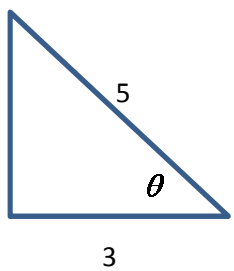
Practice Problems for VPT Calculus Part II

Calculate the period of the following trigonometric functions.

1. $y = \sin\theta,\ y = \cos\theta,\ y = \tan\theta,\ y = \csc\theta,\ y = \sec\theta,\ y = \cot\theta$
2. $y = 2\cos 3\theta,\ y = 3\sin 4\theta$

3. Given the following right triangle, find the exact value of the following trigonometric functions.



$y = \sin\theta,\ y = \cos\theta,\ y = \tan\theta,\ y = \csc\theta,\ y = \sec\theta,\ y = \cot\theta$

4. Given $P = \left(-\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$ is a point on the unit circle that corresponds to θ, find the exact value of the following trigonometric functions.

$y = \sin\theta,\ y = \cos\theta,\ y = \tan\theta,\ y = \csc\theta,\ y = \sec\theta,\ y = \cot\theta$

5. Given $P = \left(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$ is a point on the unit circle that corresponds to θ, find the exact value of the following trigonometric functions.

$y = \sin\theta,\ y = \cos\theta,\ y = \tan\theta,\ y = \csc\theta,\ y = \sec\theta,\ y = \cot\theta$

Use Pythagorean Identities to simplify the following.

6. $\cos^2\theta(1 + \tan^2\theta)$
7. $\sin u \csc u - \cos^2 u$

Write the following using only sines and cosines.

8. $\dfrac{\cot\theta}{\csc\theta}$
9. $\tan\theta\csc\theta$
10. $\cot\theta\sec\theta$

Solve the following equations on $[0, 2\pi]$

11. $\tan\theta + 1 = 0$
12. $2\sin\theta + 1 = 0$

13. Graph $y = 2\cos 3x$

14. Graph $y = 3\sin(4x - 8)$

15. Simplify $\dfrac{1+\tan\theta}{1+\cot\theta}$

16. Simplify $\dfrac{\tan\theta + \cot\theta}{\sec\theta\csc\theta}$

17. A 22-foot extension ladder leaning against a building makes a 70° angle with the ground. How far up the building does the ladder touch?

Find the exact value of the following.

18. $\sin\left(\tan^{-1}\left(\dfrac{1}{2}\right)\right)$
19. $\tan\left(\cos^{-1}\left(-\dfrac{1}{3}\right)\right)$

20. Determine the domain and range of $y = \sin\theta,\ y = \cos\theta,\ y = \tan\theta$

Answers to Practice Problems for VPT Calculus Part II

1.
$y = \sin\theta : 2\pi$
$y = \cos\theta : \ 2\pi$
$y = \tan\theta : \ \pi$
$y = \csc\theta : 2\pi$
$y = \sec\theta : \ 2\pi$
$y = \cot\theta : \ \pi$

2.
$y = 2\cos 3\theta : \ \dfrac{2\pi}{3}$
$y = 3\sin 4\theta : \ \dfrac{\pi}{2}$

3.
$\sin\theta = \dfrac{4}{5}$
$\cos\theta = \dfrac{3}{5}$
$\tan\theta = \dfrac{4}{3}$
$\csc\theta = \dfrac{5}{4}$
$\sec\theta = \dfrac{5}{3}$
$\cot\theta = \dfrac{3}{4}$

4.
$\sin\theta = \dfrac{\sqrt{3}}{2}$
$\cos\theta = -\dfrac{1}{2}$
$\tan\theta = -\sqrt{3}$
$\csc\theta = \dfrac{2\sqrt{3}}{3}$
$\sec\theta = -2$
$\cot\theta = -\dfrac{\sqrt{3}}{3}$

