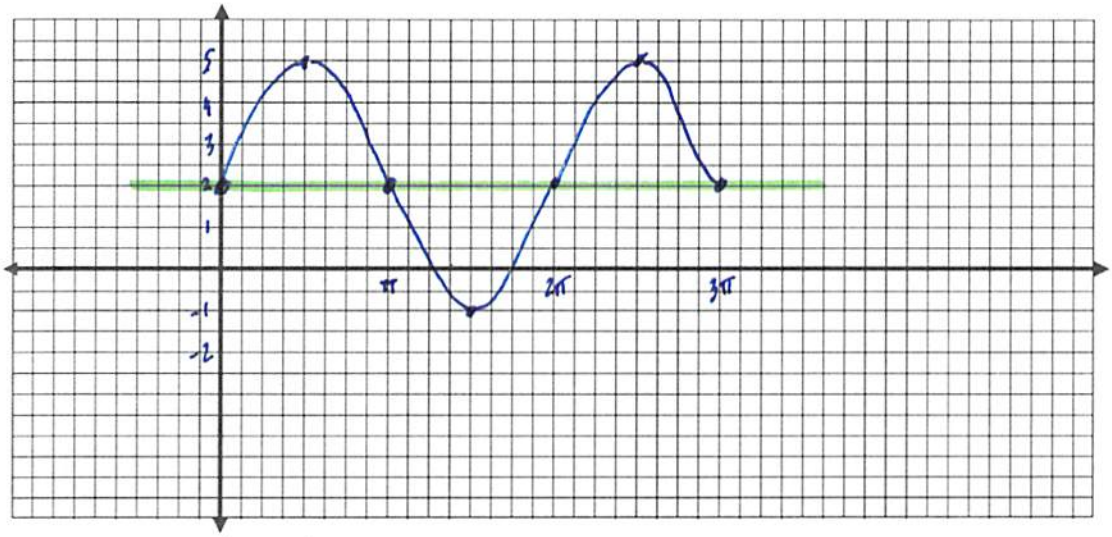
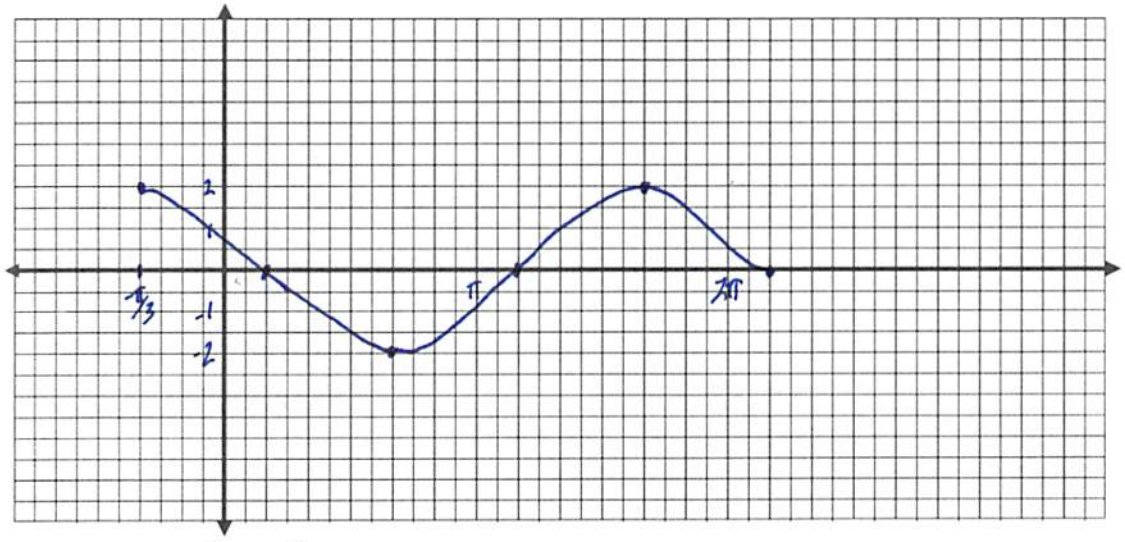
GPS Pre-Calculus: Review –Graphing Trigonometric Functions Name KEY

For each graph, sketch an accurate and complete graph over the domain $0 \le x \le 2\pi$.

