Determining Equations of Trigonometric Functions

Dec 9/2019

1. Unless specified, choose sine or cosine as parent function.

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

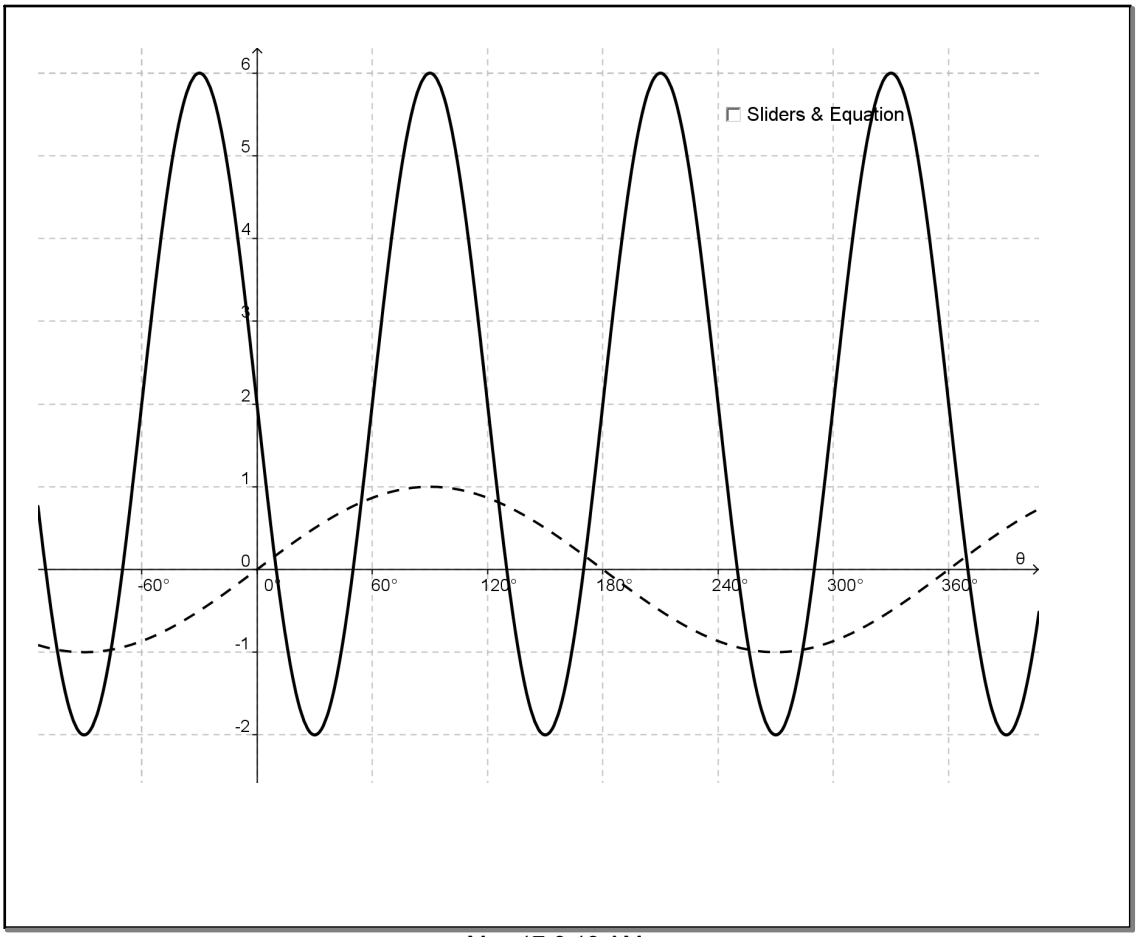
2. Identify key properties of period and axis of the curve and use them to determine *k* and *q*.
   *For simplicity, always choose k to be positive.

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 *p (phase shift)*, to have a positive a-value and k-value.

