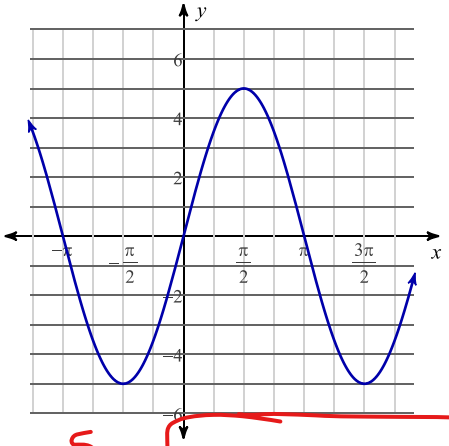
Precalculus Name_____

Equations of Trig Graphs and Law of Sines Notes

Date_____ Period____

Determine the equation of the function.

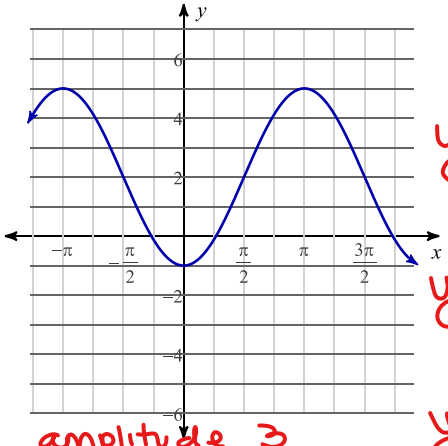
1) In terms of sin x



amplitude 5
Period 2π
midline: 0

$y = 5\sin x$

2) In terms of cos x



amplitude 3
period 2π
midline 2

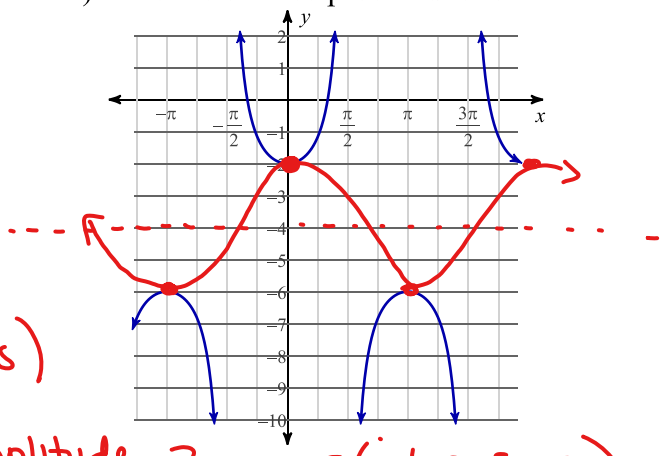
$y = -3\cos x + 2$

$y = 3\cos(x+\pi)+2$

$y = 3\cos(x-\pi)+2$

3) In terms of a reciprocal function

sec or csc



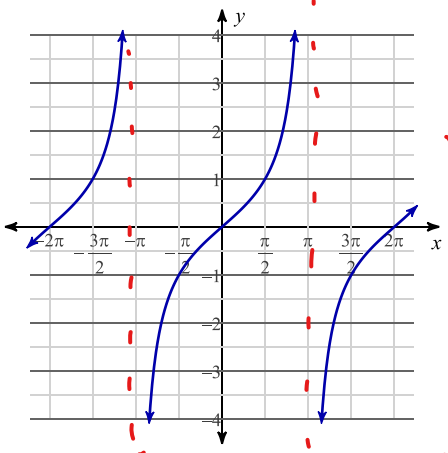
(cos)

amplitude 2
period: 2π
midline: -4

as (i to sec)

