IM2 – F.IF.4: Key Characteristics of Graphs (Notes 03) – Zeros, Roots, & Intercepts

- **Zeros, Roots, and x-intercepts**
    - Zero of the function = Root of the equation = x-intercept of the graph

    ➢ <u>Intercepts</u> (x, y) – Points where a graph crosses an axis

        - <u>x-intercept</u>
            - The location where a graph crosses the x-axis
            - Location where y is 0 on the graph
            - When y = 0 in an equation
            - Coordinate: $(x, 0)$
        - <u>y-intercept</u>
            - The location where the graph crosses the y-axis
            - Location where x is 0 on a graph
            - When x = 0 in an equation
            - Coordinate: $(0, y)$

    ➢ <u>Zeros</u>
        - Numeric x-value, when f(x) = #
        - From a function
        - Ex. the **zero** of the function f(x) = x + 1 is $x = -1$.

    ➢ <u>Roots</u>
        - Numeric x-value, when f(x) = 0
        - From an equation
        - Ex. the **root** of the equation x + 1 = 0 is -1.

- **Axes**
    - <u>x-axis</u>
        - Horizontal axis
        - The line on the coordinate plane where y = 0
    - <u>y-axis</u>
   - Vertical axis
        - The line on the coordinate plane where x = 0

- **Quadratic Functions**
    - The graph of a quadratic function is a parabola (U-shaped graph): U^2
    - Parent Function: $y = x^2$
    - A parabola has an Axis of Symmetry
        - A vertical line that divides the parabola into two congruent halves
        - Always passes through the vertex of the parabola
        - The x-coordinate of the vertex is the x in the equation for the axis of symmetry
        - Equation: $x = \#$.

Practice

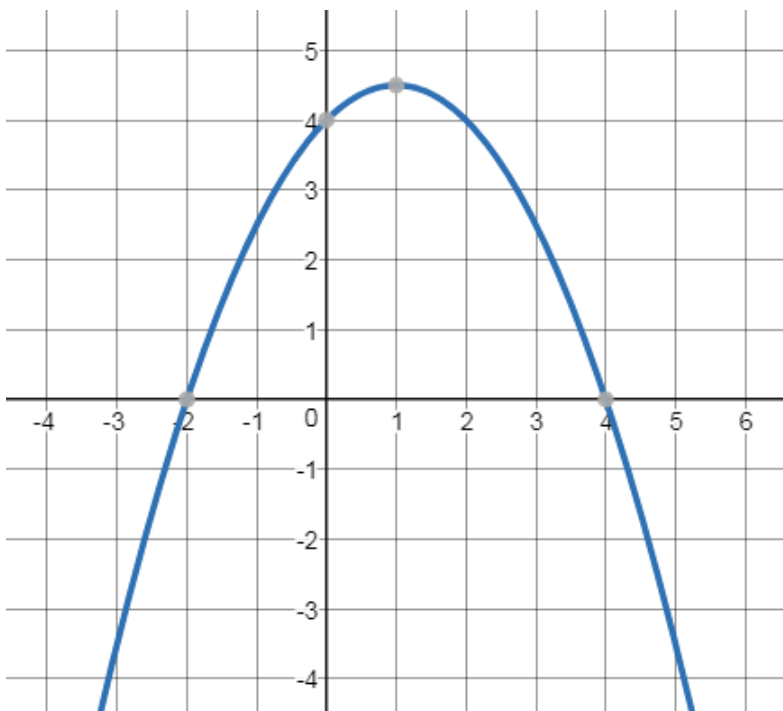1. Identify the key characteristics of the graph below.
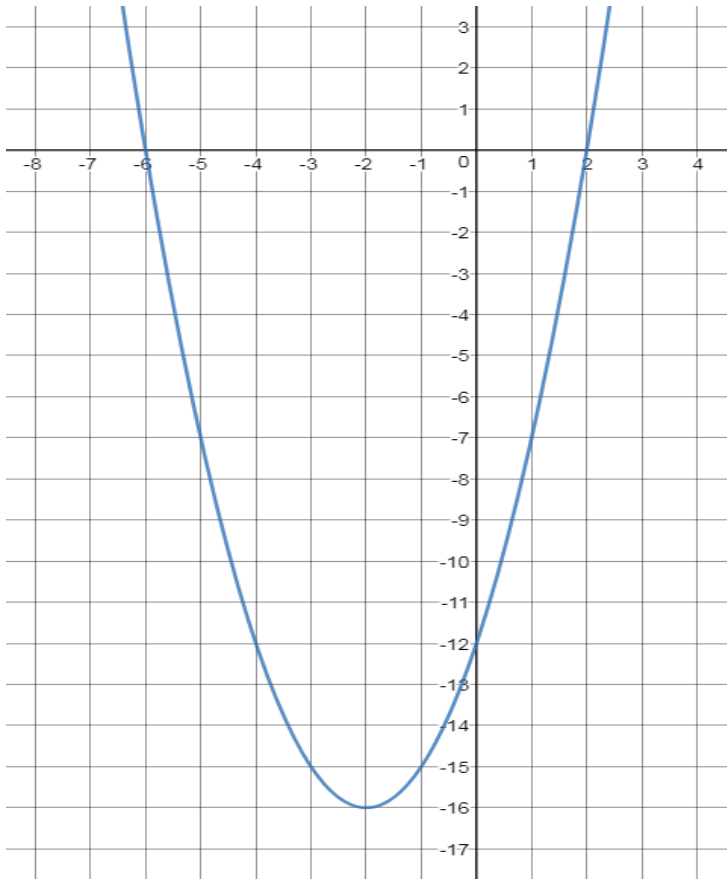
Fill in the Blanks using Inequality Notation

    a) Domain: _____

        o   Interval of Increase:

        _____

        o   Interval of Decrease:

        _____

    b) Range: _____

Determine the following Key Characteristics

    c) Circle: Minimum, Maximum, or N/A

        o   Coordinate: _____ or N/A

    d) x-intercept(s): _____

    e) Zero(s): _____

    f) Root(s): _____

    g) y-intercept: _____

    h) Axis of Symmetry: x = _____

2. Identify the key characteristics of the graph below.

Fill in the Blanks using Inequality Notation

    g) Domain: _____

        o   Interval of Increase:

        _____

        o   Interval of Decrease:

        _____

    h) Range: _____

Determine the following Key Characteristics

    i) Circle: Minimum, Maximum, or N/A

        o   Coordinate: _____ or N/A

    j) x-intercept(s): _____

    k) Zero(s): _____

    l) Root(s): _____

    i) y-intercept: _____

    j) Axis of Symmetry: x = _____