4. Write the equation, remembering that multiple answers may correctly represent the same graph.

May 17-9:17 AM



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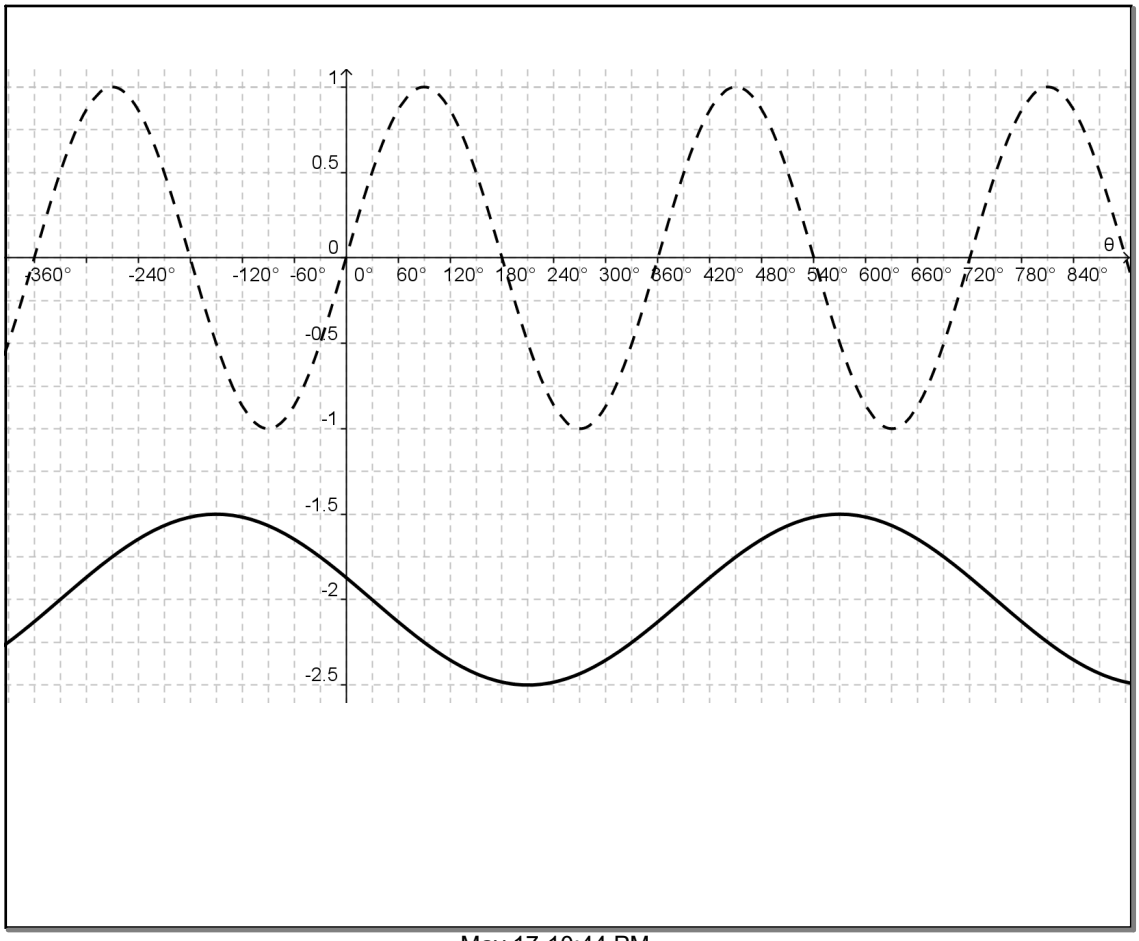


May 17-10:44 PM

Assigned Work:

