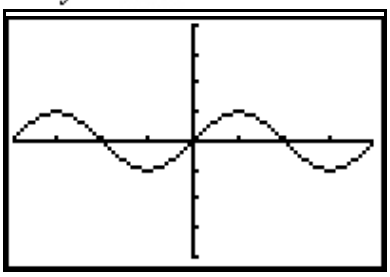
Summary of Graphing Trig Functions

1. $y = \sin x$



$$y = a \sin b(x - c) + d$$

Amplitude = a

Period = $\frac{360}{b}$ or $\frac{2\pi}{b}$

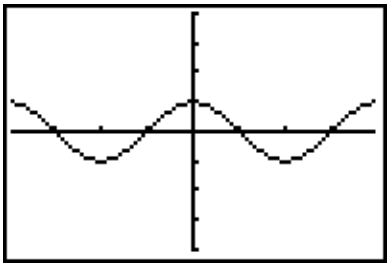
Horizontal Shift = c

Vertical Shift = d

Steps to sketch

1. x-coordinate Graph begins at Horizontal Shift and ends at H.S. + period. Use midpoint rule to locate intermediate points.
2. y-coordinate. Baseline shifts by Vertical Shift. Compute maximum and minimum y-values by adding and subtracting amplitude from baseline.
3. Locate high, low, and baseline points. Sine wave starts at baseline, goes to max, then back to baseline, down to min, and back to baseline. Connect all points with a smooth, rounded curve.

2. $y = \cos x$



$$y = a \cos b(x - c) + d$$

Amplitude = a

Period = $\frac{360}{b}$ or $\frac{2\pi}{b}$

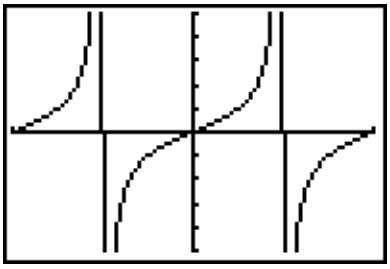
Horizontal Shift = c

Vertical Shift = d

Steps to sketch

1. x-coordinate Graph begins at Horizontal Shift and ends at H.S. + period. Use midpoint rule to locate intermediate points.
2. y-coordinate. Baseline shifts by Vertical Shift. Compute maximum and minimum y-values by adding and subtracting amplitude from baseline.
3. Locate high, low, and baseline points. Cosine wave starts at max, goes to baseline, down to min, back to baseline, and back to max. Connect all points with a smooth, rounded curve.

3. $y = \tan x$



$y = a\tan b(x - c) + d$

Amplitude = does not apply

Period = $\frac{180}{b}$ or $\frac{\pi}{b}$

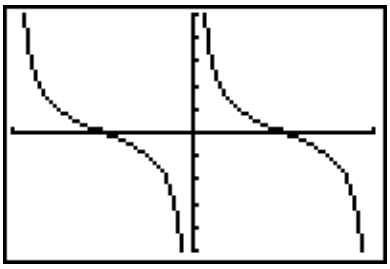
Horizontal Shift = c

Vertical Shift = d

Steps to sketch

1. x-coordinate. x-intercept at Horizontal Shift. Vertical asymptotes occur one-half period either side of x-intercept.
2. y-coordinate. Baseline shifts by Vertical Shift.
3. Graph starts in lower left region, swings through the x-intercept, and continues up to the upper right region.

4. $y = \cot x$



$y = a\cot b(x - c) + d$

Amplitude = does not apply

Period = $\frac{180}{b}$ or $\frac{\pi}{b}$

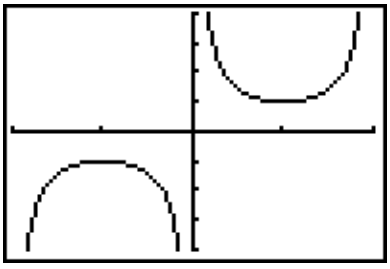
Horizontal Shift = c

Vertical Shift = d

Steps to sketch

1. x-coordinate. Left asymptote occurs at Horizontal Shift. Right asymptote occurs a full period to the right. x-intercept occurs midway between the asymptotes
2. y-coordinate. Baseline shifts by Vertical Shift.
3. Graph starts in upper left region, swings through the x-intercept, and continues up to the lower right region.

5. $y = \csc x$



$y = a\csc b(x - c) + d$

Amplitude = doesn't apply

Period = $\frac{360}{b}$ or $\frac{2\pi}{b}$

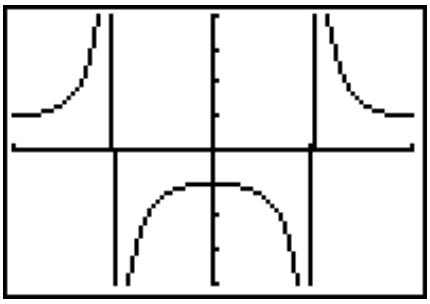
Horizontal Shift = c

Vertical Shift = d

Steps to sketch

1. x-coordinate Graph begins at Horizontal Shift and ends at H.S. + period. Use midpoint rule to locate intermediate points. Draw a dashed sine wave. Whenever, the sine crosses the x-axis, draw a vertical asymptote
2. y-coordinate. Baseline shifts by Vertical Shift. Locate max and min points of sine wave. Minimum point of cosecant is at the maximum of sine wave. The minimum is at Vertical Shift + *a*. Maximum point of cosecant is at the minimum of sine wave. The minimum is at Vertical Shift - *a*.
3. Draw U-shaped graphs from the max/min points out to the vertical asymptotes.

6. $y = \sec x$



$y = a\sec b(x - c) + d$

Amplitude = doesn't apply

Period = $\frac{360}{b}$ or $\frac{2\pi}{b}$

Horizontal Shift = c

Vertical Shift = d

Steps to sketch

1. x-coordinate Graph begins at Horizontal Shift and ends at H.S. + period. Use midpoint rule to locate intermediate points. Draw a dashed cosine wave. Whenever, the cosine crosses the x-axis, draw a vertical asymptote
2. y-coordinate. Baseline shifts by Vertical Shift. Locate max and min points of sine wave. Minimum point of secant is at the maximum of cosine wave. The minimum is at Vertical Shift + *a*. Maximum point of cosecant is at the minimum of cosine wave. The minimum is at Vertical Shift - *a*.
3. Draw U-shaped graphs from the max/min points out to the vertical asymptotes.