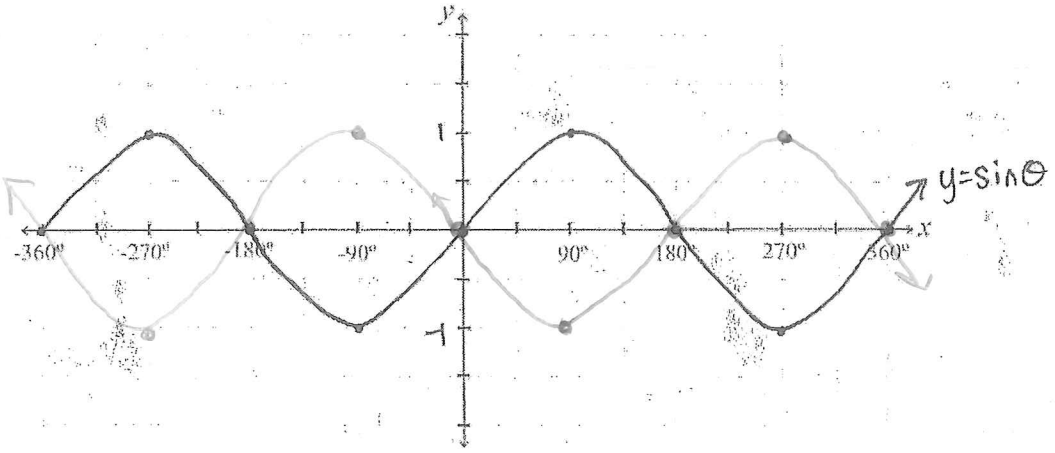
Trigonometric Transformations Name_____

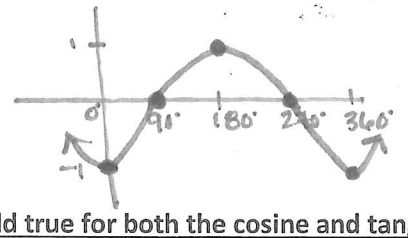
1. a). Sketch the graph of $y = -\sin\theta$ using a different color.



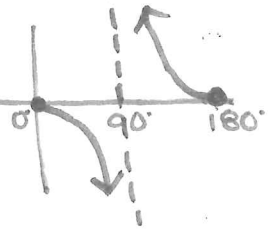
b). Describe the transformation that occurred from having a negative coefficient.

- graph reflects/flips over midline
  - max pts ⇒ min pts
  - min pts ⇒ max pts

$y = -\cos\theta$



$y = -\tan\theta$



<u>These transformations hold true for both the cosine and tangent functions as well. To summarize</u>

$$y = A\ \sin B(\theta - C) + D$$

|A| : Amplitude (max/min) ⇒
- tan has no amplitude (width)
- if negative, changes pattern of graph & flips it over midline

B: period change ⇒ $\frac{360°}{B}$ or $\frac{2\pi}{B}$ | $\frac{180°}{B}$ or $\frac{\pi}{B}$

C: phase shift ⇒ left $(\theta + C)$ or right $(\theta - C)$
(think opposite & ALWAYS LAST ★)

D: vertical shift ⇒ midline up (+) / down (−)

<u>Steps to graphing without a calculator:</u>

1. Graph the new midline, max line and minimum if applicable.
2. Determine the period.
3. Apply any phase shifts & graph following the patterns of the parent function.
   - Sine = midline, max, midline, minimum, midline
   - Cosine = max, midline, minimum, midline, max
   - Tangent = midline, asymptote, midline

Alg 2 & Alg 2YD Name_____

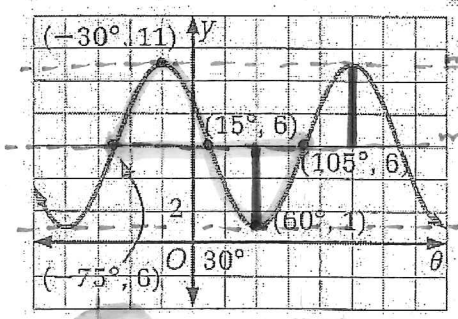
Notes - Equation Writing for Trig Functions

To write an equation from a graph:

1. Find Amplitude ⇒ distance from max/min to midline
2. Identify the period from graph and then solve to find b
3. Find the vertical translation (sketch midline)
4. Write a sine or cosine function depending on the phase shift.

Example 1: Write a sinusodal equation for the graph.

sine



① max = 11 > midline = 6
min = 1
Amp = 5 (A)

② Period = $\frac{360°}{B}$

$\frac{180°}{1} = \frac{360°}{B}$ B = 2

③ VS up 6 D = 6

★ ④ PS left 75° C = −75°

−75° → 105° ⇒ 180°

$y = A \sin B(\theta - C) + D$

$y = 5 \sin 2(\theta + 75°) + 6$

Example 2: Write a cosine equation for the graph.