finish worksheet
p.391 # (1-7)(ac if applicable), 8, 11, 14

$\frac{5ac}{7}$ $8cd$

5(a) $y = \cos(3x) + 2$

or

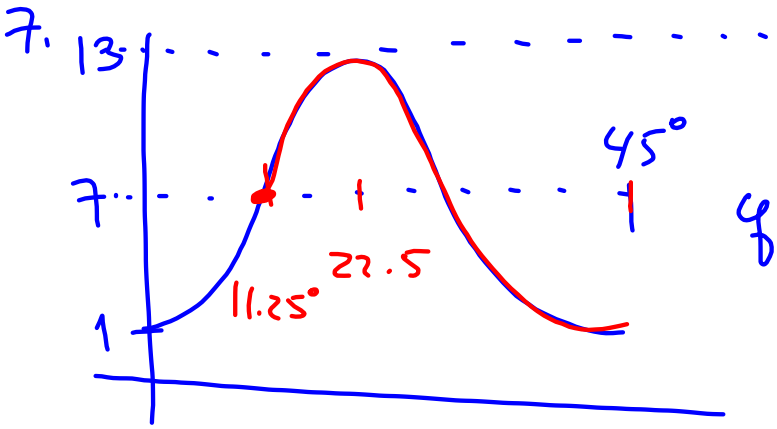
$y = \sin(3(x - 30°)) + 2$

period $= \frac{360°}{k}$

$k = \frac{360°}{\text{period}}$

Dec 10-9:40 AM

7.



$q = 7$

$k = \frac{360°}{45°}$

$= 8$

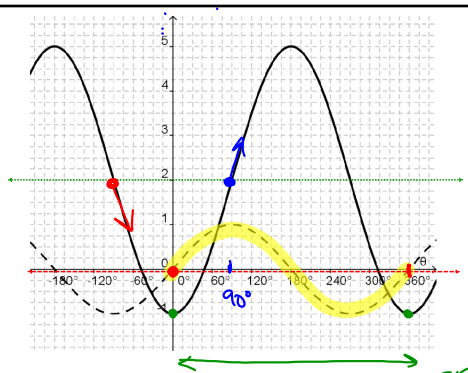
$y = -6\cos[8x] + 7$

OR

$y = 6\sin[8(x - 11.5°)] + 7$

Dec 10-12:48 PM

WS.A



② A of C: $y = 2$

$\Rightarrow q = 2$

① period $= \frac{360°}{k}$

$360° = \frac{360°}{k}$

$k = \frac{360°}{360°}$

$k = 1$

③ $|a| = 3$

④ p and sign of a

$p = +90°$ (90° to right)

$a = +3$

OR

$p = -90°$

$a = -3$

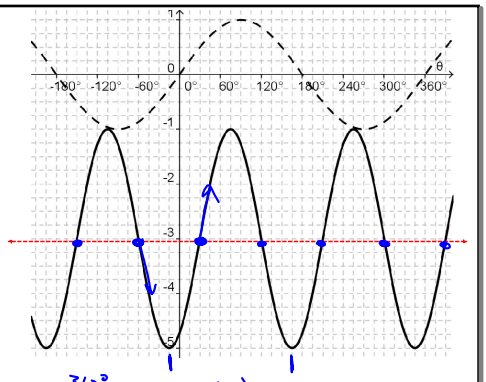
$y = 3\sin(x - 90°) + 2$

OR

$y = -3\sin(x + 90°) + 2$

Dec 11-12:07 PM

WS.B



① period $= \frac{360°}{k}$ $\quad 12(15°) = 180°$

$k = \frac{360°}{\text{period}}$

$k = 2$

② A of C : $y = -3$, $q = -3$

③ $|a| = 2$

④ $p = +30°$, $a = +2$

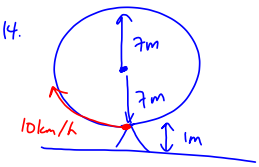
$y = 2\sin[2(x-30°)] - 3$

or

$y = -2\sin[2(x+60°)] - 3$

Dec 11-12:08 PM

14.



period? time for 1 revolution?

