# Chapter 4.4-4.7 Practice Test

**Precalculus | Mr. Cooper**

Name _____

Date _____

Period _____

Grade _____

List all transformations of the parent functions: period, amplitude (or vertical stretch/shrink), vertical shift, horizontal shift, and reflections for the following: (make sure to include if it is a stretch or shrink accordingly)

1. $y = -3\sin(\frac{x}{4} - \pi)$

Amp: 3 - w/a vertical reflection by a factor of 3
- this is a vertical stretch

Per: $\frac{2\pi}{\frac{1}{4}} = 8\pi$ - horizontal stretch by a factor of 4

shifted right $4\pi$ $(\frac{1}{4}(x - 4\pi))$

2. $y = 5\tan(2x)$

Vertical stretch by a factor of 5 (No AMP w/TAN)

Period = $\frac{\pi}{2}$ (Remember period of tan is $\pi$)
this is a horizontal shrink by a factor of $\frac{1}{2}$

3. $y = \frac{2}{5}\cos(5x) + 2$

Amp: $\frac{2}{5}$ for a vertical shrink by a factor of $\frac{2}{5}$.

Period = $\frac{2\pi}{5}$ for a horizontal shrink by a factor of $\frac{1}{5}$

Shifted down 2 units.

4. $y = 3\cos(2x + 6) + 4$

Amp: 3, thats a vertical stretch by a factor of 3

Period = $\frac{2\pi}{2}$ for a horizontal shrink by a factor of $\frac{1}{2}$

Shifted left 3 units $(2(x+3))$

and ~~down~~ up 4 units.

5. $y = 4\tan\left(\frac{2x}{\pi}\right) + 2$

Vertical stretch by a factor of 4

Period = $\frac{\pi}{\frac{2}{\pi}} = \frac{\pi^2}{2}$ for a horizontal stretch by a factor of $\frac{\pi}{2}$

Shifted up 2 units.

6. $y = \frac{5}{2}\cos(5x + \pi) - 5$

Oh my. This amplitude is $\frac{5}{2}$ which is a vertical stretch by a factor of the same.

Period = $\frac{2\pi}{5}$ for a horizontal shrink by a factor of $\frac{1}{5}$

Shifted left $\frac{\pi}{5}$ units $(5(x + \frac{\pi}{5}))$

and down 5 units

7. $y = -3\cos(4x + 8) - 5$

Indeed y has a vertical stretch by a factor of 3 since the amplitude is 3 yet is also reflected vertically. The period is $\frac{\pi}{2}$ $(\frac{2\pi}{4})$ which shrinks the graph horizontally by a factor of $\frac{1}{4}$. y is shifted left 2 units $(4(x+2))$. Alas, it is shifted down 5 units.

No need for a calculator here! Find the exact value for each of the following expressions.

8. $\sin^{-1}\left(\frac{\sqrt{2}}{2}\right) = \frac{\pi}{4}$

$\sin^{-1}\left(-\frac{\sqrt{2}}{2}\right) = ?$

$-\frac{\pi}{4}$

9. $\tan^{-1}(-1) = -\frac{\pi}{4}$

10. $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right) = \frac{\pi}{3}$

