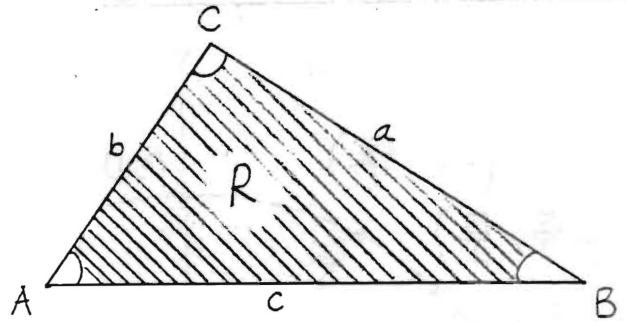




# Area and sides of a triangle

Law of Cosines:  $a^2 = b^2 + c^2 - 2bc \cos A$   
 $b^2 = a^2 + c^2 - 2ac \cos B$   
 $c^2 = a^2 + b^2 - 2ab \cos C$

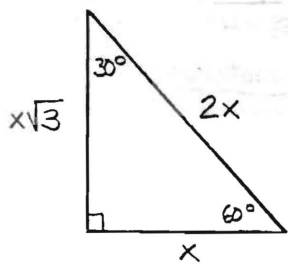
Law of Sines:  $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$



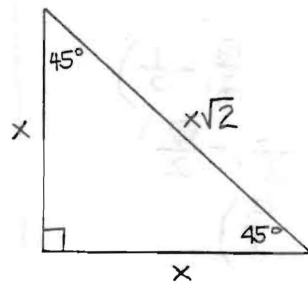
Area:  $R = \frac{1}{2} ab \sin C$   
 $= \frac{1}{2} bc \sin A$   
 $= \frac{1}{2} ac \sin B$

Given 3 sides of a triangle; wish to find the area:  
 Heron's Theorem:  $R = \sqrt{s(s-a)(s-b)(s-c)}$   
 where  $s = \frac{1}{2}$  the perimeter of the triangle ( $s = \frac{a+b+c}{2}$ )

## Right Triangles: (Geometry Review)



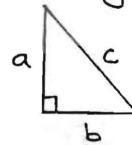
30-60 Right Triangle



Isosceles Right Triangle

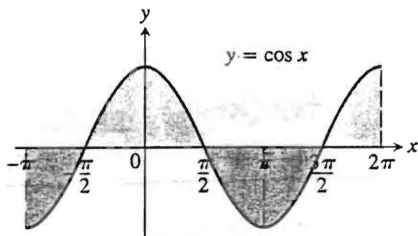
Area of an equilateral triangle:  $\frac{x^2}{4}(\sqrt{3})$   
 where  $x =$  side of a triangle.

Pythagorean Theorem:



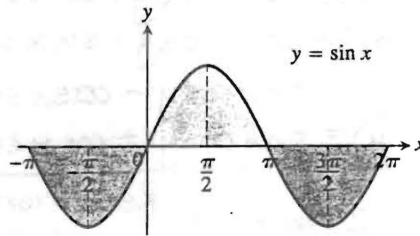
$a^2 + b^2 = c^2$

## Principal functions and their graphs



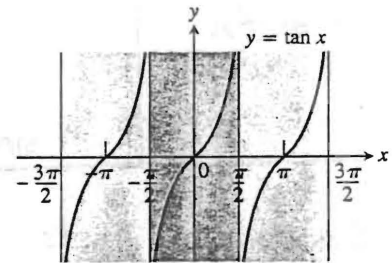
Domain:  $-\infty < x < \infty$   
 Range:  $-1 \leq y \leq 1$   
 Period:  $2\pi$

(a)



Domain:  $-\infty < x < \infty$   
 Range:  $-1 \leq y \leq 1$   
 Period:  $2\pi$

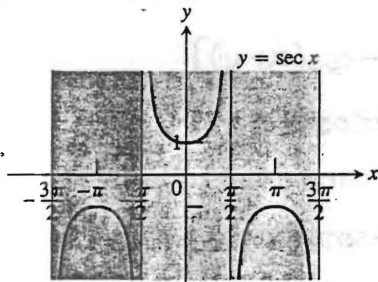
(b)



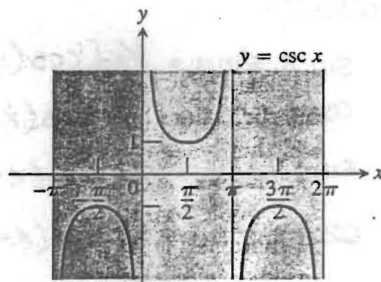
Domain:  $x \neq \pm \frac{\pi}{2}, \pm \frac{3\pi}{2}, \dots$

Range:  $-\infty < y < \infty$   
 Period:  $\pi$

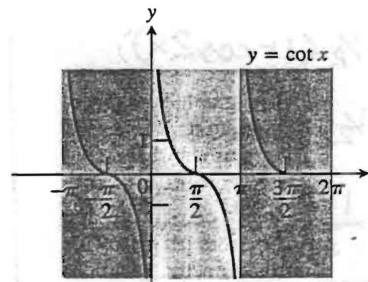
(c)



Domain:  $x \neq \pm \frac{\pi}{2}, \pm \frac{3\pi}{2}, \dots$   
 Range:  $y \leq -1$  and  $y \geq 1$   
 Period:  $2\pi$



Domain:  $x \neq 0, \pm \pi, \pm 2\pi, \dots$   
 Range:  $y \leq -1$  and  $y \geq 1$   
 Period:  $2\pi$



Domain:  $x \neq 0, \pm \pi, \pm 2\pi, \dots$   
 Range:  $-\infty < y < \infty$   
 Period:  $\pi$