Determining Equations of Trigonometric Functions
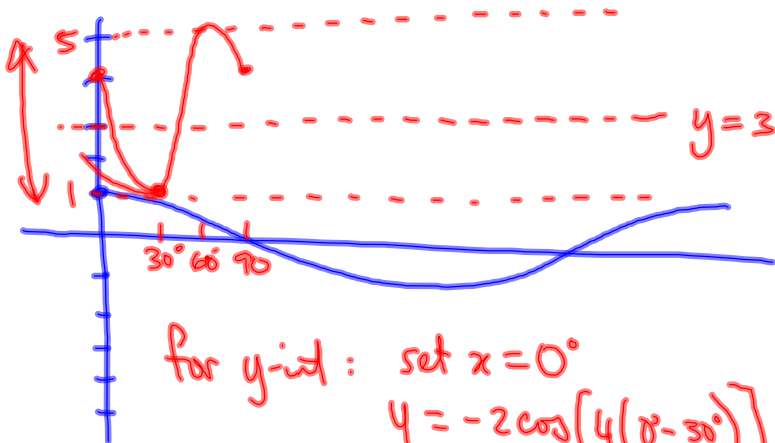
1. Unless specified, choose sine or cosine as
   parent function.

2. Identify key properties of period and axis of the curve and
   use them to determine k and q.
   These properties have a single value.

3. Identify key properties of amplitude and phase shift and
   use them to determine a and p.
   These properties may vary depending on the parent
   function you have selected.

   * Note: It is always possible, through choices of
   a and p, to always have a positive amplitude.

4. Write the equation, remembering that multiple answers
   may correctly represent the same graph.
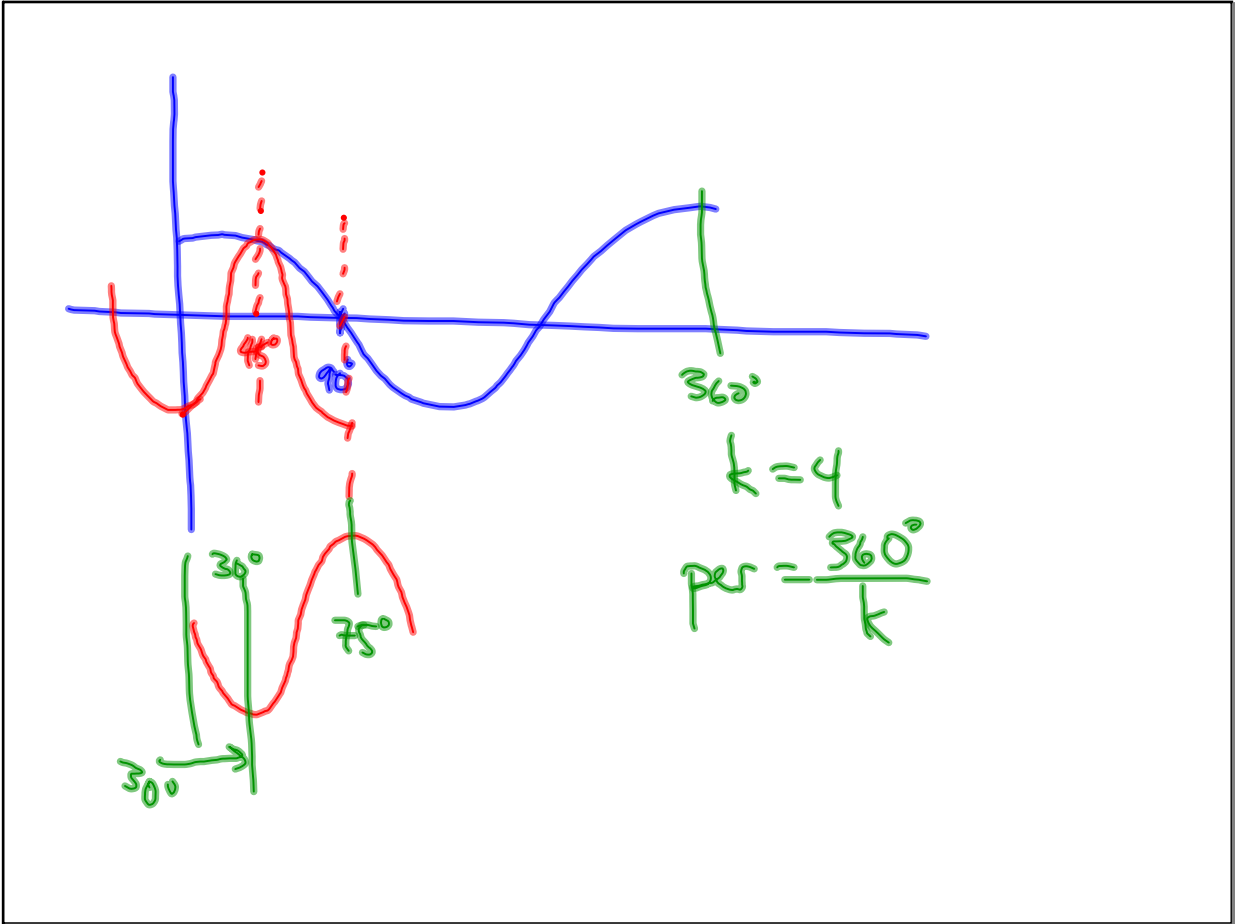
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WS: $y = -2\cos\left[4(x-30°)\right] + 3$