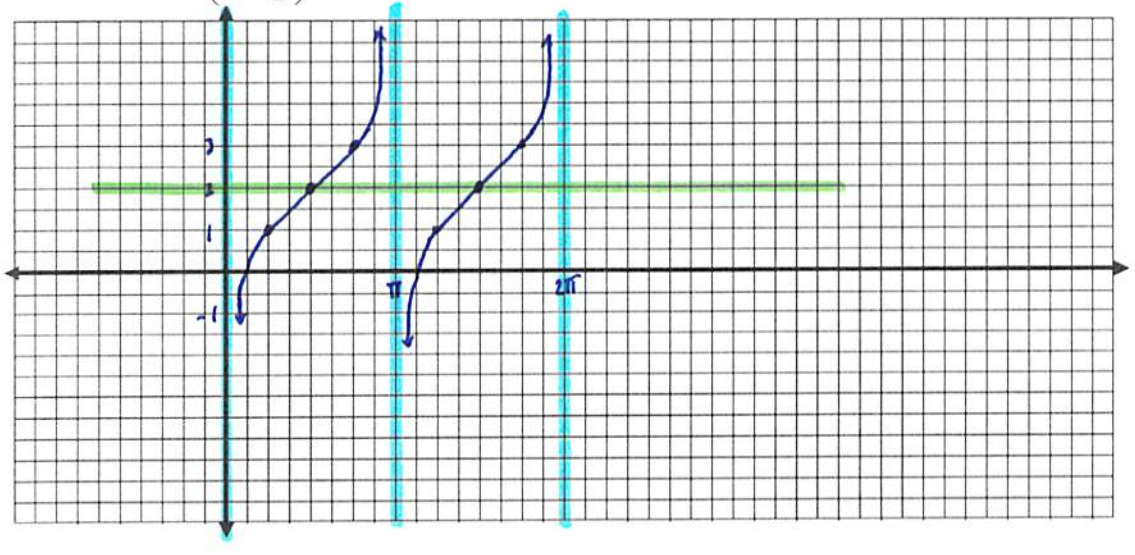
1. Graph: $y = -3\sin(x-\pi)+2$



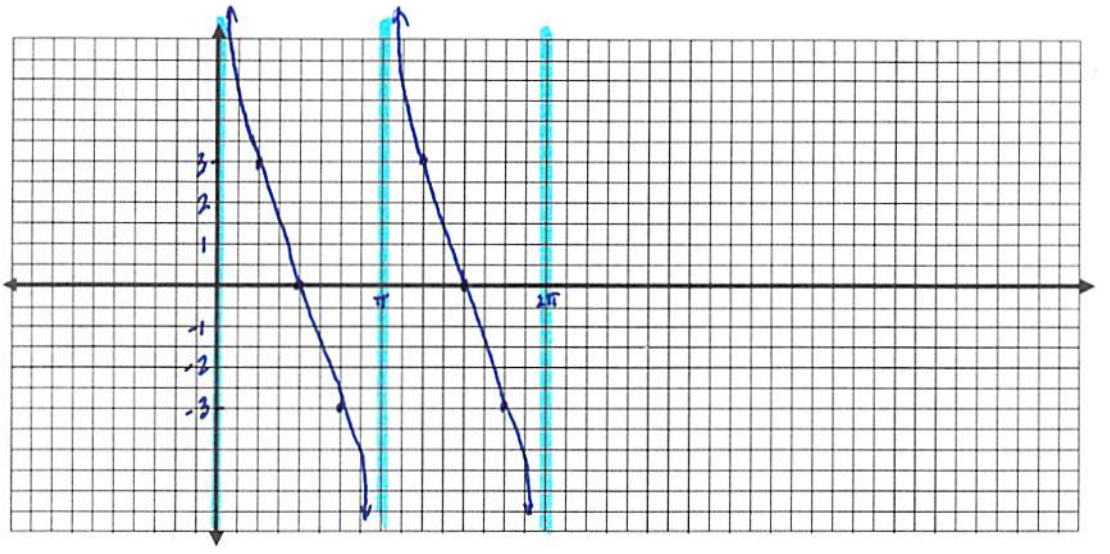
2. Graph: $y = 2\cos\left(x+\frac{\pi}{3}\right)$