$y = 2\sec x - 4$

4) In terms of tan x



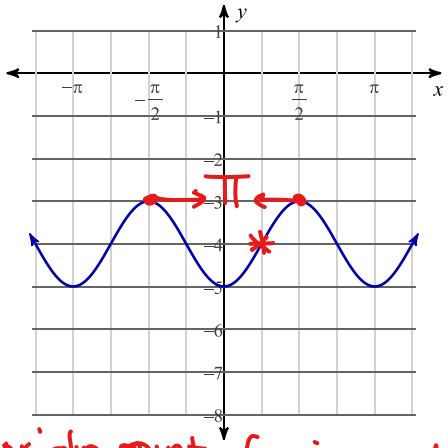
$y = \tan\frac{1}{2}x$

Period $= 2\pi = \frac{\pi}{k}$

$2\pi k = \pi$

$k = \frac{\pi}{2\pi} = \frac{1}{2}$

5) In terms of sin x



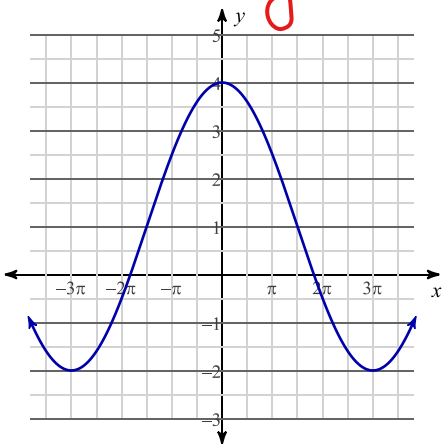
if * is origin point of origin, then my horizontal shift is $\frac{\pi}{4}$ right

Period $= \pi = \frac{2\pi}{k} \rightarrow k\pi = 2\pi \rightarrow k = 2$

$$y = 1\sin 2\left(x - \frac{\pi}{4}\right) - 4$$

or $y = -\sin 2\left(x + \frac{\pi}{4}\right) - 4$

6) In terms of cos x $y = 3\cos\frac{1}{3}(x) + 1$

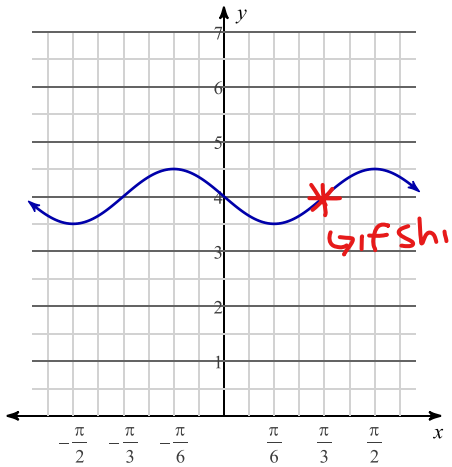


$6\pi = \frac{2\pi}{k}$

$k = \frac{1}{3}$

$\frac{4+(-2)}{2} = \frac{2}{2} = 1 \rightarrow$ MIDLINE

7) In terms of sin x



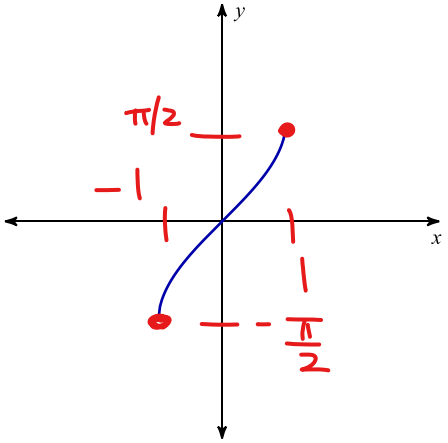
if shift right $\frac{\pi}{3}$

$\frac{3}{3}\frac{\pi}{2} + \frac{\pi}{6} \rightarrow \frac{4\pi}{6} - \frac{2\pi}{3} = \frac{2\pi}{k} \rightarrow k = 3$

$$y = \frac{1}{2}\sin 3\left(x - \frac{\pi}{3}\right) + 4$$

$$y = -\frac{1}{2}\sin 3x + 4$$

8) In terms of an inverse function



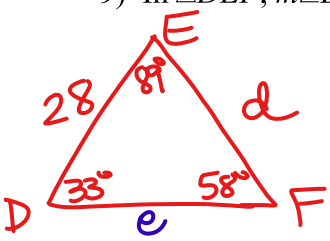
$y = \sin^{-1} x$

Solve each triangle. Round your answers to the nearest tenth.