$y = 3$

for y-int: set $x = 0°$
$y = -2\cos\left[4(0-30°)\right] + 3$
$y = 4$

$\text{period} = \dfrac{360°}{k}$

$\text{period} = 90°$

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k = 4

$$per = \frac{360°}{k}$$

45°   90°   360°   30°   75°   30°

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$y = 4\sin(-2x) - 2$

2   180°   -2   45   90   135 $y = -2$ -6

for x-int: set y = 0

$0 = 4\sin(-2x) - 2$

$2 = 4\sin(-2x)$

$\frac{1}{2} = \sin(-2x)$

$\frac{1}{2} = \sin\theta$

$\theta = 30°$ or $150°$

let $\theta = -2x$

RAA = 30°

S A
T C

2   30 $\sqrt{3}$ 60   1

but $\theta = -2x$

$-2x = 30°$ or $-2x = 150°$

$x = -15°$ or $x = -75°$

Want x-int between 0° and 180° (one cycle)

to find coterminal angles, add/subtract period

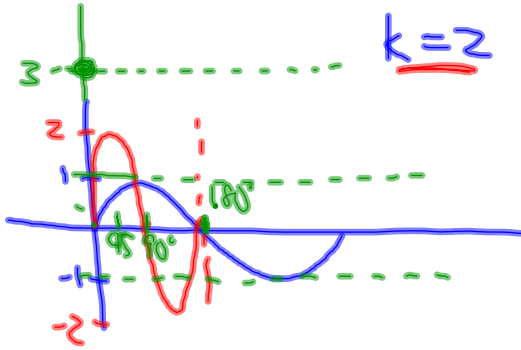$x = -15°$ $x = -75°$

$+ 180°$ $+ 180°$

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$$f(x) = a \sin[k(x-p)] + q$$

