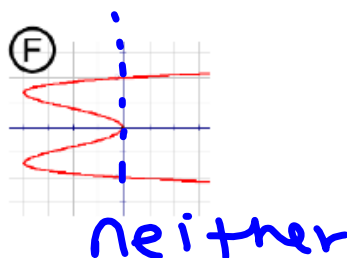
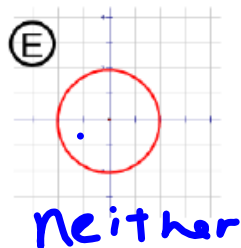
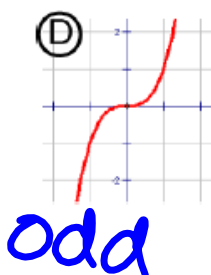
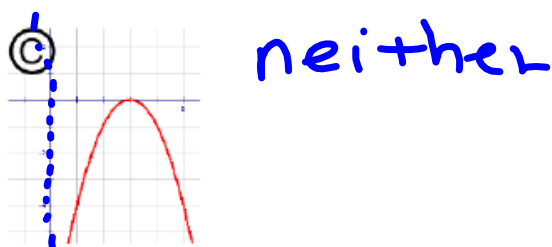
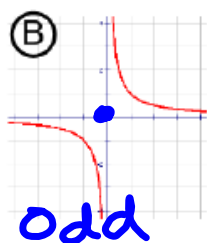


When looking at the graph, first make sure it is a function. Then...

- Symmetry about the y-axis \Rightarrow **EVEN FUNCTIONS**
- Symmetry about the origin \Rightarrow **ODD FUNCTIONS**



Even: All the exponents are even (including zero); constant
 Odd: All the exponents are odd

Determine from the equation if the polynomial is even, odd, or neither.

$$a(x) = x^3 - 5x$$

odd

$$b(x) = x^6 - 2x^3 + 3x - 1$$

neither

$$c(x) = x^6 - 2x^2 + 3$$

even

$$d(x) = x^3 - 3$$

neither

$$e(x) = 4x^9 - 2x^3 + 3x$$

odd

$$f(x) = x^6 - 3$$

even

Average Rate of Change

* Slope ; $y = mx + b$

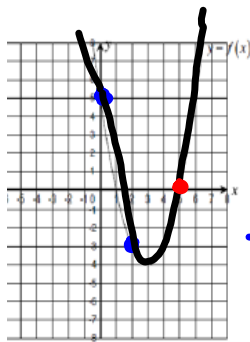
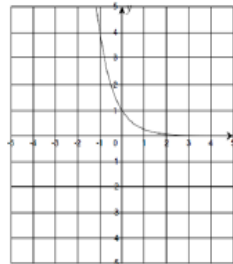
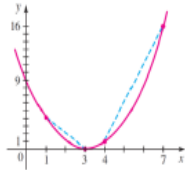
$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\text{rise}}{\text{run}}$$

Constant rate of change
Linear \rightarrow same slope

Variable rate of change
exponential + quadratic

MPLE: For the function $f(x) = (x - 3)^2$, whose graph is shown in the Figure below, find average rate of change between the following points:

- $x = 1$ and $x = 3$
- $x = 4$ and $x = 7$



Find the average rate of change.

a. from $x = 0$ to $x = 2$

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{-3 - 5}{2 - 0} = \frac{-8}{2} = -4$$

b. from $x = 2$ to $x = 5$

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{0 - 3}{5 - 2} = \frac{-3}{3} = -1$$

Suppose the temperature at 1:00 pm was 82°F and at 9:00 pm the temperature was 70°F . What was the average rate of change of the temperature over that time interval?

$$\frac{3(2) + 5 = 11}{3(3) + 5 = 14}$$

$$\frac{0 - 3}{5 - 2} = \frac{-3}{3} = -1$$

d the average rate of change from $x = 0$ to $x = 3$.

x	0	1	2	3	4
$f(x)$	3	6	12	24	48

$$\frac{24 - 3}{3 - 0} = \frac{21}{3} = 7$$

Find the average rate of change for each of the following.

a) $f(x) = 3x + 5$ from $x = 2$ to $x = 3$

b) $g(x) = x^2 + 4$ from $x = 2$ to $x = 3$

c) $h(x) = 3^x$ from $x = 2$ to $x = 3$

d) Write a conclusion regarding how you can use the average rate of change to compare the three functions on the given interval.

$$\frac{2^2 + 4}{3^2 + 4} = 13$$

Handwritten calculations for parts a, b, and c:

- a) $\frac{14 - 11}{3 - 2} = 3$
- b) $\frac{13 - 8}{3 - 2} = 5$
- c) $\frac{13 - 9}{3 - 2} = 4$