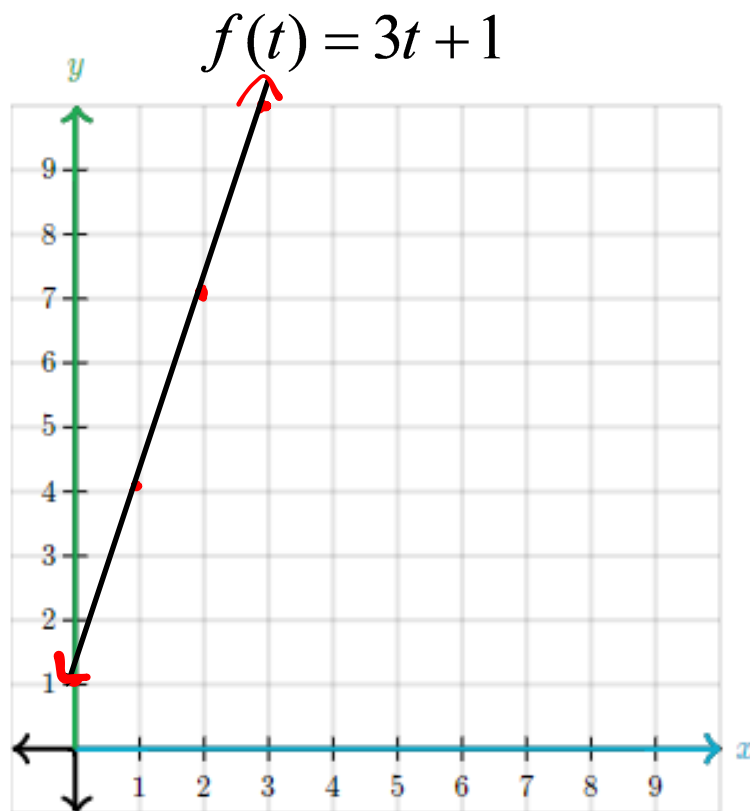




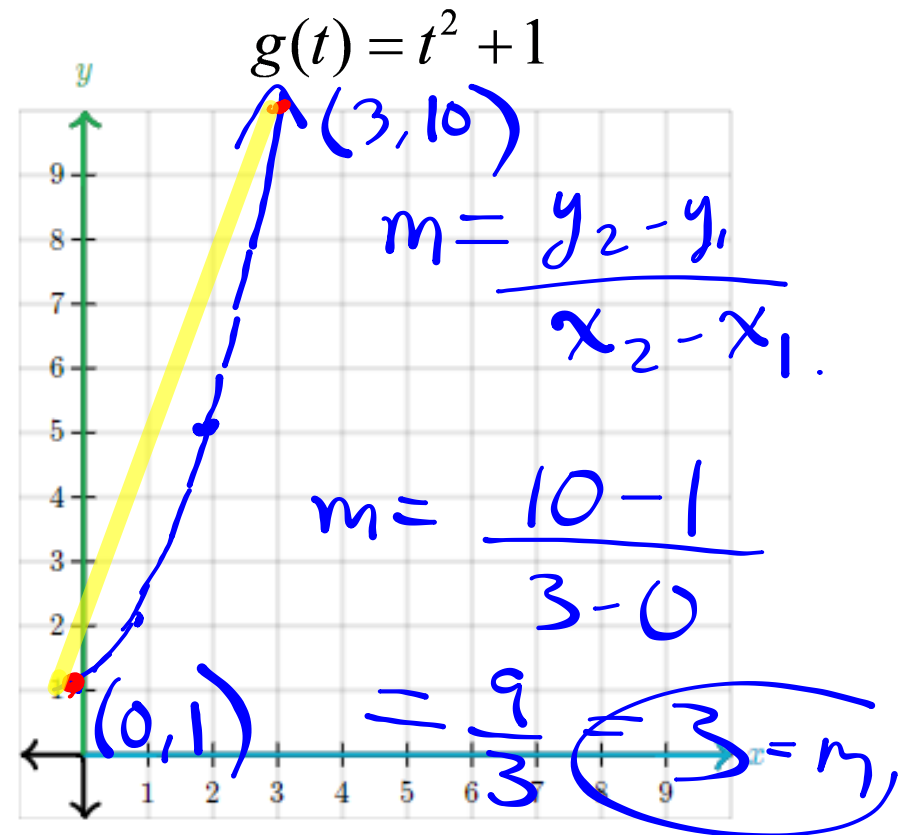
Notes 1.1 - Average Rate of Change (AROC)/Function

Attributes * WARM UP *



Find the rate of change.

$$m = 3$$



Find the average rate of change over the domain 0 to 3.





