Honors Precalculus

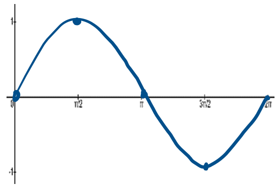
Chapter 4 – Pt 2 PRACTICE TEST

Name:______________________ Per: ______

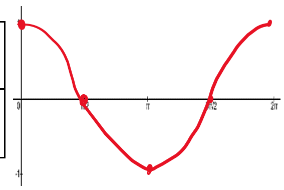
Use an additional sheet, if necessary, to show your work

1. Fill in the tables for $\sin x$ and $\cos x$ and then sketch a graph of each.

x	0	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$	2π
$\sin x$	0	1	0	-1	0



x	0	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$	2π
$\cos x$	1	0	-1	0	1



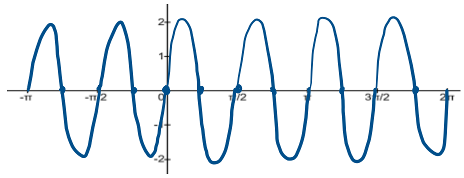
2. Identify the amplitude and period of each.

$-1.5\cos\left(\frac{1}{4}x\right)$

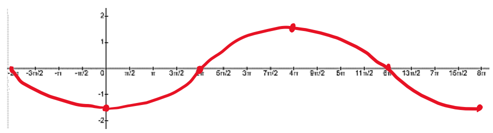
$2\sin(4x)$	$-1.5\cos(x/4)$
Amplitude: $\lvert 2\rvert = \boxed{2}$	Amplitude: $\lvert -1.5\rvert = \boxed{1.5}$
Period: $P = \frac{2\pi}{b}$ $= \frac{2\pi}{4}$ $= \boxed{\frac{\pi}{2}}$	Period: $P = \frac{2\pi}{b}$ $= \frac{2\pi}{1/4} = \boxed{8\pi}$

3. Sketch the graph for each from Problem 2.

$2\sin(4x)$

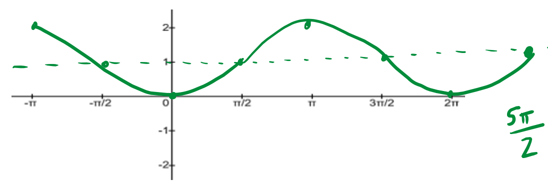


$-1.5\cos(x/4)$



4. Describe how the graph of $g(x) = \sin\left(x - \frac{\pi}{2}\right) + 1$ compares to $f(x) = \sin(x)$ and then sketch g(x).

Right $\pi/2$ and up 1



$\frac{5\pi}{2}$

5.

Identify the information for $f(x) = 4\cos\left(\frac{1}{2}\left(x - \frac{\pi}{6}\right)\right) - 5.$	Identify the information for $f(x) = 0.5\sin(2x - \pi) + 8.$
	$f(x) = 0.5\sin\left(2\left(x - \frac{\pi}{2}\right)\right) + 8$
Horizontal shift: $\boxed{\text{Right } \frac{\pi}{6}}$	Horizontal shift: $\boxed{\text{Right } \frac{\pi}{2}}$
Period: $\frac{2\pi}{1/2} = \boxed{4\pi}$	Period: $\frac{2\pi}{2} = \boxed{\pi}$
Amplitude: $\lvert 4\rvert = \boxed{4}$	Amplitude: $\lvert 0.5\rvert = \boxed{0.5}$
Vertical shift: $\boxed{\text{Down } 5}$	Vertical shift: $\boxed{\text{Up } 8}$

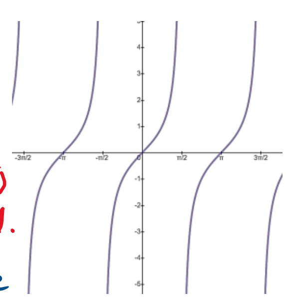
6. Use the parent table for $\sin x$ to fill in the table for $f(x) = 0.5\sin(2x - \pi) + 8$

$+\pi/4$

x	$\pi/2$	$\frac{3\pi}{4}$	π	$\frac{5\pi}{4}$	$3\pi/2$
$f(x)$	8	8.5	8	7.5	8

$0(0.5)+8$ $1(0.5)+8$ $0(0.5)+8$ $-1(0.5)+8$ $0(0.5)+8$

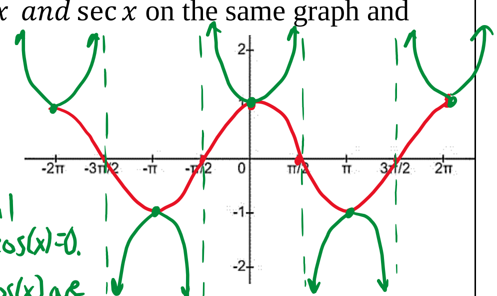
7. Use the fact that $f(x) = \tan x = \frac{\sin x}{\cos x}$ to explain why the graph has a vertical asymptotes at $x = \frac{\pi}{2}$ and a zero at $x = 0$.