3. Graph: $y = \tan\left(x-\frac{\pi}{2}\right)+2$

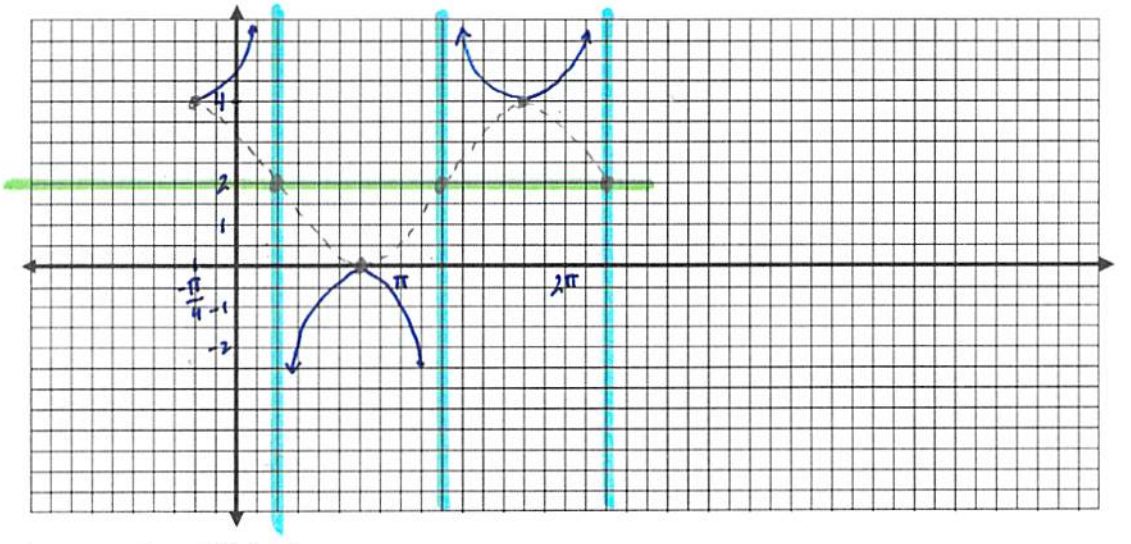


4. Graph: $y = 3\cot(x)$



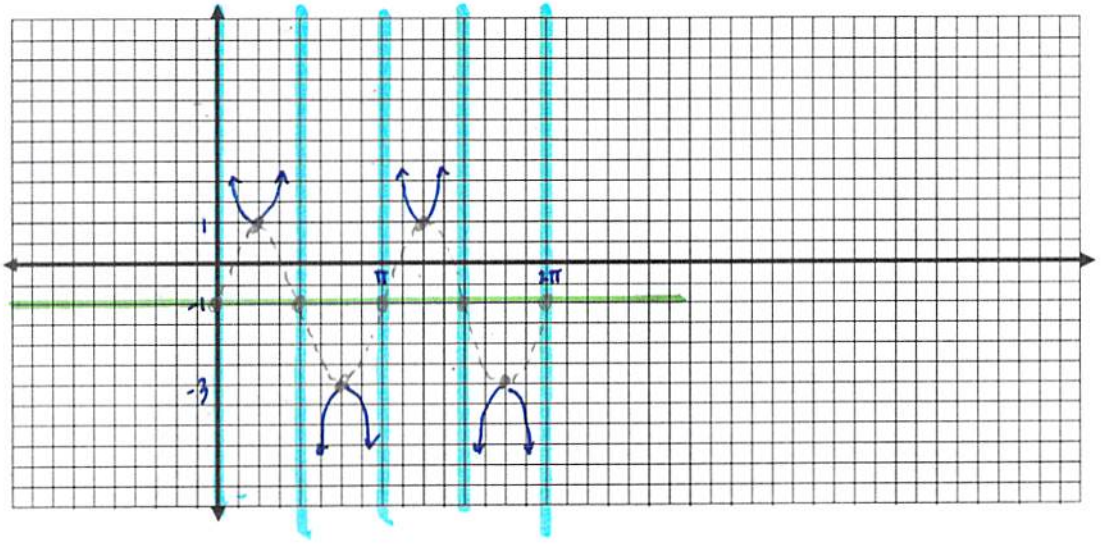
5. Graph: $y = 2\sec\left(x + \frac{\pi}{4}\right) + 2$

(cos)



6. Graph: $y = 2\csc 2(x) - 1$

(sin)



For each described graph, write an equation using the function indicated.

