

Algebraic formulas & facts       $\sqrt{x^2} = |x|$ ,  $(-x)^{1/3} = -(x^{1/3})$

1.  $(a+b)^2 = a^2 + 2ab + b^2$        $(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$
2.  $(a-b)^2 = a^2 - 2ab + b^2$        $(a-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$
3.  $a^2 - b^2 = (a-b)(a+b)$        $a^3 - b^3 = (a-b)(a^2 + ab + b^2)$
4. If  $p(a) = 0$ , then  $(x-a)$  is a factor of the polynomial  $p(x)$ .
5.  $\frac{a/b}{c/d} = \frac{a}{b} \cdot \frac{d}{c}$ ,       $\frac{a}{b} + \frac{c}{d} = \frac{ad+bc}{bd}$ ,       $\frac{a}{b} - \frac{c}{d} = \frac{ad-bc}{bd}$
6.  $(x-a)^2 + (y-b)^2 = r^2$       circle of radius  $r$  & center  $(a,b)$
7.  $y-b = k(x-a)^2$       vertical parabola with vertex  $(a,b)$
8.  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$       ellipse with semi-vertical axis  $b$  and  
with semi-horizontal axis  $a$ .
9.  $\frac{x^2}{a^2} - \frac{y^2}{b^2} = \pm 1$       horizontal & vertical hyperbolas.
10.  $y = mx + b$        $m =$  slope and  $b =$   $y$ -intercept.
11.  $y - y_1 = m(x - x_1)$       slope & one-point formula
12.  $\frac{y - y_1}{y_2 - y_1} = \frac{x - x_1}{x_2 - x_1}$       two-point formula of straight line

Trigonometric formulas & facts :       $\pi$  radians =  $180^\circ$

1. Arc length =  $r \cdot \theta$  where  $r =$  radius,  $\theta =$  angle in radians
2. Area of sector =  $\frac{1}{2} r^2 \theta$  where  $r =$  radius,  $\theta =$  angle
3.  $\tan \theta = \frac{\sin \theta}{\cos \theta}$ ,       $\cot \theta = \frac{\cos \theta}{\sin \theta}$ ,       $\sec \theta = \frac{1}{\cos \theta}$ ,       $\csc \theta = \frac{1}{\sin \theta}$
4.  $\sin^2 \theta + \cos^2 \theta = 1$ ,       $\tan^2 \theta + 1 = \sec^2 \theta$ ,       $\cot^2 \theta + 1 = \csc^2 \theta$
5.  $\sin(\pi/6) = 1/2$ ,       $\cos(\pi/6) = \sqrt{3}/2$ ,       $\tan(\pi/6) = 1/\sqrt{3}$
6.  $\sin(\pi/4) = 1/\sqrt{2}$ ,       $\cos(\pi/4) = 1/\sqrt{2}$ ,       $\tan(\pi/4) = 1$
7.  $\sin(\pi/3) = \sqrt{3}/2$ ,       $\cos(\pi/3) = 1/2$ ,       $\tan(\pi/3) = \sqrt{3}$
8.  $\sin(-x) = -\sin x$ ,       $\cos(-x) = \cos x$ ,       $\tan(-x) = -\tan x$
9.  $\sin(A+B) = \sin A \cos B + \cos A \sin B$
10.  $\cos(A+B) = \cos A \cos B - \sin A \sin B$ .

