M-PC Pre-Calculus 1/17

Determine whether the function is even, odd, or neither.

1.) $x^8 + x^4 + 6x^0$ (even, even, even)

even

2.) $x^7 + x^3 + x^1$ (odd, odd, odd)

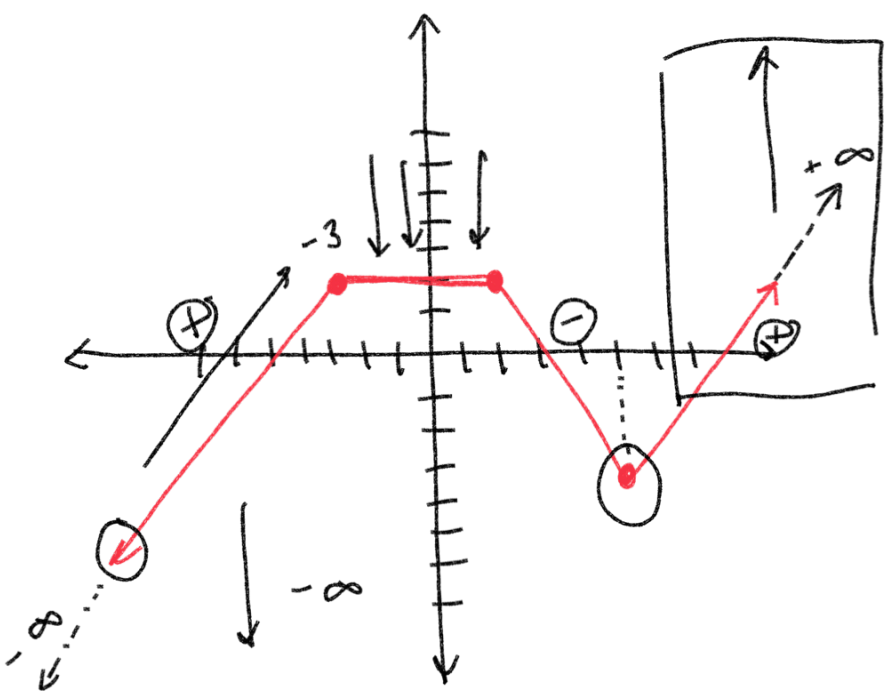
odd

3.) $x^6 + x^3 + 2x^0$ (even, odd, even)

neither

4.) $2x^2 + 3x^1 - 8x^0$ (even, odd, even)

neither



x values

Domain: $\mathbb{R}$ $(-\infty, \infty)$

Range: $(-\infty, +\infty)$

+ slope

Increasing: $(-\infty, -3)$ $(5, +\infty)$

− slope

Decreasing: $(2, 5)$

Constant: $(-3, 2)$

Average Rate of Change $\longrightarrow$ Slope

$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1} \qquad y_2 = f(x_2) \qquad y_1 = f(x_1)$$