5. $\sin\theta = -\frac{\sqrt{2}}{2}$

$\cos\theta = -\frac{\sqrt{2}}{2}$

$\tan\theta = 1$

$\csc\theta = -\sqrt{2}$

$\sec\theta = -\sqrt{2}$

$\cot\theta = 1$

6. 1

7. $\sin^2\theta$

8. $\cos\theta$

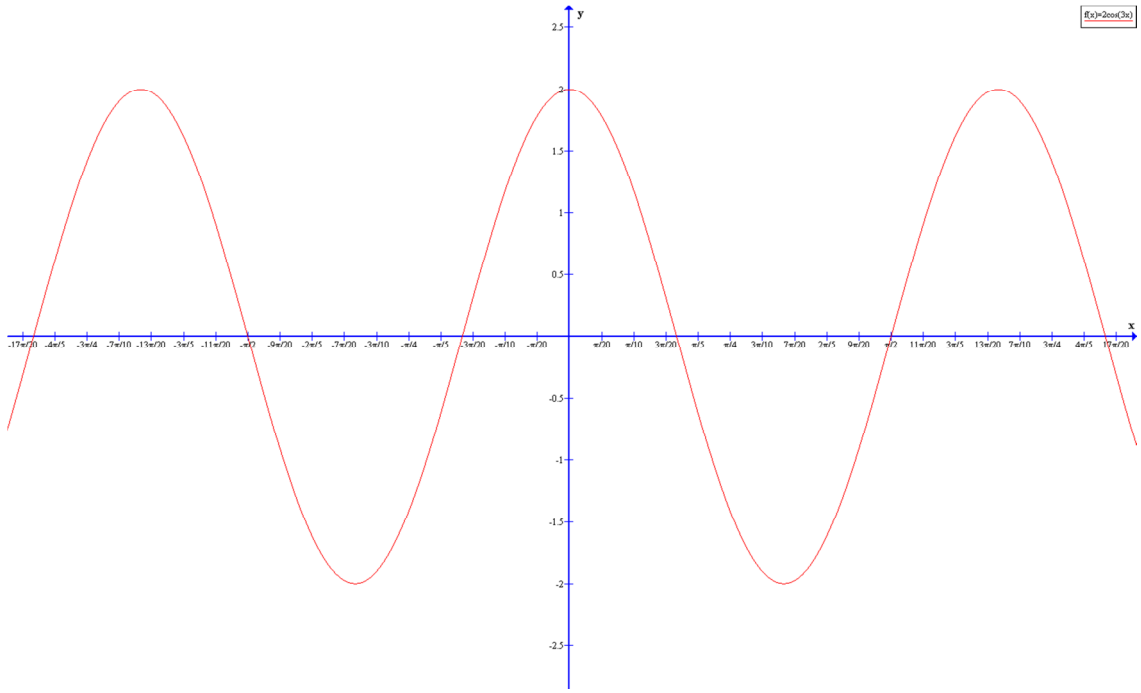
9. $\frac{1}{\cos\theta}$

10. $\frac{1}{\sin\theta}$

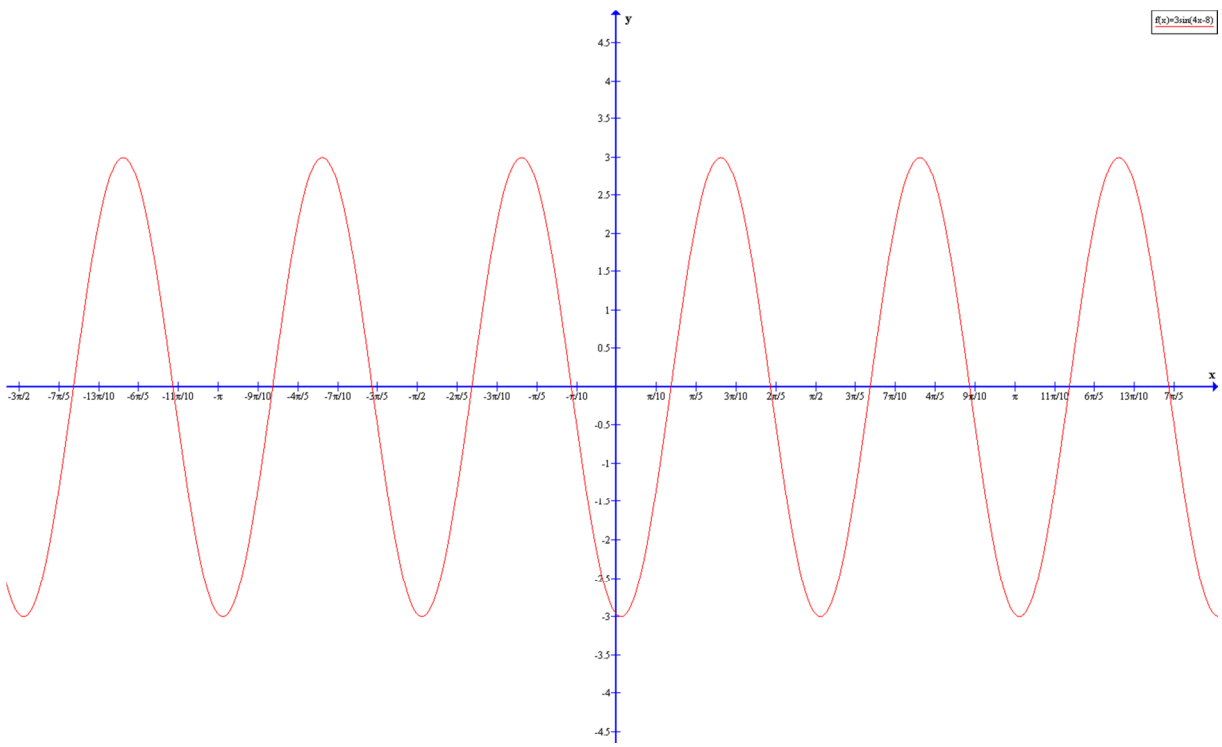
11. $\theta = \frac{3\pi}{4}, \frac{7\pi}{4}$

12. $\theta = \frac{7\pi}{6}, \frac{11\pi}{6}$

13.



14.



15. $\tan\theta$

16. 1

17. 20.67 feet

18. $\frac{\sqrt{5}}{5}$

19. $-2\sqrt{2}$

20.

$y = \sin\theta$ D=$(-\infty,\infty)$ R=$[-1,1]$

$y = \cos\theta$ D=$(-\infty,\infty)$ R=$[-1,1]$

$y = \tan\theta$ D=All real numbers except odd multiples of $\frac{\pi}{2}$ R=$(-\infty,\infty)$