Even Function: Symmetric to the y-axis; f(x) = f(-x); cos(x)

Odd Function: Symmetric to the origin; -f(x) = f(-x); sin(x)

End Behaviour: The behaviour of a function’s ends as they move to ±∞

Even Degree Polynomial End Behaviour: Same end behaviour

Odd Degree Polynomial End Behaviour: Opposite end behaviour

Point of Inflection: Point where the behaviour of a function changes

Multiplicity: When two or more x-intercepts are at a point. Function does not cross axis if multiplicity is even.

Piecewise Function: A function which has multiple sections each with their own equation.

Trigonometric Equation: An equation with the following form a\*sin(bx+c)+d; may involve any function not only sign; a controls the amplitude of the function; b controls period length; c controls horizontal shift; and d controls vertical shift.

Powers of i: In the situation ix if x%4 =1 then ix = i, if x%4=2 then ix = -1, if x%4=3 then ix = -i, and if x%4=0 then ix = 1.

Compound Interest Formula: A = P(1+r/n)nt; A = Amount; P = Principle(initial); R = Rate; N = Number of Times Compounded per Year and T = Time (in years).

Continuously Compounded Interest: A = P(e)rt; A = Amount; P = Principle; R = Rate; T = Time (in years).

Logarithm Formulas:

|  |  |  |  |
| --- | --- | --- | --- |
| Logab + Logac = Loga(bc) | Log­ab + Logac = Loga(b/c) | c\*Logab = loga(bc) | loga0 = 1 |

Factor Theorem: Given x - a and a is a factor of p(x), then the remainder when preforming division is 0.

Fundamental Theorem of Algebra: Any polynomial of degree n has n roots.

Number of Zeroes Theorem: A function defined by degree n has at most n distinct roots.

Rational Zeroes Theorem: For a function define p and q. P is the leading coefficient of the function and q is the coefficient whose variable has a power of 0. The factors of p and q, defined sets a and b corresponding to p and q respectively define all the possible rational roots with the fraction p/q.

Vertical Asymptotes: A vertical asymptote is created when an equation’s line is undefined in both the original and simplified form at a given value.

Point of Discontinuity: A value that gets cancelled out in the simplified form of a polynomial.

Horizontal Asymptote: Horizontal Asymptotes may be determined by the degree of the numerator and denominator with the x-axis being the asymptote if n° < d°; the equation of the horizontal asymptote is the first term of the numerator, a of n, divided by the first term of the denominator, a of d; If n° > d° there is no asymptote.

Oblique Asymptote: A diagonal asymptote that occurs when the degree of the numerator is greater than that of the denominator by 1. Its slope is found by dividing the numerator by the denominator without accounting for remainders.

Trigonometric Functions: sin(x) = OPP/HYP; cos(x) = ADJ/HYP; tan(x) = OPP/ADJ; csc(x) = HYP/OPP;

sec(x) = HYP/ADJ; cot(x) = ADJ/OPP;

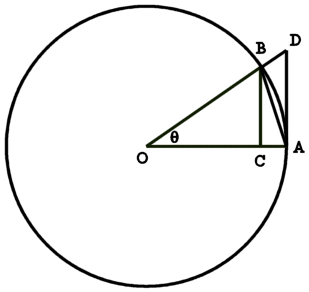
Pythagorean Identity: By identifying the equation of the unit circle we find that x2 + y2 = 1, after substituting in cosine and sine we find that sin2 + cos2 = 1 which is the Pythagorean Root Identity.

Trigonometric Identifies List

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sin2 + Cos2 = 1 | Csc2 = Cot2 + 1 | Sec2 = Tan2 + 1 | Sin(-x) = -Sin(x) | Cos(-x) = Cos(x) |
| Tan(-x) = -Tan(x) | Csc(-x) = -Csc(x) | Sec(-x) = Sec(x) | Cot(-x) = -Cot(x) |  |

Epsilon-Delta Notation: A notation for limits where one specifies for the x-range of the limit (notated by δ), that the y-values will be within a range (notated by ε).

Squeeze Theorem: Given an inequality x ≥ y ≥ z, if x = z, then y = x = z.

Proof of lim(x->0) sin(x)/x = 1:

Given the diagram shown to the right, we can determine that the triangle ABO has an area of sin(x)/2 (its height is sin(x)), we can also determine the Sector AB has an area of x/2 (π\*x/2π) and the triangle ADO has an area of tan(x)/2 (its height is tan(x)). After finding the areas of these triangles we can order then in an inequality, |sin(x)/2| < |x/2| < |tan(x)/2|. We can simplify this inequality by multiplying it by |2/sin(x)| to get 1 < x/sin(x) < 1/cos(x). We can then invert the inequality and get 1 > sin(x)/x > cos(x), since cos(x) moves towards 1 the closer x is to 0 we can then use the squeeze theorem to say that the lim(x->0) sin(x)/x = 1.

Rationalization (Removing discontinuities): For discontinuities resulting form Points of Discontinuity we may remove discontinuities by simplifying the polynomial and then substituting the x-value of the Point of the Point of Discontinuity into the simplified polynomial to find the lim(x->x1) f(x)->f(x1), in other words to rationalize the function. For discontinuities resulting from the asymptotes by finding an expression that is equivalent for the lim(x->x1) by taking the factored form of the expression, taking the term that causes the asymptote and multiplying the polynomial by any form of 1 that will cause that term to disappear from the new polynomial where you thence find the discontinuity’s value.