distance $= C$

$= 2\pi r$ $\quad r = 7m$

$= 14\pi$ units m

$d = vt$

$t = \frac{d}{v}$ $\quad v = 10\,km/h = \frac{10000\,m}{60\,min}$

$t = \frac{14\pi}{\frac{1000}{6}}$

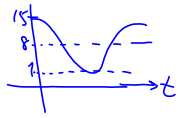
$= \frac{(14\pi)(6)}{1000}$

$\doteq 0.264$ → period in minutes

$k \doteq \frac{360°}{0.264}$

$\doteq 1364°$

$y = 7\cos(1364°t) + 8$



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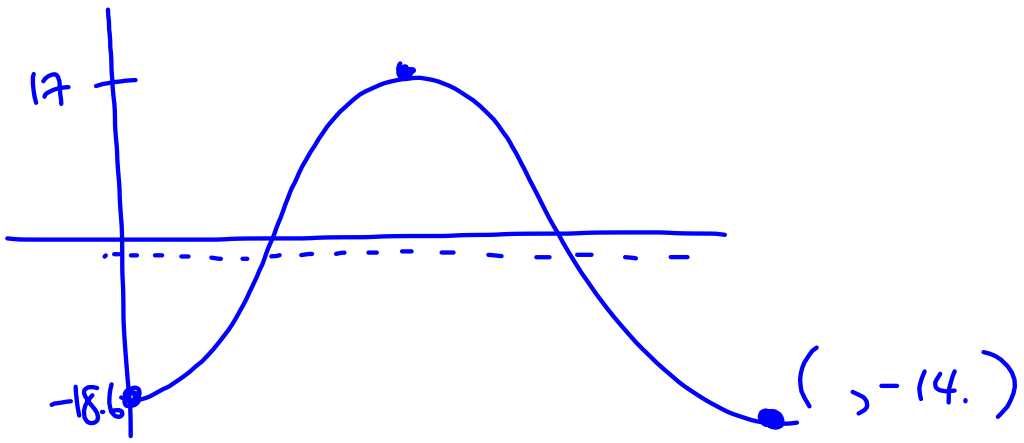
8 c d



$y = -17.5\cos[30^\circ t] - 0.5$

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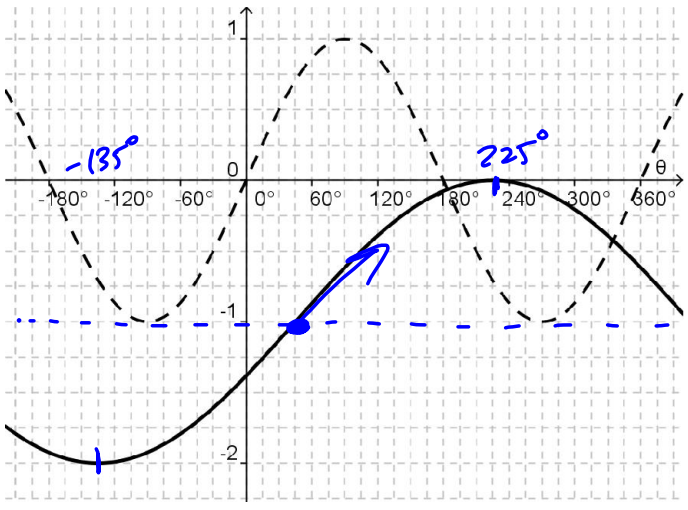
WS.C



$q = -1 \quad |a| = 1$

$p = 45^\circ \quad a = 1$

period $= 720^\circ$

$k = \frac{360^\circ}{720^\circ}$

$= \frac{1}{2}$

$y = \sin\left[\frac{1}{2}(x - 45^\circ)\right] - 1$

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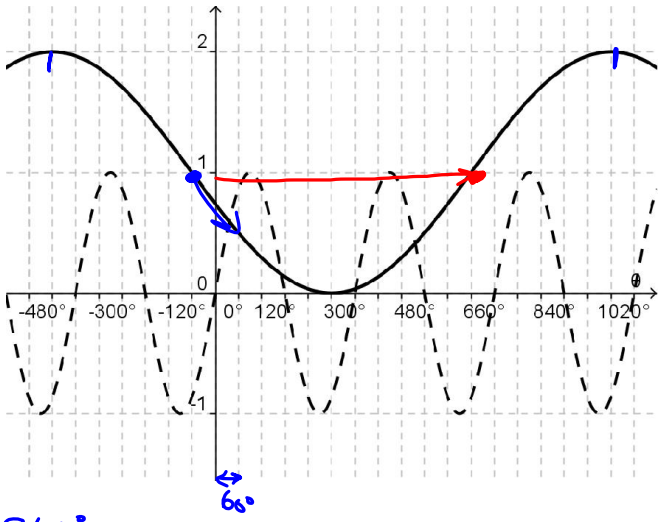
WS.D