$$\text{ARC} = \frac{f(x_2) - f(x_1)}{x_2 - x_1} \qquad x_1 = -1 \quad x_2 = 3$$

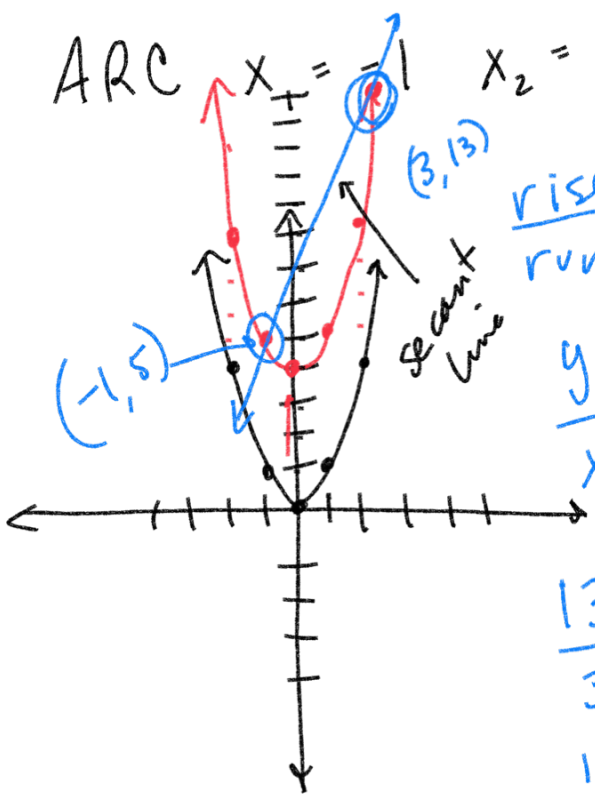
$$\frac{f(3) - f(-1)}{3-(-1)}$$

$$f(x) = x^2 + 4$$

even

$$\frac{\left[(3)^2+4\right] - \left((-1)^2+4\right)}{3+1}$$

ARC $x_1 = -1 \quad x_2 = 3$



$$\frac{\text{rise}}{\text{run}}$$

$$\frac{y_1 - y_1}{x_2 - x_1}$$

$$\frac{(9+4) - (1+4)}{4}$$

$$\frac{13 - 5}{4} = \frac{8}{4} = 2$$

$$\frac{13-5}{3-(-1)}$$

ARC $\rightarrow$ slope

$$\frac{13-5}{3+1} = \frac{8}{4} = 2$$

$f(x) = 2x - 5$

$x_1 = -4 \quad x_2 = 3$

Average Rate of Change

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1}$$

$$\frac{f(3) - f(-4)}{3 - (-4)}$$

$$\frac{[2(3)-5] - [2(-4)-5]}{3+4}$$

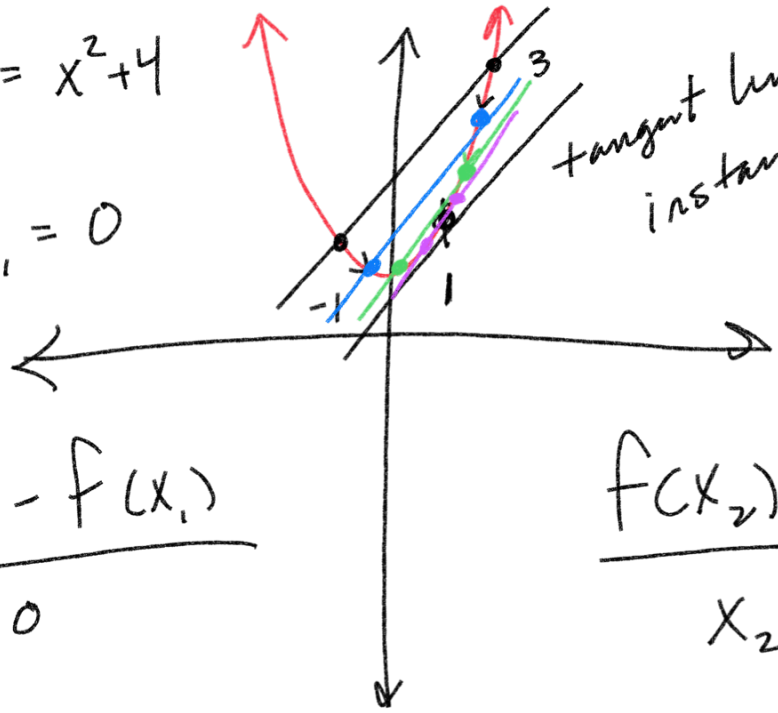
$$\frac{[6-5] - [-8-5]}{7}$$

$$\frac{1 - (-13)}{7}$$

$$\frac{1+13}{7} = \frac{14}{7} = 2$$

$f(x) = x^2 + 4$

$x_2 - x_1 = 0$



tangent line
instantaneous slope

$$\frac{f(x_2) - f(x_1)}{0}$$

undefined

$$\frac{f(x_2) - f(x_1)}{x_2 - x_1}$$

$x_1 = -1$
$x_2 = 3$ } 4

$x_1 = -1$

$x_2 = -1 + 4$

$$\frac{f(a+h) - f(a)}{\cancel{a} + h \cancel{-a}}$$

$x_1 = a$

$x_2 = a + h$

$$\lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$

Difference quotient

$f(x) = x^2 + 4$

Difference quotient

$$\frac{f(x+h) - f(x)}{h}$$

$$\frac{(x+h)^2 + 4 - (x^2+4)}{h}$$

$(x+h)(x+h)$

$x^2 + hx + hx + h^2$

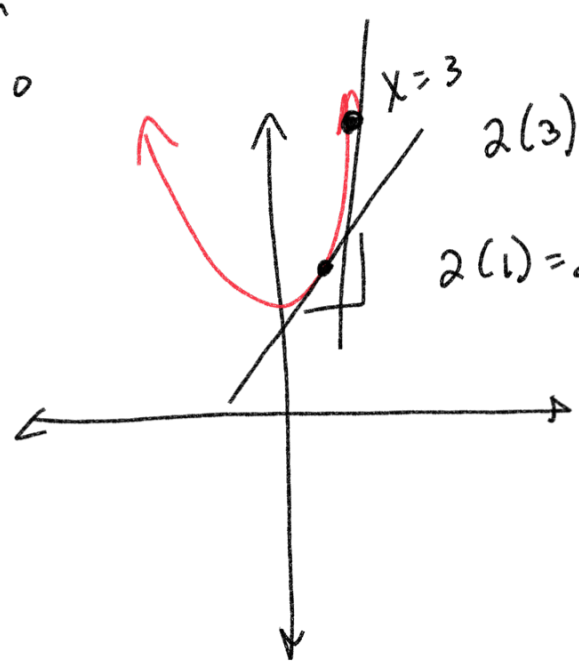
$x^2 + 2hx + h^2$

$$\frac{\cancel{x^2} + 2hx + h^2 \cancel{+4} \cancel{-x^2} \cancel{-4}}{h}$$

$$\frac{2\cancel{h}x + h^{\cancel{2}}}{\cancel{h}} = \boxed{2x + h}$$

$\lim_{h \to 0}$

instantaneous slope $= 2x$



$2(3) = 6$

$2(1) = 2$

$f(x) = x^{2} + \cancel{4}^{0}$

$2x$

$$f(x) = 3x^{4-1} - 2x^{3-1}$$

$$\boxed{12x^3 - 6x^2} + \boxed{}$$