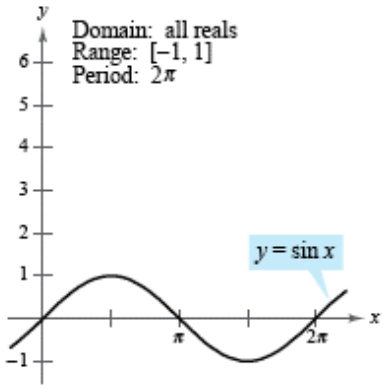
THE GRAPHS OF THE TRIG FUNCTIONS

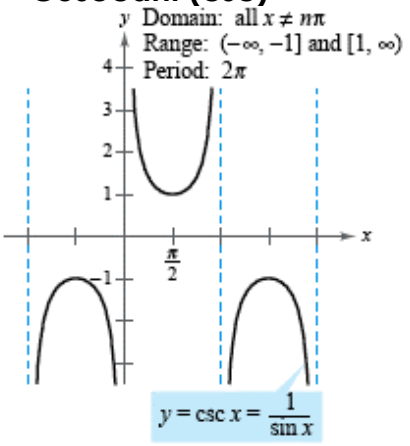
Advanced Algebra & Trigonometry

I. The Basic Graphs

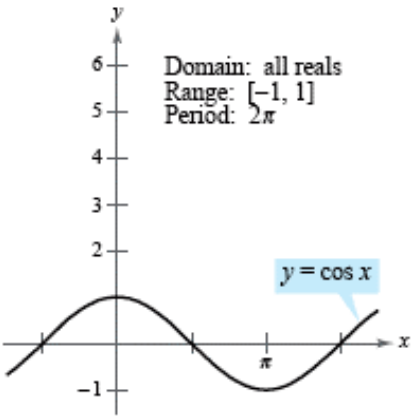
A. Sine (sin)



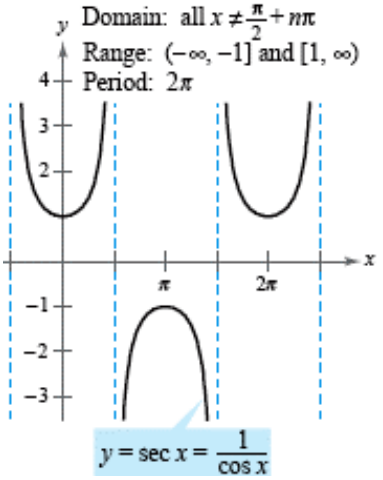
B. Cosecant (csc)



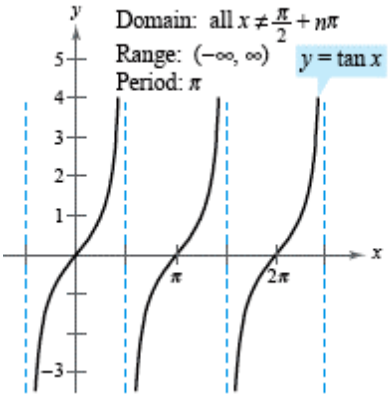
C. Cosine (cos)



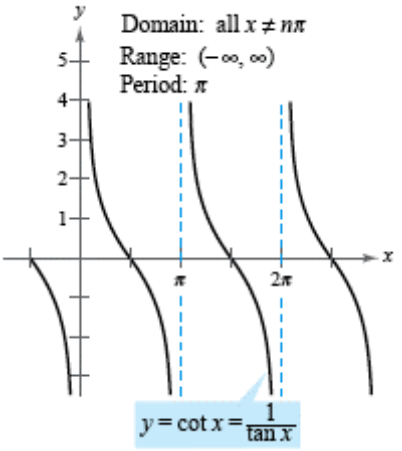
D. Secant (sec)



E. Tangent (tan)



F. Cotangent (cot)



II. Shifts of the Trig Graphs: $y = a[\text{trig func}](bx - h) + k$

A. ***Amplitude:*** Distance of the Max & Min points to the horizontal axis found by $|a|$

1. If $|a| > 1 \rightarrow$ the graph is steeper

2. If $|a| < 1 \rightarrow$ the graph is flatter

B. ***Period:*** The total distance before the graph repeats

1. Sin (Csc), Cos (Sec) $\rightarrow$ $2\pi/b$

2. Tan & Cot $\rightarrow$ π/b

C. ***Vertical Shift:*** The movement of the entire graph up or down the *y*-axis

1. If $k > 0 \rightarrow$ the entire graph moves up the *y*-axis "k" units

2. If $k < 0 \rightarrow$ the entire graph moves down the *y*-axis "k" units

D. ***Horizontal (Phase) Shift:*** The movement of the entire graph to the left or right along the x-axis

1. If $h > 0 \rightarrow$ the entire graph shifts to the left $^h/_b$ units

2. If $c < 0 \rightarrow$ the entire graph shifts to the right $^h/_b$ units

3. *Determining the amount to move, Left or Right:*

Example: $y = a \cos(bx + h)$

a. Factor out the "b" $y = a \cos b(x + {}^h/_b)$

b. Shift graph to the left (if $^h/_b$ is pos) or right (if $^h/_b$ is neg) $^h/_b$ units

E. ***Left & Right "Endpoints"***

1. Left and Right "endpoints" can be found for Sin (Csc) and Cos (Sec) by solving the equations:

Left: $bx - h = 0$ *Right:* $bx - h = 2\pi$

2. Left and Right "endpoints" can be found for Tan (Cot) by solving the equations:

Left: $bx - h = -\pi/2$ *Right:* $bx - h = \pi/2$