7. Sine Function

Answer: $y = -3.7 \sin \frac{1}{5}\left(x + \frac{5\pi}{6}\right) + 5$

Up 5; left $\frac{5\pi}{6}$; stretch by 3.7 (reflected); has a period of 10π

$\frac{2\pi}{P} = \frac{10\pi}{1}$

$\frac{10\pi P}{10\pi} = \frac{2\pi}{10\pi}$

$P = \frac{1}{5}$

8. Cosine Function

Answer: $y = 5\cos\frac{6}{7}\left(x - \frac{3\pi}{4}\right)$

Right $\frac{3\pi}{4}$; stretched by 5; has a period of $\frac{7\pi}{3}$

$\frac{2\pi}{P} = \frac{7\pi}{3}$

$\frac{7\pi P}{7\pi} = \frac{6\pi}{7\pi}$

$P = \frac{6}{7}$

9. Tangent Function

Answer: $y = 12 + \tan 4\left(x - \frac{\pi}{7}\right) - 4$

Down 4; right $\frac{\pi}{7}$; stretch by 12; has a period of $\frac{\pi}{4}$

$\frac{\pi}{P} = \frac{\pi}{4}$

$P\pi = 4\pi$

$P = 4$

10. Cotangent Function

Answer: $y = -\cot\frac{4}{9}\left(x + \frac{3\pi}{4}\right) + 1$

Up 1; left $\frac{3\pi}{4}$; reflect across the x axis; has a period of $\frac{9\pi}{4}$

$\frac{\pi}{P} = \frac{9\pi}{4}$

$\frac{9\pi P}{9\pi} = \frac{4\pi}{9\pi}$

$P = \frac{4}{9}$

11. Secant Function

Answer: $y = 2\sec\frac{1}{7}\left(x + \frac{7\pi}{6}\right) - 4$

Down 4; left $\frac{7\pi}{6}$; stretch by 2; has a period of 14π

$\frac{2\pi}{P} = \frac{14\pi}{1}$

$\frac{14\pi P}{14\pi} = \frac{2\pi}{14\pi}$

$P = \frac{1}{7}$

12. Cosecant Function

Answer: $y = -\frac{7}{3}\csc\frac{8}{7}\left(x - \frac{8\pi}{13}\right)$

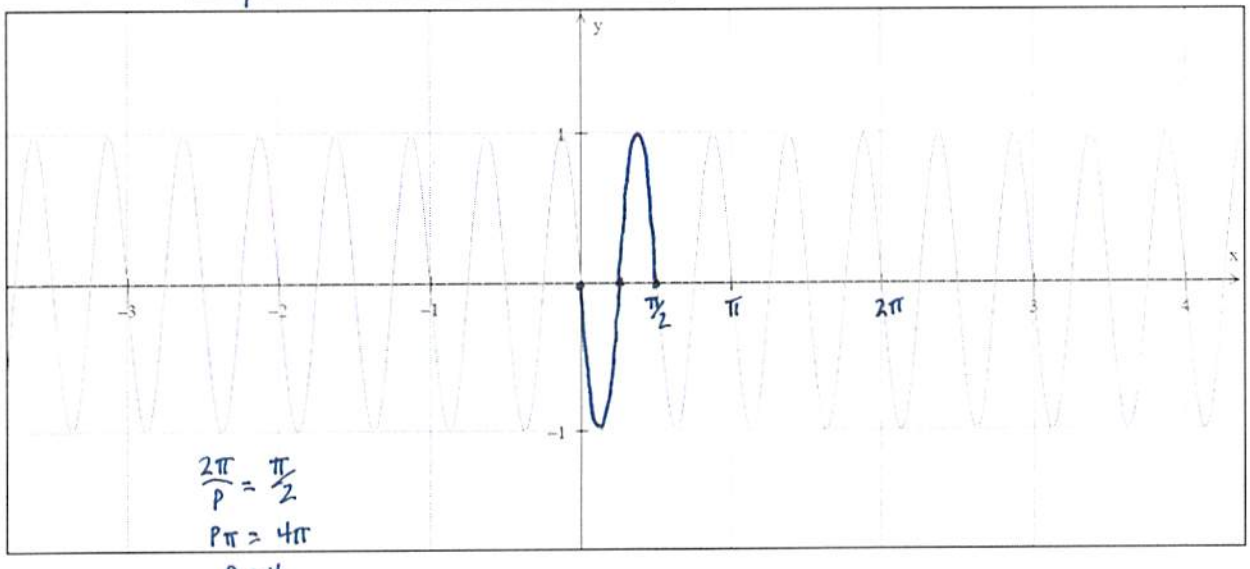
Right $\frac{8\pi}{13}$; reflect across the x axis; stretch by $\frac{7}{3}$; has a period of $\frac{7\pi}{4}$

