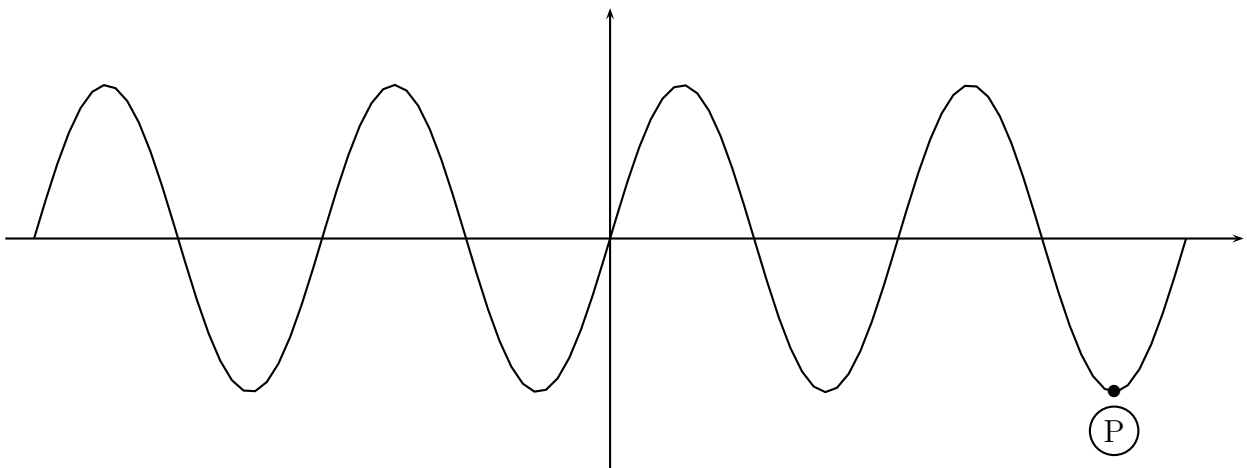


1. Factor the expression $x^{1/2}(x^2 + x) - 3x^{3/2} - 3x^{1/2}$ (where $x \geq 0$).
2. What is the domain of the function f defined by $f(x) = \frac{x+2}{\sqrt{5+3x}}$?
3. Find the domain of $\log(4x^3 - x^5)$.
4. Simplify $\frac{2^{\sqrt{5}+1}}{2^{\sqrt{5}-1}}$
5. If $f(t) = \frac{1}{t} + 1$, then $f^{-1}(t) =$
6. If $f(x) = \frac{x}{x^2 + 3}$ then $f(3+h) =$
7. What is the average rate of change of $s(t) = 7t^2$ on $[2, 5]$?
8. Find the solution(s) of the equation $e^{3x+5} = 2$.
9. Solve $5^{-4x} = 2^{7+3x}$
10. Find the composition $f \circ g(x)$ when

$$f(x) = \frac{x+6}{3x-6} \quad \text{and} \quad g(x) = \frac{x+1}{x-2}.$$

11. Solve $3(2^{2x}) - 5(2^x) + 2 = 0$
12. The population of a midwestern city follows the exponential law. If the population decreased from 1,000,000 to 800,000 from 1995 to 1998, what will the population be in 2001?
13. Simplify $(\tan x) \left(\frac{1}{\sin x} - \sin x \right)$
14. Verify whether or not the following is an identity:

$$\cos^2 t - \sin^2 t = 1 + 2 \sin^2 t$$
15. Suppose that $\triangle ABC$ is a right triangle with $\angle C = \frac{\pi}{2}$. If $AC = 6$ and $BC = 8$ find $\sin A$, $\cos A$ and $\tan A$
16. Express 450° in radians.
17. Two angles of a triangle are $\frac{\pi}{3}$ and $\frac{2\pi}{5}$. What is the third angle?
18. Evaluate $\sin \left(\frac{183\pi}{4} \right)$
19. In the following graph of $y = \sin(x)$, what are the coordinates of the point P ?



20. Simplify $\frac{\sin^2 \beta}{1 - \cos \beta} + \frac{\sin^2 \beta}{1 + \cos \beta}$

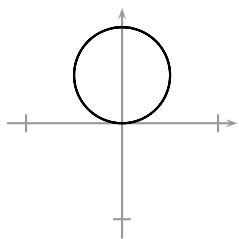
21. When an analog clock reads 5:00, what is the smaller angle, in radians, between the hour hand and the minute hand?
22. A wheel of radius 3 feet is rotating at 100 rpm (revolutions per minute). What is the linear speed in feet per minute of a point on the circumference of the wheel?
23. What is the area of the triangle with sides $a = 4$, $b = 10$ and included angle $\theta = \frac{\pi}{6}$?
24. Sketch the graph of $y = \cos(x + \pi/4)$.
25. What is the period of $f(x) = -3\sin(13\pi x - 2)$?

For the next two problems:

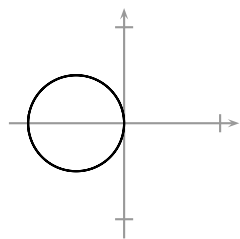
$$\sin A = \frac{1}{3} \quad \text{with} \quad \frac{\pi}{2} < A < \pi \quad \text{and} \quad \sin B = -\frac{2}{7} \quad \text{with} \quad \pi < B < \frac{3\pi}{2}$$

26. Find the exact value of $\cos(A - B)$:
27. Find the exact value of $\sin(A - B)$:
28. Find the exact value of $\cos(-15^\circ)$
29. Solve $\sin(x) \cos(x) = \frac{\sqrt{2}}{4}$

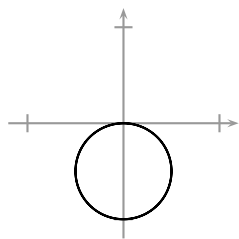
30. Find all angles θ in the range $0^\circ \leq \theta \leq 360^\circ$ for which $\sin(\theta) = \sqrt{3}\cos(\theta)$
31. Simplify $\cos^{-1}\left(\cos\left(\frac{5\pi}{4}\right)\right)$
32. Solve $\sin^2(\theta) + 3\sin(\theta) = -2$.
33. Simplify $\cos\left(\cos^{-1}\left(\frac{5\pi}{40}\right)\right)$
34. I want to construct a triangle with sides of length a, b, c opposite angles A, B, C respectively. If I want $a = 2, b = 5$ and $c = 12$, find $\cos(A)$ or show that no such triangle exists.
35. I want to construct a triangle with sides of length a, b, c opposite angles A, B, C respectively. If I want $\sin(A) = \frac{1}{10}, \sin(B) = \frac{1}{8}$ and $b = 5$, find a or show that no such triangle exists.
36. Convert polar coordinates of $(6, \frac{\pi}{6})$ to rectangular coordinates:
37. Give all possible polar coordinates for the point with rectangular coordinates $(6, -6)$:
38. State whether the graph of $-7x^2 + 5y^2 + 23x - 46y + 7 = 0$ is a circle, a parabola, an ellipse (Not a circle) or a hyperbola. You may assume that it is one of these curves.
39. Find the vertex of the parabola $7y = x^2 - 12x + 57$.
40. Which of the following is the graph of $r = -4\sin\theta$?



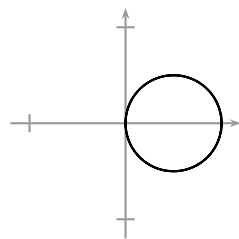
(a)



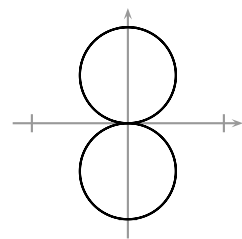
(b)



(c)



(d)



(e)