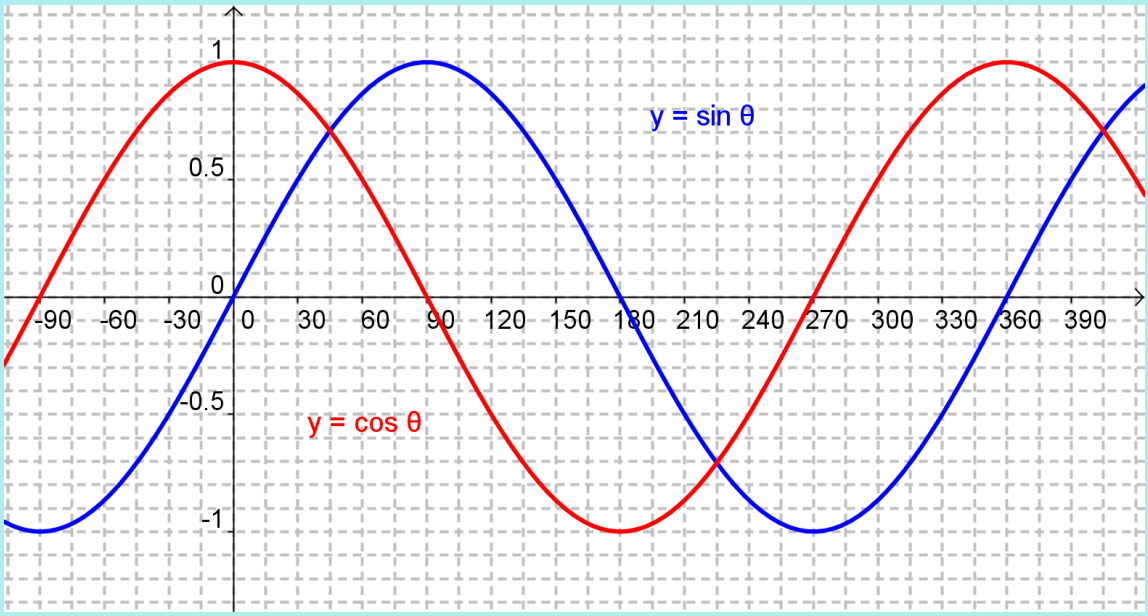
Stretches of Periodic Functions

Recall:



May 21-8:27 PM

Graphing Transformations of Trig Functions

May 22/2012

Recall: $y = af[k(x-p)]+q$

For sinusoidal functions, this becomes

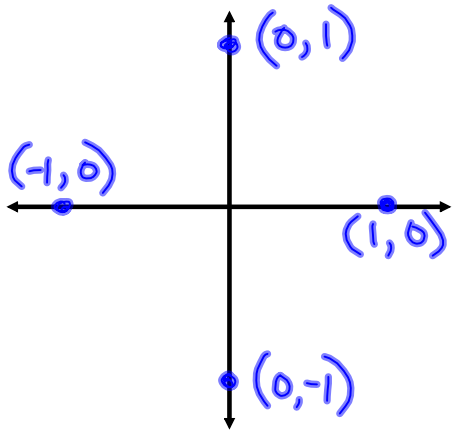
$$y = a\sin\left[k\left(x-p\right)\right]+q$$

