Polynomial Functions & Graphs

**Formula Sheet**

|  |  |  |
| --- | --- | --- |
| **Name** | **Definition** | **Formula** |
| Zero Product Property | The Zero Product Property holds that if the product of two or more factors is zero, then at least one factor must be zero. | If , then , , or both and equal to zero. |
| Polynomial Identities | A polynomial equation that is always true for any value of the variables. | Common Polynomial Identities: |
| The Factor Theorem | The Factor Theorem links factors and zeros of polynomials. | If is a zero of a polynomial, then is a factor of that polynomial. |
| Odd Multiplicity and Graph Behavior | If a factor is raised to an oddexponent, the graph will cross the *x*-axis. |  |
| Even Multiplicity and Graph Behavior | If a factor is raised to an even exponent, the graph will touch the *x*-axis and turn back to the direction it came from. |  |
| Quadratic Formula | The quadratic formula is a general formula for finding the roots of a quadratic equation. | where *a*, *b*, and *c* are the coefficients and constant of the terms in a quadratic equation |
| Relative Extrema | The degree of a polynomial relates to the number of relative extrema that the graph of a polynomial will have. |  |
| The Division Algorithm | The remainder is represented by adding it to the product of the quotient and divisor. | where   * = polynomial * = divisor * = quotient * = remainder |
| The Remainder Theorem | The Remainder Theorem states that the remainder of dividing a polynomial by a factor is the value of the polynomial at that factor. | The value of a function, , at a given value, , then divide the polynomial by by the linear function . |
| Single Motion Projectile | The formula that models the motion of an object where is height and is time. | where   * is the gravitational constant ( or ) * = initial velocity * = initial height |