Notes 1.1 - Average Rate of Change (AROC)

Average Rate of Change

The average rate of change over the interval $[a, b]$ is given by

$$m = \frac{f(b) - f(a)}{b - a}$$





Notes 1.1 - Average Rate of Change (AROC)

X	-5	-3	-1	0	2	3	6	7	9
f(x)	-3	-1	0	4	7	8	2	0	-1

★ Find $f(0)$. $f(0) = 4$

★ $f(?) = 0$ $x = -1, x = 7$

★ Find the **average rate of change**
for $-3 \leq x \leq 2$. $\frac{f(b) - f(a)}{b - a} = \frac{f(2) - f(-3)}{2 - (-3)}$
 $\frac{7 - (-1)}{5} = \frac{8}{5} = m$



★ Find the **average rate of change**

@ $x = 8$, $\frac{f(9) - f(7)}{9 - 7} = \frac{-1 - (0)}{2} = -\frac{1}{2}$

$$m = -\frac{1}{2} \text{ AROC @ } x = 8$$

★ Over which interval(s) is the function **increasing/decreasing?**

INCREASING: $(-5, 3)$

DECREASING: $(3, 9)$

X	-5	-3	-1	0	2	3	6	7	9
f(x)	-3	-1	0	4	7	8	2	0	-1



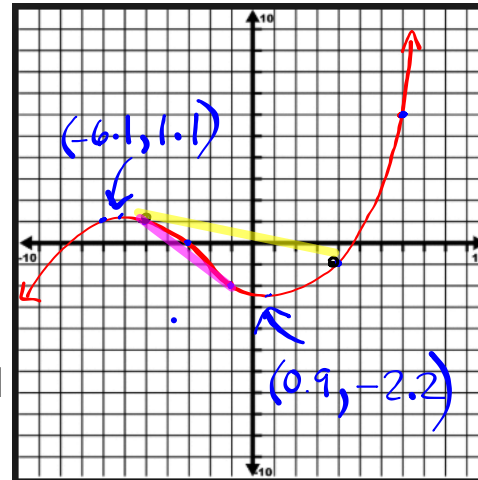
Notes 1.1 - Average Rate of Change (AROC)

★ Find $f(-1)$. $f(-1) = -2$

★ Find x when $f(x) = 6$
 $x = 7$

★ Find the average rate of change between $x = -5$ and $x = 4$

$$\frac{-1 - (1)}{4 - (-5)} = \frac{-2}{9} \quad \boxed{\frac{-2}{9} = m}$$



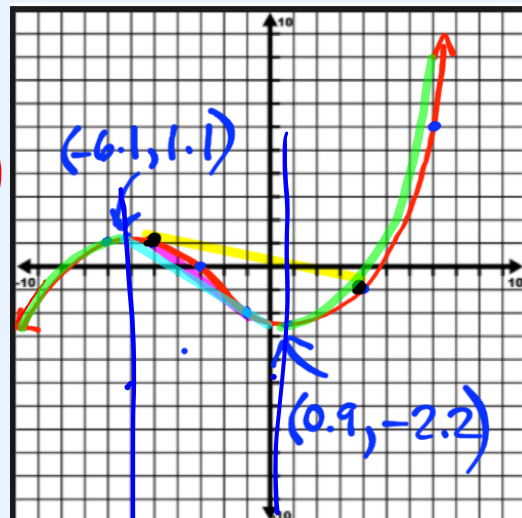
★ Find the average rate of change at $x = -3$.

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

★ Over which interval(s) is the function increasing/decreasing?

INCREASING:
 $(-\infty, -6.1) \cup (0.9, \infty)$

DECREASING:
 $(-6.1, 0.9)$





Notes 1.1 - Average Rate of Change (AROC)

Given $h(t) = t^2 + 5t$

★ Find $h(-3)$. $h(-3) = -6$

★ Find t when $h(t) = 0$.

$$t^2 + 5t = 0$$

$$t(t+5) = 0$$

$$t = 0, t = -5$$



★ Find the average rate of change over

$$[-1, 2]. \quad \frac{f(b) - f(a)}{b - a} = \frac{14 - (-4)}{2 - (-1)} = \frac{18}{3} = 6$$

$$f(2) = (2)^2 + 5(2)$$

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

$$m = 6 \quad \text{AROC } [-1, 2]$$