Law of sines

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

9) In $\triangle DEF$, $m\angle D = 33°$, $m\angle F = 58°$, $f = 28$ cm



$+33 + 58 = 91$ $\quad 180 - 91 = 89$

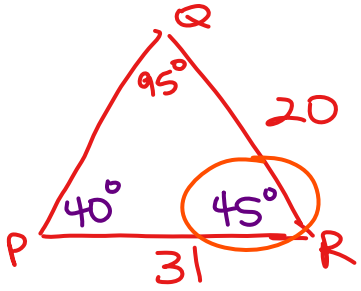
$$\frac{28}{\sin 58°} = \frac{d}{\sin 33°}$$

$$\frac{28 \sin 33°}{\sin 58°} = d = 17.98 \text{ or } 18.0 \text{ cm}$$

$$\frac{28}{\sin 58°} = \frac{e}{\sin 89°}$$

$$\frac{28 \sin 89°}{\sin 58°} = e = 33.01 \text{ or } 33.0 \text{ cm}$$

10) In $\triangle PQR$, $m\angle Q = 95°$, $p = 20$ m, $q = 31$ m



$$\frac{31}{\sin 95°} = \frac{r}{\sin 45°}$$

$$r = \frac{31 \sin 45°}{\sin 95°}$$

$r = 22$

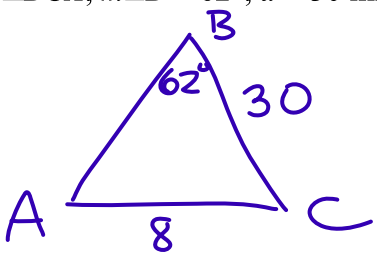
$$\frac{31}{\sin 95°} = \frac{20}{\sin P}$$

$$\frac{31 \sin P}{31} = \frac{20 \sin 95°}{31}$$

$$\sin P = \frac{20 \sin 95°}{31}$$

$$P = \sin^{-1}\left(\frac{20 \sin 95°}{31}\right) \rightarrow P = 40°$$

11) In $\triangle BCA$, $m\angle B = 62°$, $a = 30$ mi, $b = 8$ mi



NO triangle

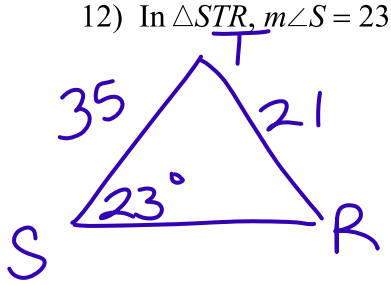
$$\frac{8}{\sin 62°} = \frac{30}{\sin A}$$

$$8 \sin A = 30 \sin 62°$$

$$\sin A = \frac{30 \sin 62°}{8}$$

$$A = \sin^{-1}\left(\frac{30 \sin 62°}{8}\right)$$

12) In $\triangle STR$, $m\angle S = 23°$, $r = 35$ cm, $s = 21$ cm



Triangle 1	Triangle 2
$\angle R = 40\ 634°$	$\angle R = 139\ 366°$
$\angle T = 116\ 366°$	$\angle T = 17\ 634°$
$t = 48\ 1$ or $48\ 2$	$t = 16\ 3$

$$\frac{21}{\sin(23°)} = \frac{35}{\sin R}$$

$$21\sin R = 35\sin 23$$

$$\sin R = \frac{35\sin 23}{21}$$

$$R = \sin^{-1}\left(\frac{35\sin 23}{21}\right)$$

$R = 40\ 634°$

$$\frac{21}{\sin(23°)} = \frac{t}{\sin 116\ 366°}$$

$$t = \frac{21\sin 116\ 366°}{\sin 23°}$$

$$\frac{21}{\sin(23°)} = \frac{t}{\sin 17\ 634}$$

$$t = \frac{21\sin 17\ 634}{\sin 23}$$