or

$$y = a\cos\left[k\left(x-p\right)\right]+q$$

May 17-9:17 AM

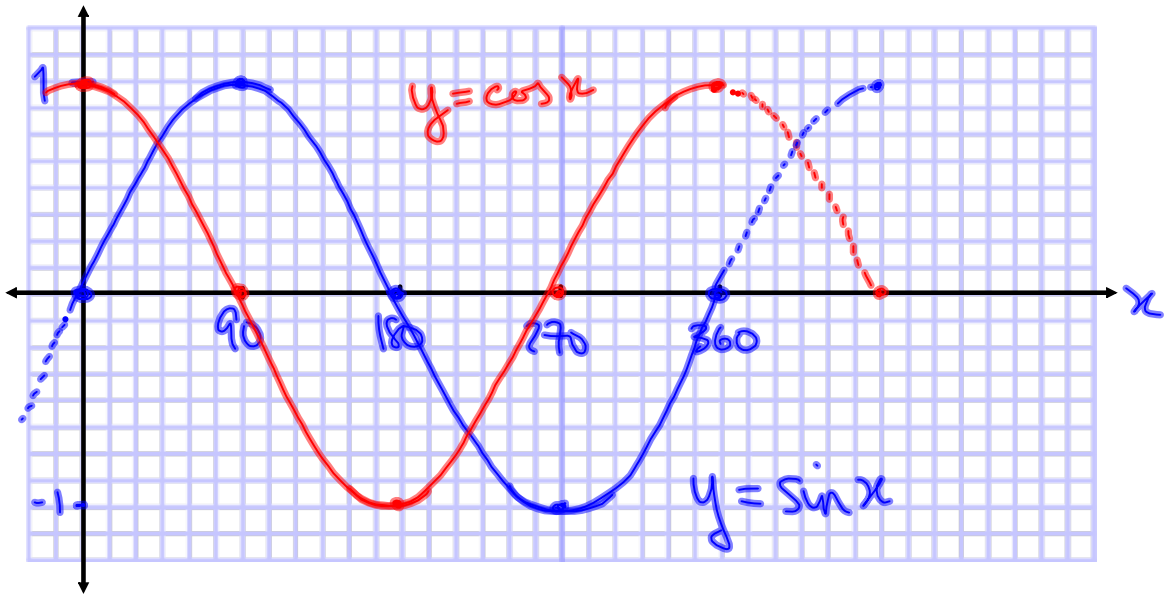
The simplest way to sketch the parent function for sine or cosine is to use 5 key points at 90° intervals (0°, 90°, 180°, 270°, 360°).



x	$\sin x$	$\cos x$
0°	0	1
90°	1	0
180°	0	-1
270°	-1	0
360°	0	1

May 17-9:19 AM

The simplest way to sketch the parent function for sine or cosine is to use 5 key points at 90° intervals (0°, 90°, 180°, 270°, 360°).



May 17-9:19 AM

To graph a transformed function, you can:

(a) transform each point using $y = af[k(x-p)]+q$

1. a gives vertical reflection and scaling
2. k gives horizontal reflection and scaling
3. p gives horizontal translation or shift
4. q gives vertical translation or shift

$$(x,y) \rightarrow (x,ay) \rightarrow \left(\frac{x}{k},ay\right) \rightarrow \left(\frac{x}{k}+p,ay\right) \rightarrow \left(\frac{x}{k}+p,ay+q\right)$$

(1) (2) (3) (4)

