Transformations of Trig Functions p.43

*If you have a coefficient in front of x or θ that is INSIDE the parenthesis factor it OUT 1st!

Example: f(x) = -3 sin (2x - 5) + 1

$f(x) = -3 \sin 2(x - 5/2) + 1$

$f(x) = a\ \text{trig}\ b(x - c) + d$

$y = -3\sin 2\left(x - \frac{5}{2}\right) + 1$

a: graph is reflected over x-axis + amp = 3 so that is the height above + below midline

b: per $= \frac{2\pi}{b}$, per $= \frac{2\pi}{2}$, per $= \pi$ (horizontal shrink)

c = 5/2 shift right 5/2

d = 1 shift up 1

- a is the amplitude (height from midline)
- If a is negative then the graph reflects across the x-axis.
- If a is > 1, then the graph has a vertical stretch.
- If a is a number between 0 & 1, then the graph has a vertical shrink.
- ONLY sin and cos have amplitude.
- The sign is always positive!

- b affects the period length.
- The period formula is 2π/b for sin, cos, csc, & sec or π/b for tan & cot
- If b > 1, then the graph has a horizontal shrink
- If b is a number between 0 & 1 the graph has a horizontal stretch

- Be careful with the sign of c! It is always the opposite sign of what you see in the equation.
- c is called the Phase Shift.
- It is your first point on the left of your graph
- If c is positive in the equation, then the graph moves left
- If c is negative in the equation, then the graph moves right

- d is called the vertical shift
- It is the new midline of your graph
- If d is positive in the equation, the graph moves up
- If d is negative in the equation, the graph moves down

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