Function Analysis

**Formula Sheet**

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| **Name** | **Definition** | **Formula** |
| Average Rate of Change | The average measure of how much a function changed per unit over a given interval. | Average Rate of Change Formula:  Given the interval *[a, b]* |
| Linear Function | An equation of a form in which the variables appear only in the first degree, are multiplied by constants, and are combined only by addition and subtraction. | Function:  Equation (slope-intercept form):  slope or rate of change  *y-*intercept  independent variable  dependent variable |
| Quadratic Equation | A quadratic equation is a two-degree polynomial that creates a parabola when graphed. | Standard Form:  Where a, b, and c are real numbers and  Vertex Form:   * Vertex: *(h, k)* * Axis of Symmetry: *x = h* |
| Vertex Formula | When a quadratic equation is in standard form, you cannot directly identify the vertex, so a formula is used instead. | Vertex Formula:  Where b and a are values taken from the quadratic equation in standard form: |
| Key Features of a Parabola | When you plot points using a quadratic equation, the graph is a parabola. It is shaped like an upward or downward U.  There are four key parts of a parabola: the axis of symmetry, the vertex, the *x*-intercepts (zeros), and the *y*-intercept. |  |
| Exponential Function | Exponential functions are used to model growth and decay such as bacteria, population, interest, and depreciation. | Exponential Function:  Exponential Equation:  initial value  multiplier/ growth or decay factor  The multiplier is calculated from the rate, *r*.  Growth Factor:  Decay Factor: |
| Exponent Rules | Exponent rules are laws that are used for simplifying expressions with exponents. |  |
| Key Features of Exponential Graphs | The graph of an exponential function may model growth or decay and shows a quick increase or decrease. | * The y-intercept is at the point , where is the initial value. * The line is the horizontal asymptote. |
| Square Root Function | A function that contains a square root with the independent variable under the square root. | Basic Square Root Function: |
| Cube Root Function | A function that contains a cubed root with the independent variable under the cubed root. | Basic Cube Root Function:    Cube Root Function:   * Turning Point: *(h, k)* |