MATH 106 - INTEGRAL CALCULUS
Dr. Tariq A. AlFadhel

Basic Algebraic Identities

1. $(x+y)^2 = x^2 + 2xy + y^2$

2. $(x-y)^2 = x^2 - 2xy + y^2$

3. $x^2 - y^2 = (x-y)\ (x+y)$

4. The general solution of the quadratic equation $ax^2 + bx + c = 0$ is
   $$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \ , \text{ where } a \neq 0.$$

5. $(x+y)^3 = x^3 + 3x^2y + 3xy^2 + y^3$

6. $(x-y)^3 = x^3 - 3x^2y + 3xy^2 - y^3$

7. $x^3 - y^3 = (x-y)\ (x^2 + xy + y^2)$

MATH 106 - INTEGRAL CALCULUS
Dr. Tariq A. AlFadhel

Trigonometric Identities

θ	0	$\dfrac{\pi}{6}$	$\dfrac{\pi}{4}$	$\dfrac{\pi}{3}$	$\dfrac{\pi}{2}$	π	$\dfrac{3\pi}{2}$
$\sin\theta$	0	$\dfrac{1}{2}$	$\dfrac{1}{\sqrt{2}}$	$\dfrac{\sqrt{3}}{2}$	1	0	-1
$\cos\theta$	1	$\dfrac{\sqrt{3}}{2}$	$\dfrac{1}{\sqrt{2}}$	$\dfrac{1}{2}$	0	-1	0

$$\tan\theta = \frac{\sin\theta}{\cos\theta} \ , \ \cot\theta = \frac{\cos\theta}{\sin\theta} \ , \ \sec\theta = \frac{1}{\cos\theta} \ , \ \csc\theta = \frac{1}{\sin\theta}$$

$\sin^2 x + \cos^2 x = 1$
$\tan^2 x + 1 = \sec^2 x$
$1 + \cot^2 x = \csc^2 x$

$\sin(x+y) = \sin x \cos y + \sin y \cos x$
$\sin(x-y) = \sin x \cos y - \sin y \cos x$

$\cos(x+y) = \cos x \cos y - \sin x \sin y$
$\cos(x-y) = \cos x \cos y + \sin x \sin y$

$\sin(2x) = 2\sin x \cos x$
$\cos(2x) = \cos^2 x - \sin^2 x = 2\cos^2 x - 1 = 1 - 2\sin^2 x$