May 17-9:23 AM

(b) Graphing using properties

a - vertical reflection and amplitude
k - horizontal reflection and period

$$period = \frac{360°}{k}$$

p - phase shift of starting point
q - axis of the curve, $y = q$

May 17-9:18 AM

p.374 # 2odd, 3odd, 4ab, 5ab, 7a, 8b, 17, 18

c

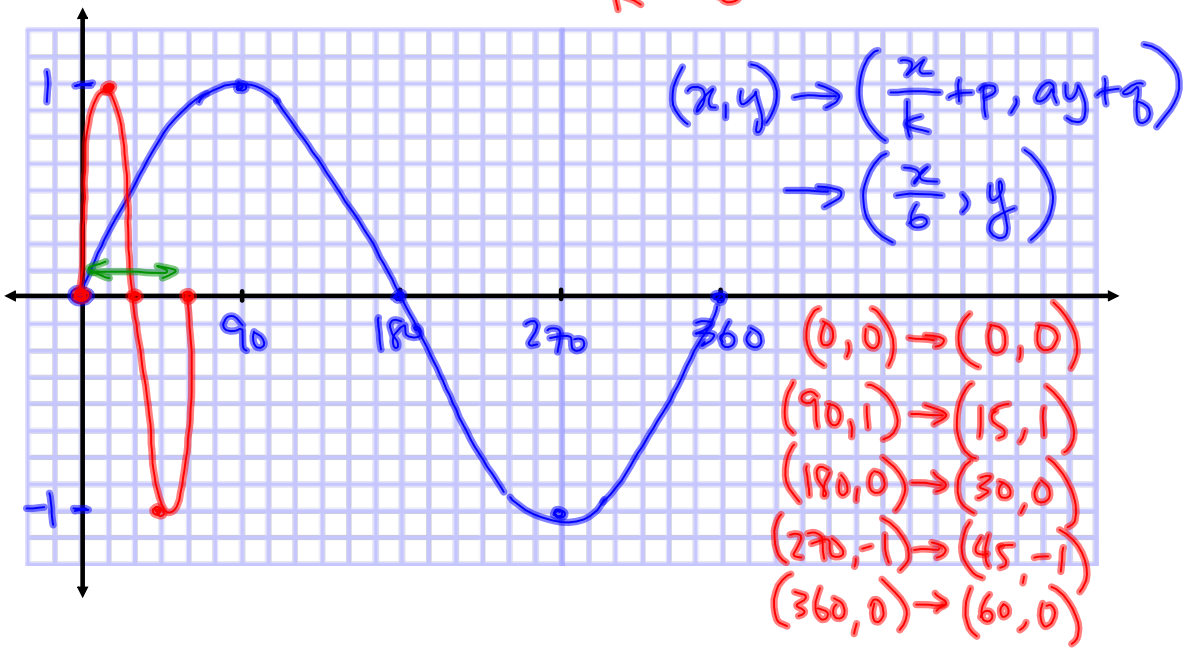
degrees only

May 22-8:28 AM

p. 374 # 2(a) $y = \sin(6x)$

$k = 6$

$\frac{360°}{6} = 60°$



$(x, y) \to \left(\frac{x}{k} + p, ay + q\right)$

$\to \left(\frac{x}{6}, y\right)$

$(0,0) \to (0,0)$