$\frac{2\pi}{P} = \frac{7\pi}{4}$

$\frac{7\pi P}{7\pi} = \frac{8\pi}{7\pi}$

$P = \frac{8}{7}$

13. Sine Function: $y = -\sin 4(x)$



$\frac{2\pi}{P} = \frac{\pi}{2}$

$P\pi = 4\pi$

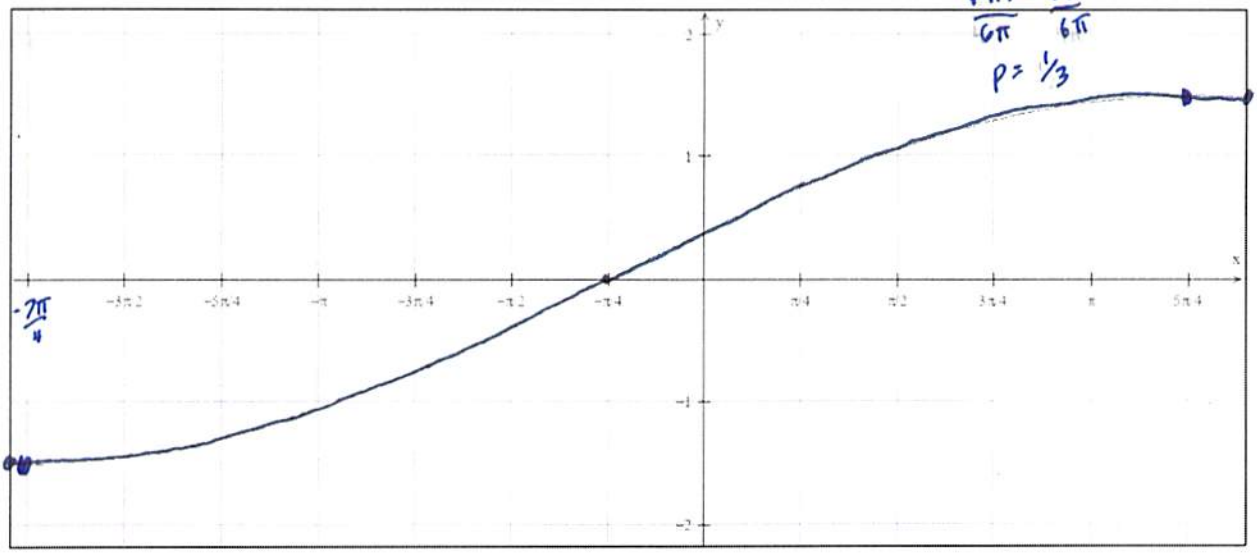
$P = 4$

14. Cosine Function: $y = \frac{3}{2}\cos\frac{1}{3}\left(x - \frac{5\pi}{4}\right)$

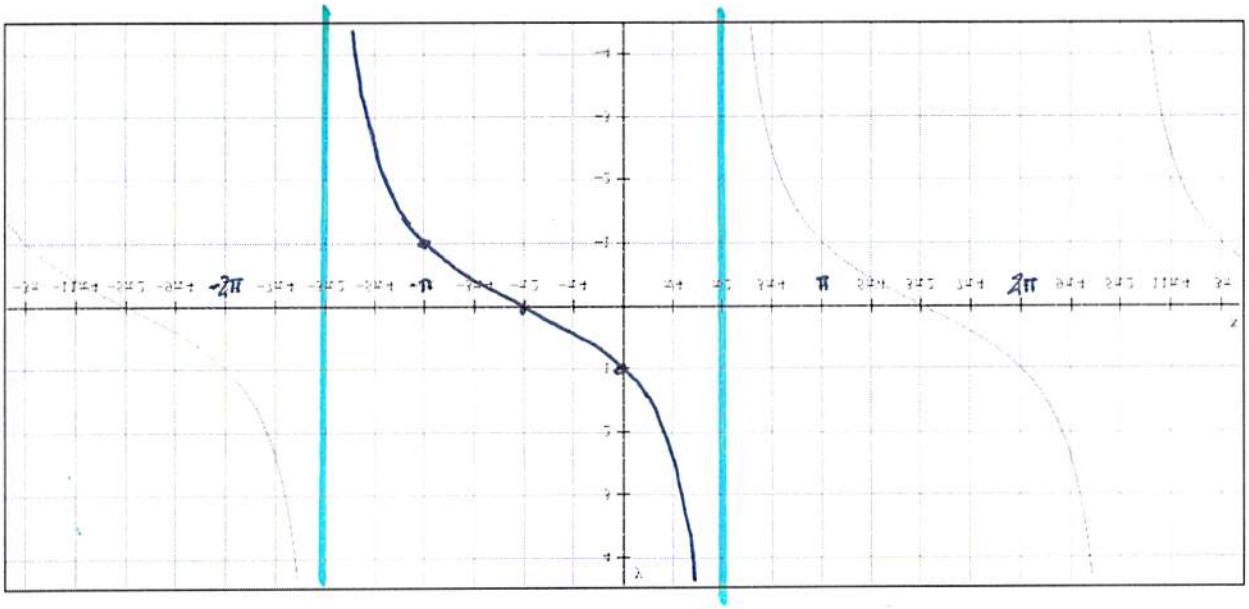
$\frac{2\pi}{P} = \frac{6\pi}{1}$

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

$P = 1/3$



15. Tangent Function: $y = -\tan\frac{1}{2}\left(x + \frac{\pi}{2}\right)$



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

$\frac{2\pi P}{2\pi} = \frac{\pi}{2\pi}$

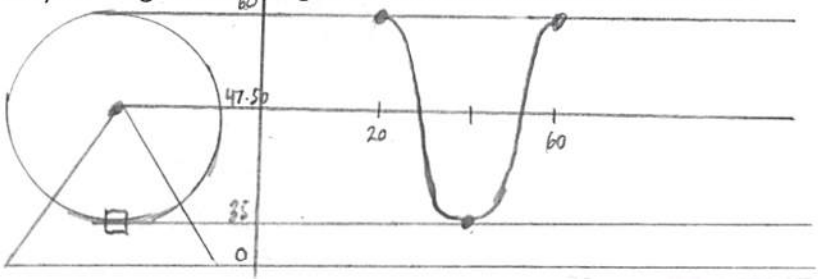
$P = \frac{1}{2}$

Write a model (equation) for the scenario below. Then use your equation to answer the follow up question(s).

16. As you ride the Ferris wheel, your distance from the ground varies sinusoidally with time. You were seated in the last seat that was filled (which is when the Ferris wheel begins to spin). Let t be the number of seconds that have elapsed since the wheel started spinning. You find that it takes you 20 seconds to reach the top, 60 feet above the ground (which means that the wheel makes one revolution every 40 seconds). The diameter of the wheel is 25 feet.

i) Find an equation that models your height off the ground in terms of t (t=0 is when the wheel began to spin)

ii) Find your height from the ground after 3 minutes (180 seconds).



$\frac{1 \text{ REV}}{40 \text{ SEC}} \Rightarrow$ PERIOD : 40 SEC

$y = 12.5\cos\left[\frac{\pi}{20}(x - 20)\right] + 47.50$

$y(180) = 60$ ft

$\frac{2\pi}{P} = \frac{40}{1}$

$\frac{40P}{40} = \frac{2\pi}{40}$

$P = \pi/20$