(a) $|a| = 2$ period $= 180°$
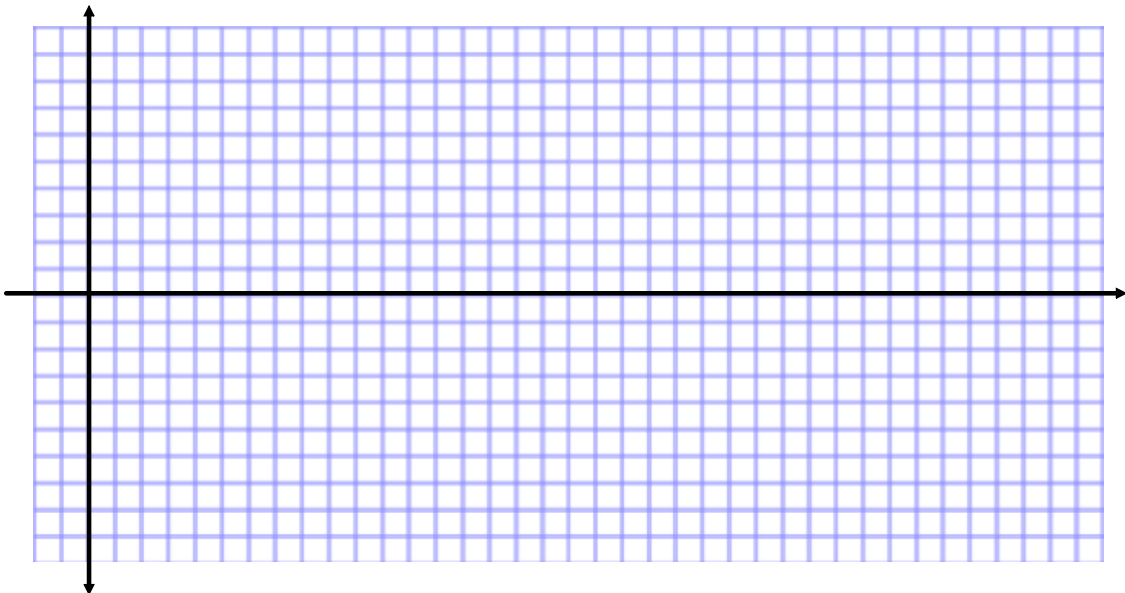
$$\frac{360°}{k} = 180°$$
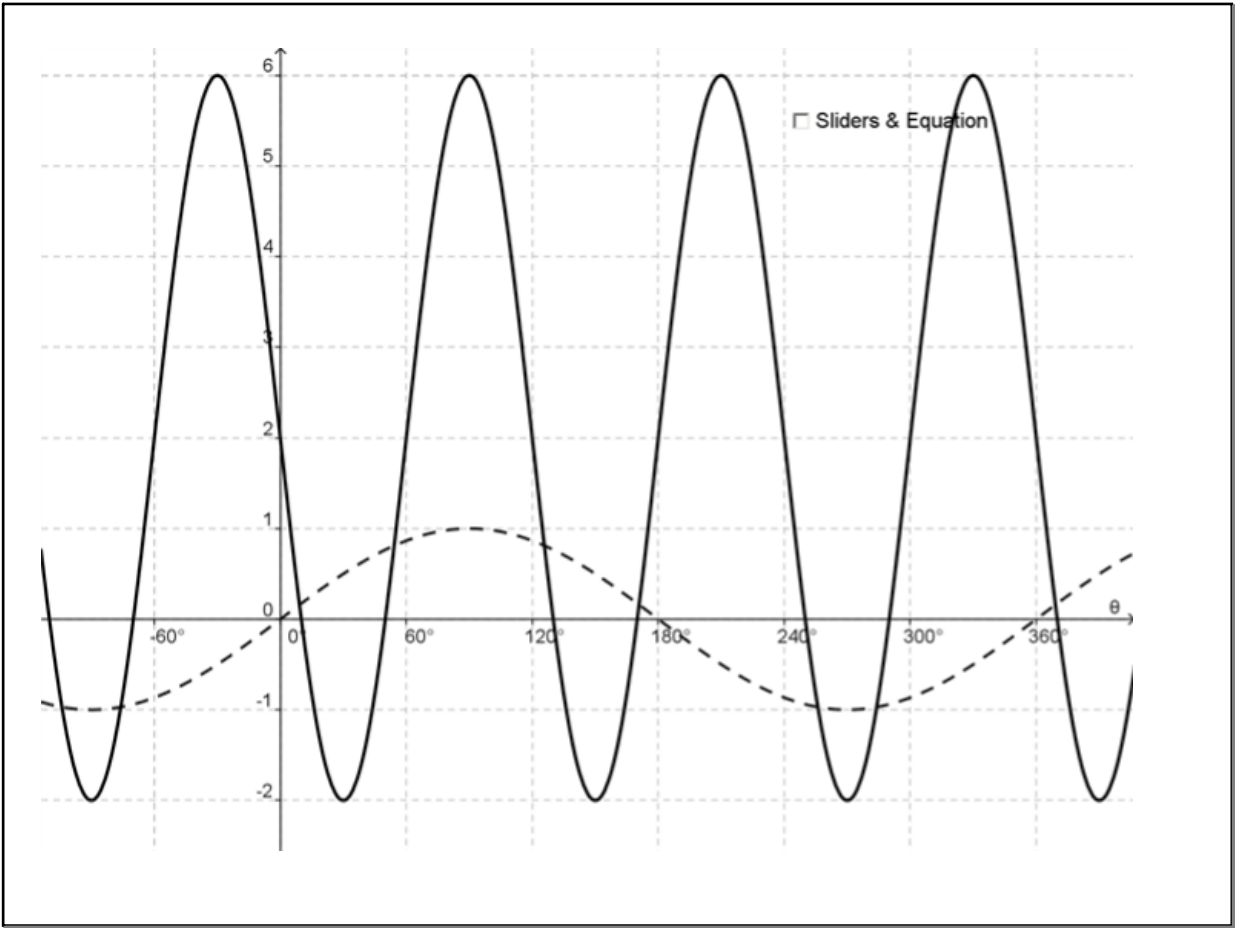
$$k = 2$$

