1.   **Odd Even Functions**.

   A function is said to be even if $f(-x) = f(x)$

   A function is said to be odd if $f(-x) = -f(x)$

Determine if the given function is odd, even or neither.

a. $f(x) = \dfrac{1}{x^2 + 1}$ b. $g(x) = x^5 - 3x^3$

c. $h(x) = \dfrac{x}{x^3 - 1}$ d. $f(x) = \dfrac{x}{x^2 + 1}$

2.   **Symmetry**

   The graph of an even function is symmetric about the y-axis.
   The graph of an odd function is symmetric about the origin.

Determine whether the given function is symmetric about the y axis, the origin or neither.

a. $f(x) = \dfrac{1}{x^2 + 1}$

b. $f(x) = \dfrac{x}{x^2 + 1}$

c. $h(x) = \dfrac{x}{x^3 - 1}$

3.   **Zeros**

  The solutions to the equation $f(x) = 0$ are called the zeros of f.

  Find all zeros of the given function.

a. $f(x) = x^2 - 7x - 10$

b. $g(x) = \dfrac{x^2 - 4x}{x^2 + 1}$

c. $h(x) = 1 + \sqrt{x - 2}$

4.   **Intervals of Increase and Intervals of Decrease**.
  A functions is said to be increasing on an interval I if for all x in I, whenever $b > a$, we get $f(b) > f(a)$.
  A functions is said to be decreasing on an interval I if for all x in I, whenever $b > a$, we get $f(a) > f(b)$.

  Find all intervals of increase and intervals of decrease of the given functions

a. $f(x) = x^2 - 4x + 1$

b. $g(x) = x^3 - x^2$ [G. Utility]

5.   **Relative Extreme Values**
*A function is said to have a minimum value at x = a if the value of f(a) is
less than or equal to every value of f in a neighborhood of x = a.*

Find all relative minimum values and all relative maximum values of the give functions

a. $f(x) = 2(x-3)^2 + 4$

b. $g(x) = x^3 - x^2$ [G. Utility]