Chapter 6 Book Review Name Key

Additional Problems:

1. A buoy, bobbing up and down in the water as waves move past it, moves from its highest point to its lowest point and back to its highest point every 10 seconds. The distance between its highest and lowest points is 3 feet.

   a. Write the trigonometric function that can model the bobbing buoy, using t = 0 as its highest point.

   $B = \frac{2\pi}{10} = \frac{\pi}{5}$ $y = 1.5\cos\left(\frac{\pi}{5}(x)\right)$

   b. According to your model, what is the height of the buoy at t = 2 seconds?

   .464 ft.

   c. According to your model, what is the height of the buoy at t = 6 seconds?

   -1.214 ft.

2. The mean temperature in a town is 64°F. The temperature fluctuates 11.5°F above and below the mean. If $t = 1$ represents January, the phase shift of the sine function is 3.

   a. Write a model for the average monthly temperature in the town.

   $B = \frac{2\pi}{12} = \frac{\pi}{6}$ $y = 11.5\sin\left(\frac{\pi}{6}(x-3)\right) + 64$

   b. According to your model, what is the average temperature in April?

   4

   69.75°

   c. According to your model, what is the average temperature in July?

   7

   73.96°

Find each value.

3. $\cos 5\pi$ 4. $\sin 13\pi$ 5. $\sin \frac{9\pi}{2}$ 6. $\cos\left(-\frac{7\pi}{2}\right)$

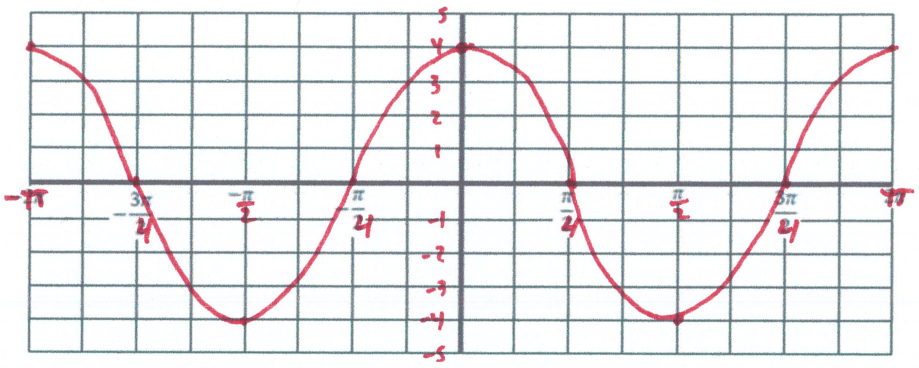
-1 0 1 0

State the amplitude and period for each function, then graph.

7. $y = 4\cos 2\theta$

Amp: 4

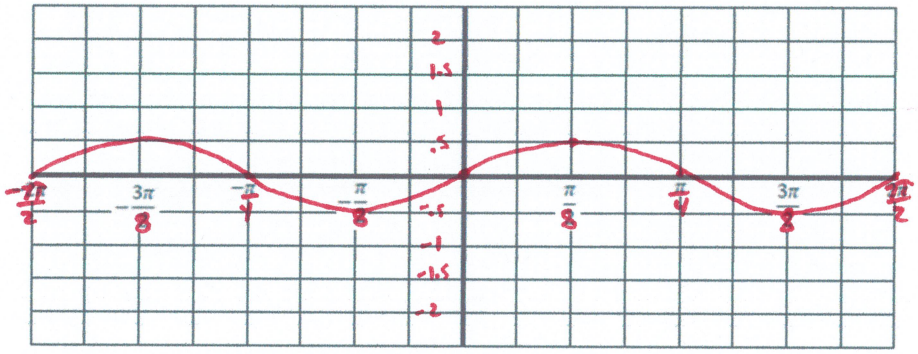
Period: π



8. $y = .5\sin 4\theta$

Amp: $\frac{1}{2}$

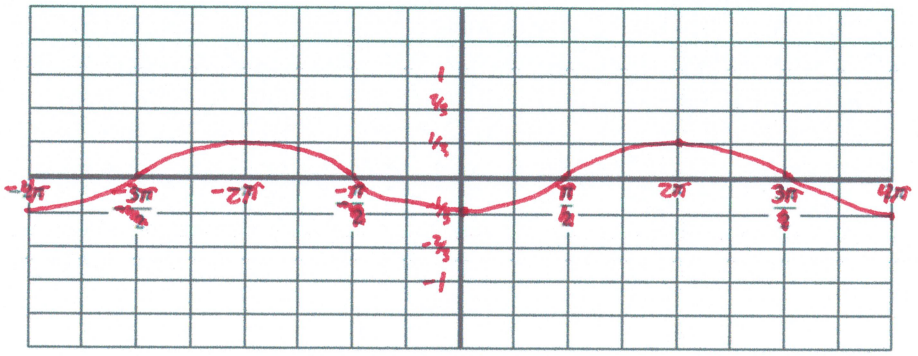
λ: $\frac{\pi}{2}$



9. $y = -\frac{1}{3}\cos\frac{\theta}{2}$

Amp: $\frac{1}{3}$ flip

Period: 4π



10. Write an equation of a sine funciton with an amplitude 4, period $\frac{\pi}{2}$, phase shift -2π, and vertical shift -1.

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

11. Write an equation of a sine funciton with an amplitude 0.5, period π, phase shift $\frac{\pi}{3}$, and vertical shift 3.

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

12. Write an equation of a cosine funciton with an amplitude $\frac{3}{4}$, period $\frac{\pi}{4}$, phase shift 0, and vertical shift 5.