We have V.A.@ $x = \pi/2$ because that is where $\cos(x) = 0$ and therefore $\tan(x)$ is undefined.

We have x-int@ $x = 0$ because that is where $\sin(x) = 0$ and therefore $\tan(x) = 0$.

8. Graph $\cos x$ *and* $\sec x$ on the same graph and state what you notice.

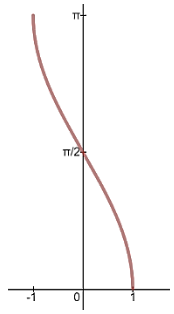


$\sec(x) = \frac{1}{\cos(x)}$

sec(x) has veretical asymptotes where cos(x)=0.

The minimum of cos(x) are the maximums of sec(x) and vice versa.

9. Identify whether this is the graph for $\sin^{-1}(x)$ *or* $\cos^{-1}(x)$ and how you know (can't just say used calculator).



ratio angles

arc	regular	
$(1,0)$	$(0,1)$	$\cos(0)=1$
$(0,\pi/2)$	$(\frac{\pi}{2},0)$	$\cos(\frac{\pi}{2})=0$
$(-1,\pi)$	$(\pi,-1)$	$\cos(\pi)=-1$

This is the graph for $\cos^{-1}(x)$.

10. Find the exact value of each (no decimals). Sketch a picture if necessary.

$\arcsin\left(\frac{1}{2}\right) \overset{?}{=}$ angle (ratio) $\boxed{\frac{\pi}{6}}$

2, 1, $\sqrt{3}$

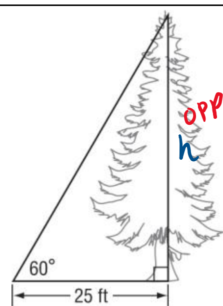
$\tan^{-1}\left(\frac{-1}{\sqrt{3}}\right) \overset{?}{=}$ angle (ratio) $\boxed{\frac{-\pi}{6}}$

$\sqrt{3}$, 2, -1

11. Find the exact value of each (no decimals, leave as fractions). Sketch a picture if necessary and use the ranges of the inverse trig functions to determine the correct answer.

$sin^{-1}(sin\,(\pi/6))$	$cos(sin^{-1}(3/5))$	$sec(sin^{-1}(3/5))$
$\sin^{-1}(\frac{1}{2})$	$\cos(a)$	$=\sec(a)$
2, 1, $\sqrt{3}$, $\pi/6$	5, 3, 4, a	5, 3, 4, a
$\boxed{\frac{\pi}{6}}$	$\boxed{\frac{4}{5}}$	$=\frac{1}{\cos(a)} = \frac{1}{4/5} = \boxed{5/4}$

12. Find the height of the tree to the nearest tenth of a foot.



opp h, adj

$\tan(60)=\frac{h}{25}$

$25\cdot\tan(60)=h$

$\boxed{43.3\text{ ft}=h}$

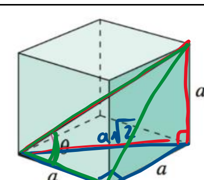
13. At a loading dock, a ramp is 55 feet long (this is how far you would walk if you walked up it). The ramp also has a height of 8 feet. Find the angle the ramp makes with the ground.

hyp 55, opp 8, a

$\sin(a)=\frac{8}{55}$

$\sin^{-1}\left(\frac{8}{55}\right)=\boxed{8.36°}$

14. Determine the angle between the diagonal of a cube and its edge, as shown.



d_B, a, a

$a^2+a^2=d_B^2$

$\sqrt{2a^2}=\sqrt{d_B^2}$

$\sqrt{2}\,a=d_B$

d_c, a, $a\sqrt{2}$

$a^2+(a\sqrt{2})^2=d_c^2$

$a^2+2a^2=d_c^2$

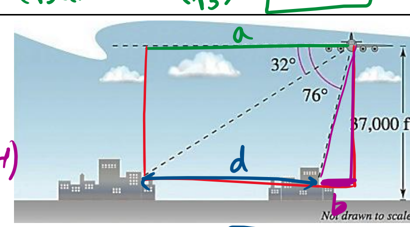
$\sqrt{3a^2}=\sqrt{d_c^2}$

$\sqrt{3}\,a=d_c$

$\sqrt{3}\,a$, θ, a

$\cos^{-1}\left(\frac{a}{\sqrt{3}a}\right)=\cos^{-1}\left(\frac{1}{\sqrt{3}}\right)=\boxed{54.7°}$

15. A passenger in an airplane flying at an altitude of 37,000 ft sees two towns as shown in the figure. How far apart are the towns?



a, 37000, 32°

$\tan(32)=\frac{37000}{a}$

$a=37000/\tan(32)=59212$

14, 37000, b

$\tan(14)=\frac{b}{37000}$

$b=37000\cdot\tan(14)$

$b=9225\text{ ft}$

$d=a-b=59{,}212-9{,}225=\boxed{49{,}987\text{ ft}}$

≈ 9.5 miles