max at $(0,3)$

axis of curve: $y = 1$
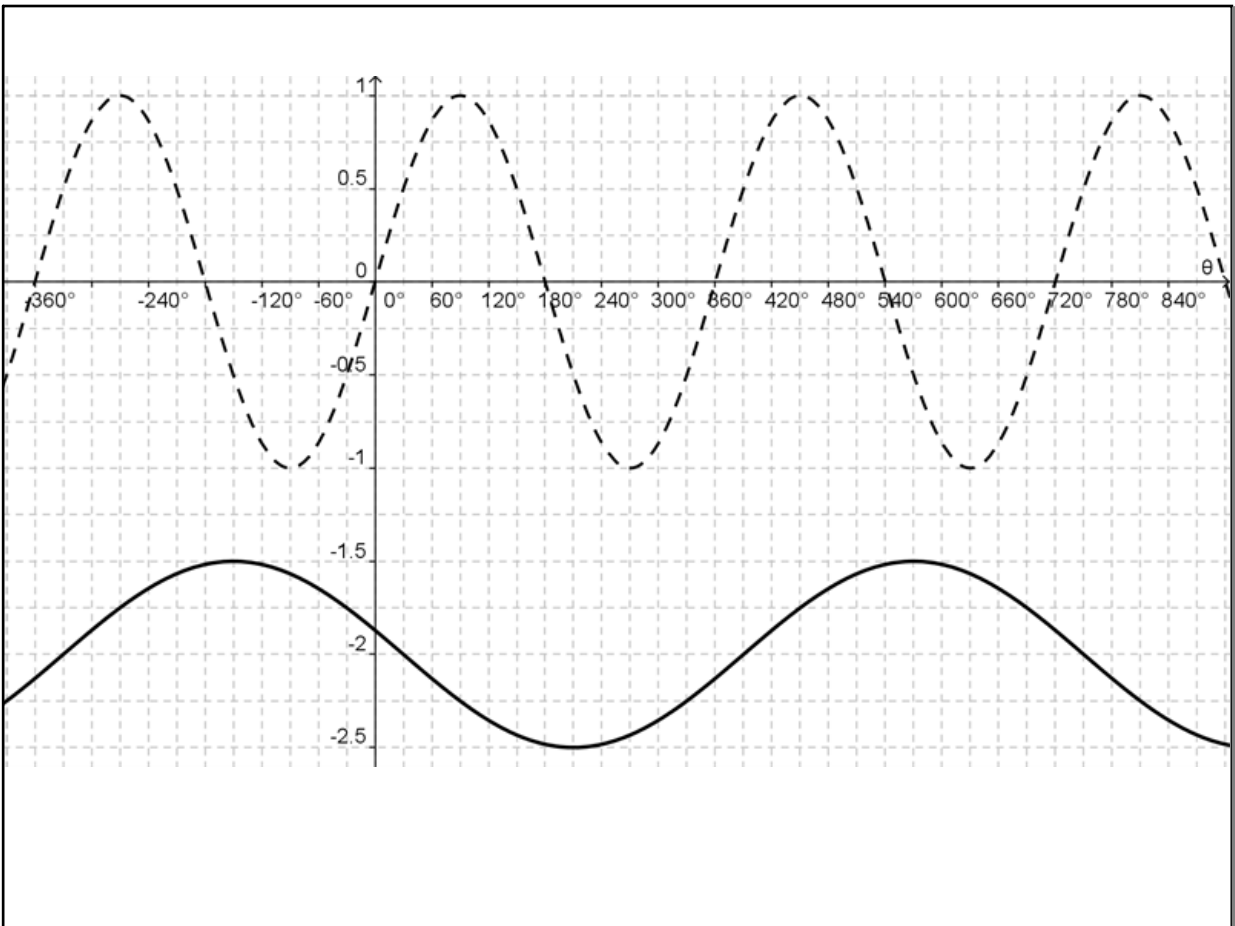
$$q = 1$$

$$y = 2\sin[2(x+45°)] + 1$$

$$p = -45°$$

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