$q = 1$

$|a| = 1$

$k = \frac{360°}{1440°} = \frac{1}{4}$

$p = -60°$, $a = -1$

$y = -\sin\left[\frac{1}{4}(x+60°)\right] + 1$

OR

$y = \sin\left[\frac{1}{4}(x-660°)\right] + 1$

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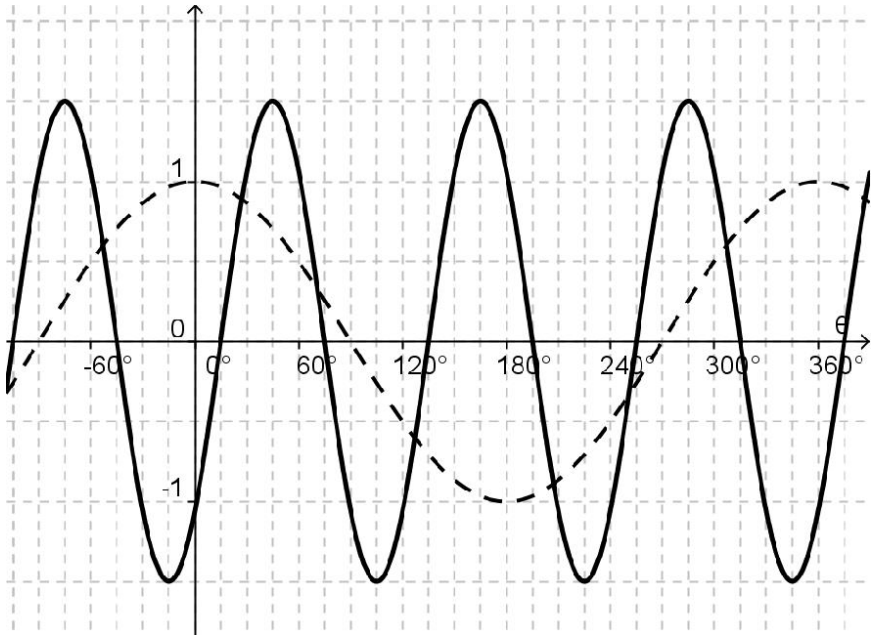
WS.E



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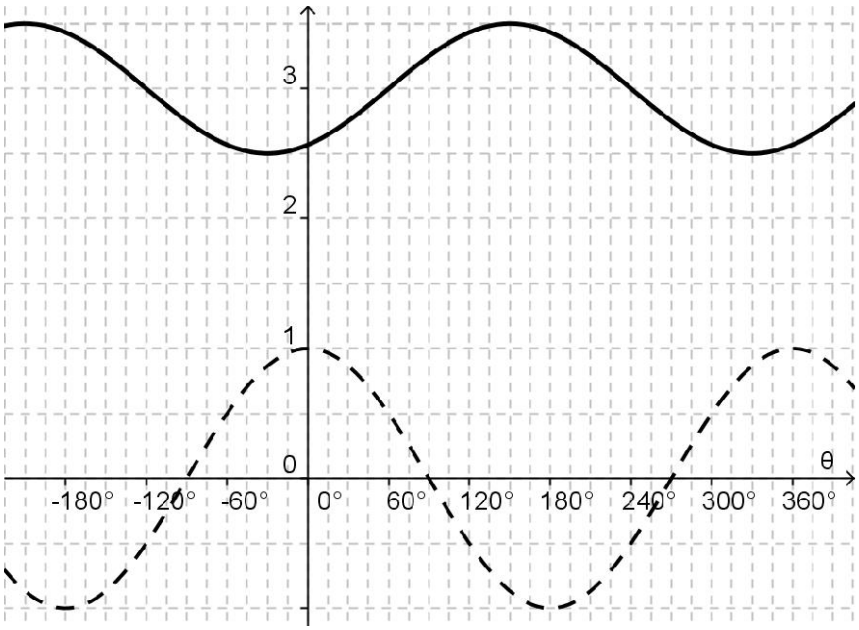
WS.F



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