$y = \frac{3}{4}\cos(8(x)) + 5$ $\quad \frac{2\pi}{\frac{\pi}{4}} = 8$

Find each principal value.

13. $\text{Arctan}(-1)$

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

14. $\text{Sin}^{-1}(1)$.

$\frac{\pi}{2}$

15. $\text{Cos}^{-1}\left(\tan\left(\frac{\pi}{4}\right)\right)$

0

16. $\sin\left(\text{Sin}^{-1}\left(\frac{\sqrt{3}}{2}\right)\right)$

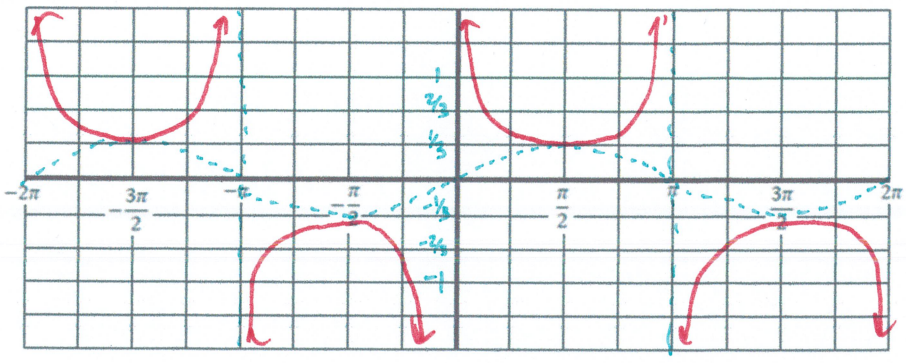
$\frac{\sqrt{3}}{2}$

17. $\cos\left(Arctan(\sqrt{3}) + \text{Arcsin}\left(\frac{1}{2}\right)\right)$

0

Graph each function.

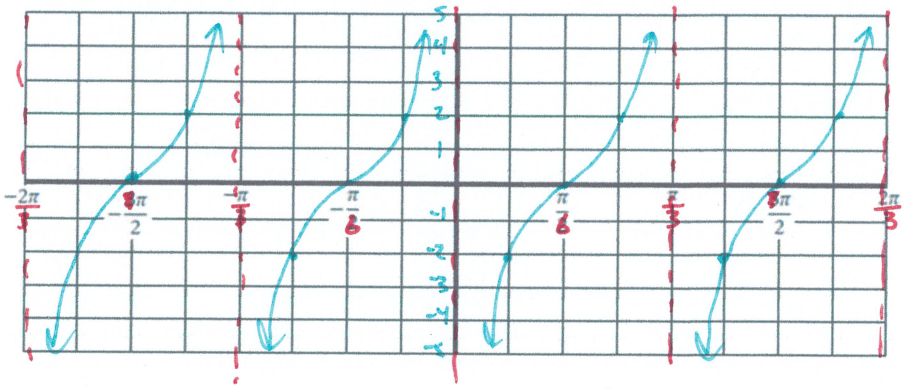
18. $y = \frac{1}{3}csc\theta$



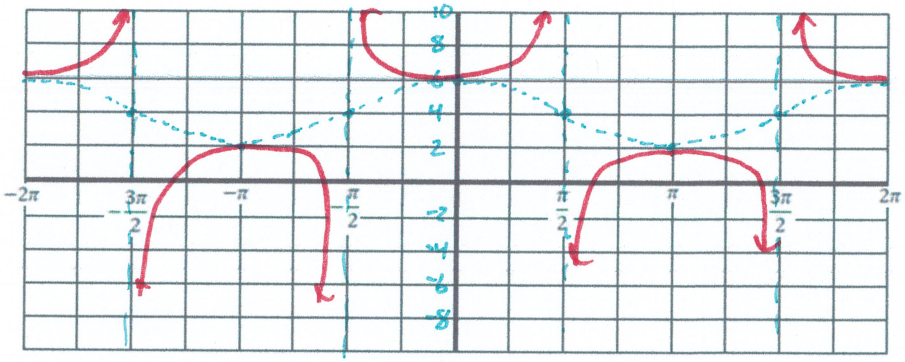
19. $y = 2tan\left(3\theta + \frac{\pi}{2}\right)$

$y = 2\tan\left(3\left(x + \frac{\pi}{6}\right)\right)$

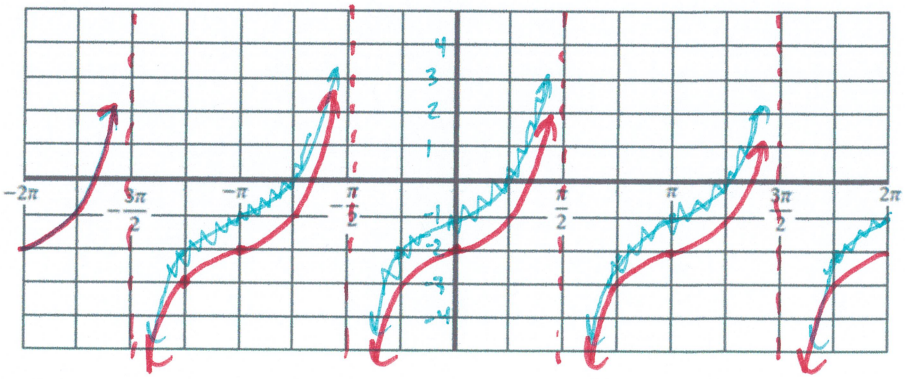
$\frac{2\pi}{3}$



20. $y = sec\theta + 4$



21. $y = \tan\theta - 2$



22. $y = \cot(x) - 2$