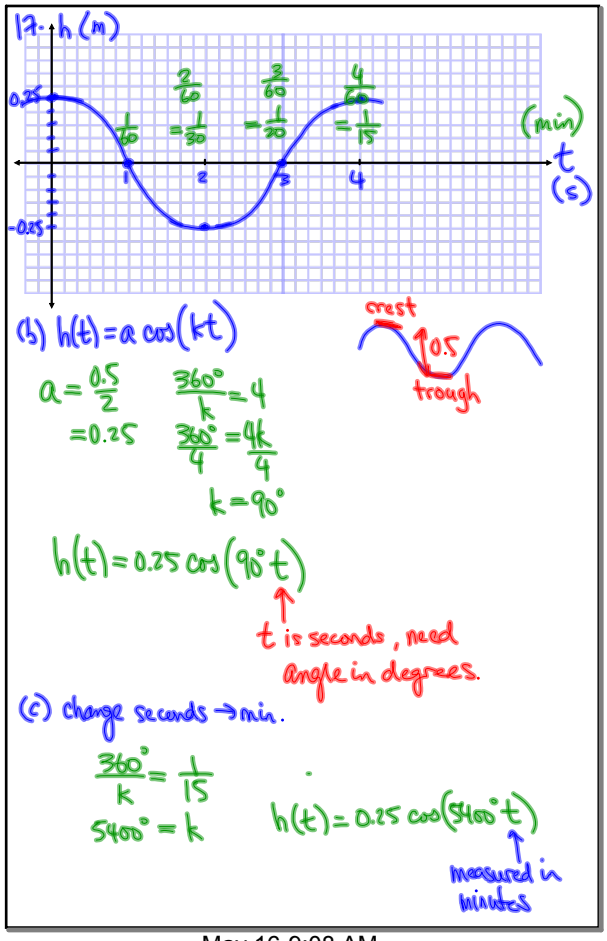
$(90,1) \to (15,1)$

$(180,0) \to (30,0)$

$(270,-1) \to (45,-1)$

$(360,0) \to (60,0)$

May 16-9:08 AM



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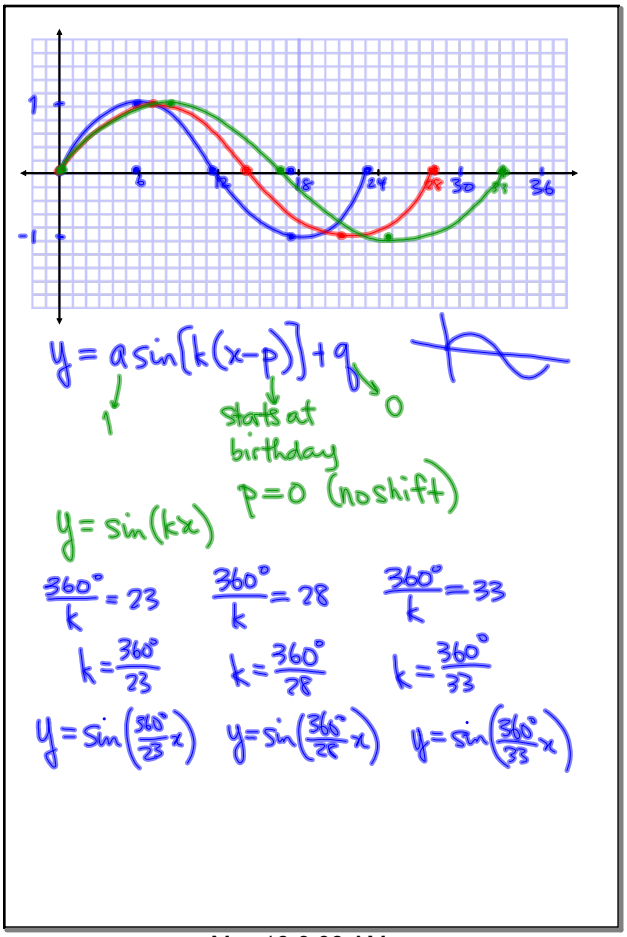

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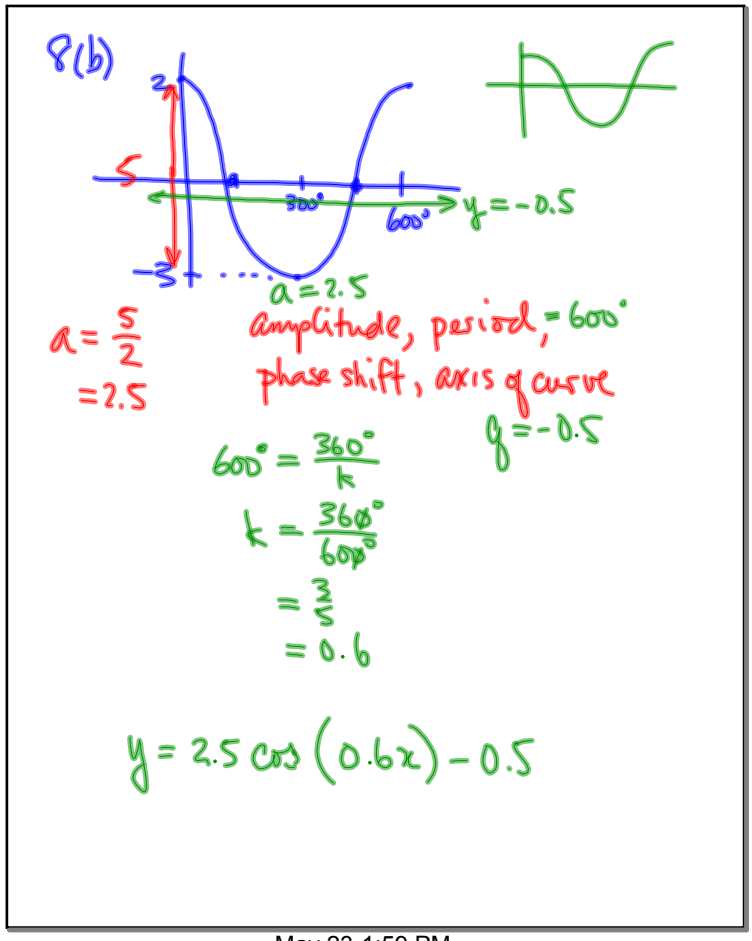
8(b)
2
5
-3
360°
600°
y = -0.5
a = 2.5
a = 5/2
= 2.5
amplitude, period, = 600°
phase shift, axis of curve
y = -0.5
600° = 360°/k
k = 360°/600°
= 3/5
= 0.6
y = 2.5 cos (0.6x) - 0.5

May 23-1:59 PM