$\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right) = ?$

$\frac{5\pi}{6}$

11. $\cot^{-1}(-1) = -\frac{\pi}{4}$

12. $\cos\left(2\sin^{-1}\left(\frac{1}{2}\right)\right) =$

$\cos\left(2\left(\frac{\pi}{6}\right)\right) =$

$\cos\left(\frac{\pi}{3}\right) = \boxed{\frac{1}{2}}$

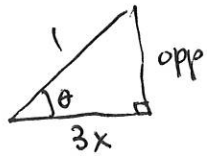
13. $\tan^{-1}(\cos\pi) =$

$\tan^{-1}(-1) = \boxed{-\frac{\pi}{4}}$

14. $\sin(\arccos \frac{3x}{1})$ ← Adj, ← hyp

$\sin\theta = \frac{opp}{hyp}$

$\boxed{\sin\theta = \frac{\sqrt{1-9x^2}}{1}}$




$\cancel{(3x)^2+(1)^2=(opp)^2}$

$(3x)^2+(opp)^2=(1)^2$

$9x^2+opp^2=1$

$-9x^2 \qquad -9x^2$

$\sqrt{opp^2}=\sqrt{1-9x^2}$

15. $\cos\left(2\sin^{-1}\left(\frac{\sqrt{2}}{2}\right)\right) =$

$\cos\left(2\left(\frac{\pi}{4}\right)\right) =$

$\cos\left(\frac{\pi}{2}\right) = \boxed{0}$

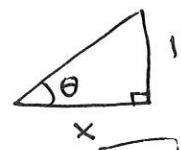
16. $\cos(\tan^{-1}(1)) =$

$\cos\left(\frac{\pi}{4}\right) = \boxed{\frac{\sqrt{2}}{2}}$

17. $\cos\left(\tan^{-1}\left(\frac{1}{x}\right)\right) =$ ← opp, ← adj

$\cos(\theta) = \frac{Adj}{hyp}$

$\boxed{\cos\theta = \frac{x}{\sqrt{x^2+1}}}$

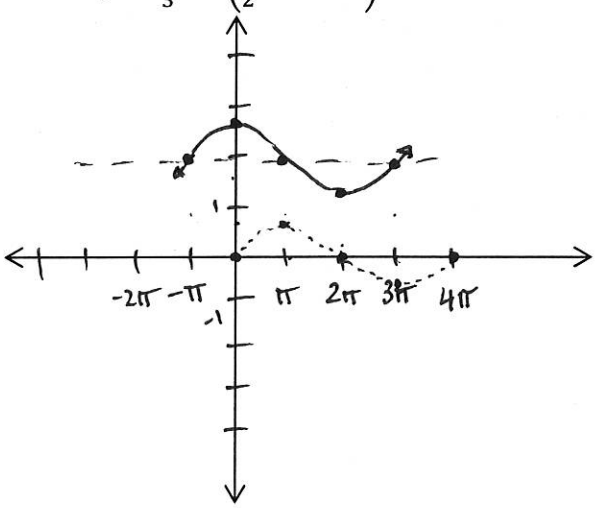



$\sqrt{hyp^2}=\sqrt{x^2+1^2}$

$hyp=\sqrt{x^2+1}$

Sketch at least one period of the following:

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



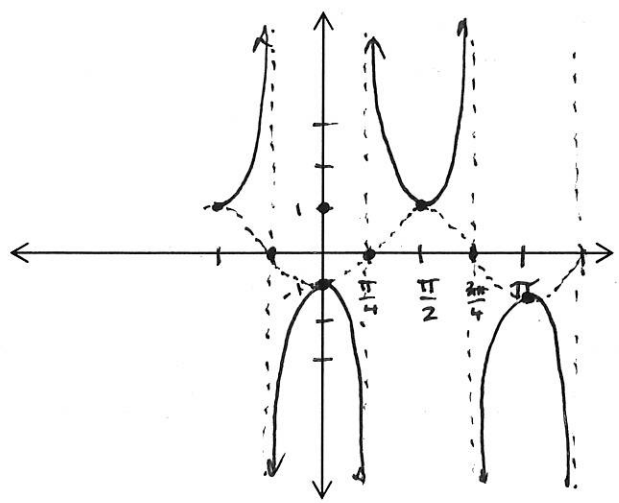

Amplitude: $\frac{2}{3}$

Period: $\frac{2\pi}{\frac{1}{2}} = 4\pi$

Phase Shift: left $\pi$

Vertical Translation: up 2

19. $y = -3\sec(2x)$



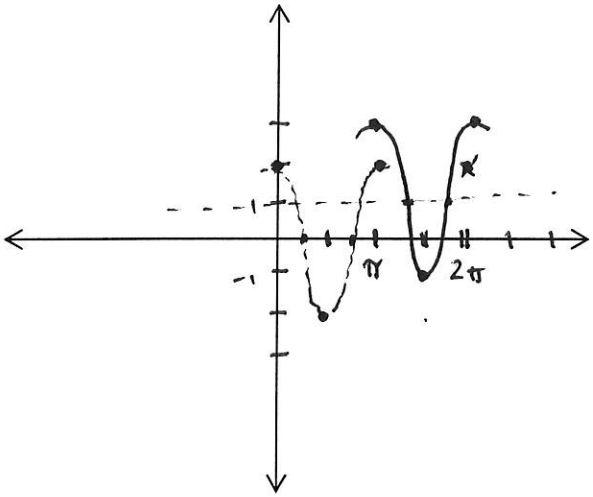

Amplitude: 3 w/ a vertical reflection

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

Phase Shift: Nope

Vertical Translation: Nope

20. $y = 2\cos\big(2(x-\pi)\big) + 1$



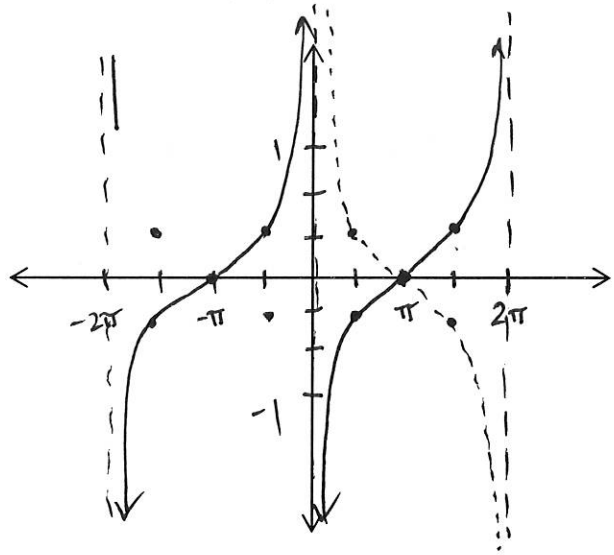

Amplitude: 2

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

Phase Shift: right $\pi$

Vertical Translation: up 1

21. $y = -\frac{1}{3}\cot\left(\frac{1}{2}x\right)$




~~Amplitude:~~ $a = \frac{1}{3}$ w/a vertical reflection

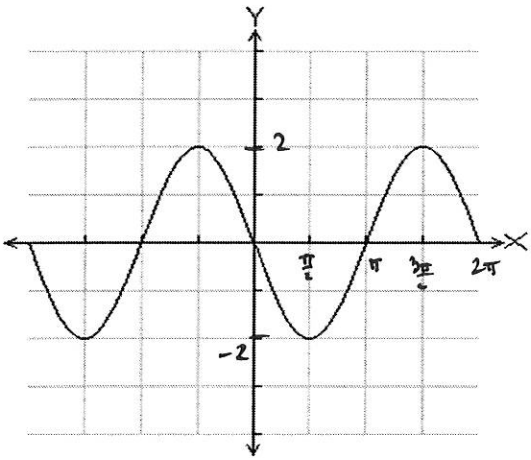
Period: $\frac{\pi}{\frac{1}{2}} = 2\pi$

Phase Shift: Nope

Vertical Translation: Nope

Give the equation of each of the following: each horizontal tick mark is $\frac{\pi}{2}$ and each vertical is1.

22.




Amp: -2

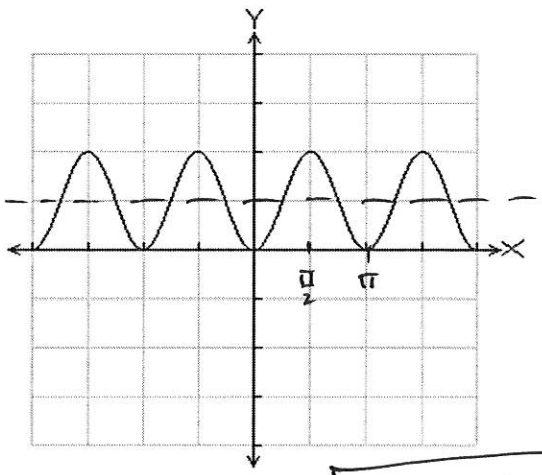
Period = $2\pi$ so $b = \frac{2\pi}{2\pi} = 1$

No P.S.

No V.T.

$\boxed{y = -2\sin x}$

23.




Amp: -1

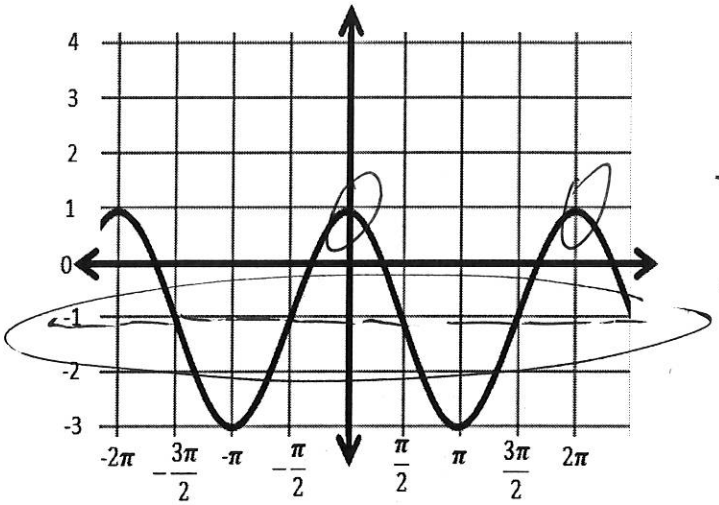
Period = $\pi$ so $b = \frac{2\pi}{\pi} = 2$

No P.S.

Up 1

$\boxed{y = -\cos(2x) + 1}$

24.




Amp = 2

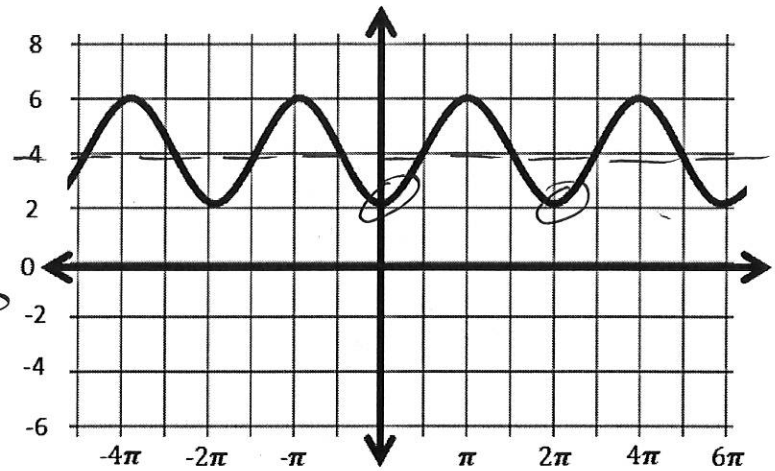
Period = $2\pi$ so $b = \frac{2\pi}{2\pi} = 1$

No P.S.

down 1 unit

$\boxed{y = 2\cos(x) - 1}$

25.




Amp: $-1$

Period = $2\pi$ so $b = \frac{2\pi}{2\pi} = 1$

No P.S.

up 2 units

$\boxed{y = -\cos(x) + 2}$