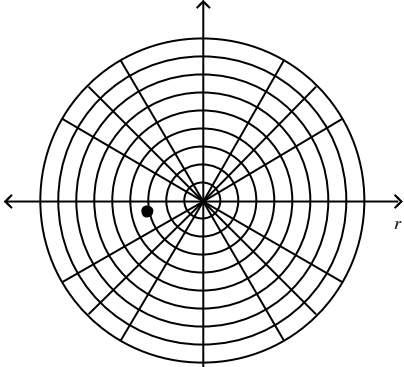


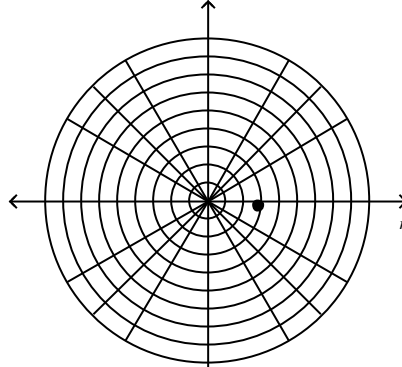
Pre-AP Precalculus Final Review

2. Which is the graph of the polar coordinate $\left(3, \frac{11\pi}{12}\right)$?

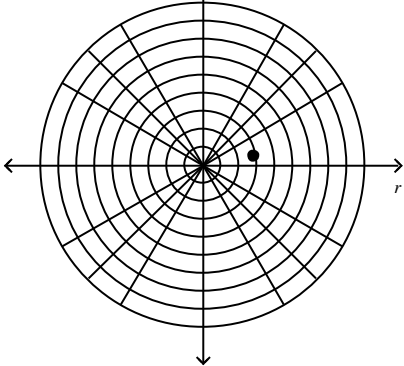
a.



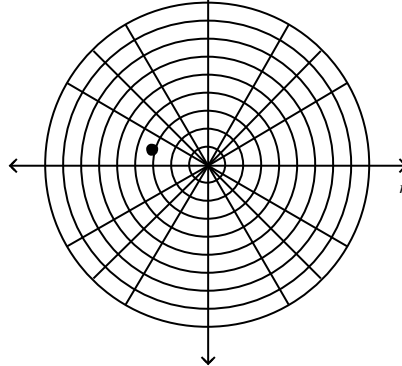
c.



b.



d.



3. Find the rectangular coordinates of $\left(5, \frac{\pi}{6}\right)$.

a. $\left(\frac{5}{2}, \frac{5\sqrt{5}}{2}\right)$

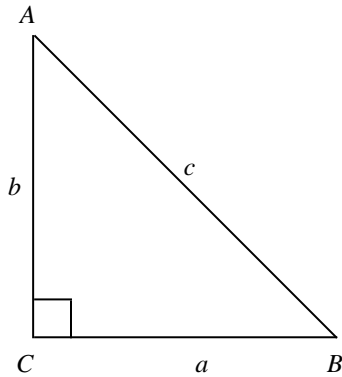
c. $\left(\frac{5}{2}, \sqrt{5}\right)$

b. $\left(\frac{5\sqrt{3}}{2}, \frac{5}{2}\right)$

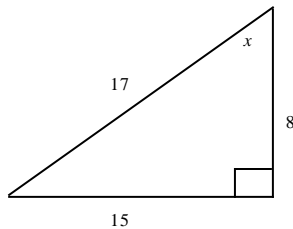
d. $\left(\frac{5}{2}, \frac{5\sqrt{3}}{2}\right)$

Short Answer

4. Given that $m\angle A = 29^\circ$ and $c = 17$, find a in the right triangle below.



5. Solve for x in the given triangle to the nearest degree.



6. A tree casts a shadow of 20 meters when the angle of elevation of the sun is 28° . Find the height of the tree to the nearest meter.
7. Given a triangle with $a = 18$, $A = 31^\circ$, and $B = 14^\circ$, what is c ?
8. Find the area of the triangle ABC under the given conditions.
 $A = 50^\circ$, $b = 5$ feet, and $c = 6$ feet
9. Which angle is *not* coterminal with 627° ?
10. Convert 288° to radians.
11. On a Ferris wheel, you travel through a central angle of $\frac{92\pi}{5}$ before stopping. If the radius of the Ferris wheel is 51 feet, how many feet have you traveled?
12. Evaluate the expression $\cos\left(\frac{3}{4}\pi\right)$.
13. Which single expression is equivalent to $\cos(\theta - 3/2\pi)$?
14. What are all the exact t -values for which $\tan t = 1$?
15. Which is the rule of a function g whose graph is the graph of $f(t) = \sec t$ compressed vertically by a factor of $\frac{1}{4}$ and shifted 8 units to the right and down 8 units.

16. A water wave is created in a wave tank. It has an amplitude of 5 and a period of $\frac{6\pi}{7}$. Find the equation of this wave as a sine function.
17. What is the amplitude and period of $f(t) = -3 \cos(8t)$?
18. What are the amplitude, period, and phase shift of the given function?
 $f(t) = \frac{2}{3} \cos(4t + 3\pi)$
19. Solve the equation.
 $\cos x = 0.6$
20. Find the exact functional value without using a calculator.
 $\sin^{-1}\left(\sin \frac{2}{3} \pi\right)$
21. Find all solutions of $\cos 2x + \frac{\sqrt{2}}{2} = 0$.
22. Use factoring, the quadratic formula, or identities to solve $-3 \cos x + 3 = 2 \sin^2 x$. Find all solutions on the interval $[0, 2\pi)$.
23. A ferris wheel has a radius of 22 feet, and its center is 49 feet above the ground. The wheel travels at a constant speed of $\frac{11}{18} \pi$ per minute. The height of a point on the ferris wheel as a function of time is given by
 $h(t) = 49 + 22 \sin\left(\frac{11}{18} \pi t\right)$, where h is the height in feet and t is the time in minutes. Find $h(t)$ when $t = 4.5$ minutes.
24. Which of the following appears to form an identity with $\frac{\sin^2 x}{1 - \cos x}$ when you test it graphically?
25. What is the simplified form of $\sin(x + 3\pi/2)$?
26. Find the absolute value of the complex number $2 - 3i$.
27. Find the exact value of $\sin\left(\frac{-11\pi}{12}\right)$.
28. Use the half-angle identity to find the exact value of $\sin\left(\frac{-7\pi}{8}\right)$.
29. Given $\tan x = -\frac{7}{11}$ and $\frac{3\pi}{2} < x < 2\pi$, find the exact value of $\tan 2x$.
30. Find all solutions of the equation on the interval $[0, 2\pi)$.
 $\tan^2 x = -\frac{\sqrt{2}}{2} \sec x$
31. Find all solutions of the equation on the interval $[0, 2\pi)$.
 $4 \cot 2x - 4\sqrt{3} = 0$

32. Find all solutions of the equation on the interval $[0, 2\pi)$.

$$3 \sec^2 \frac{x}{2} + 7 \sec \frac{x}{2} + 2 = 0$$

33. Express the number in polar form.

$$-4 + 4\sqrt{3}i$$

34. If $z = 10 \left(\cos \frac{5\pi}{18} + i \sin \frac{5\pi}{18} \right)$ and $w = 5 \left(\cos \frac{5\pi}{36} + i \sin \frac{5\pi}{36} \right)$ find:

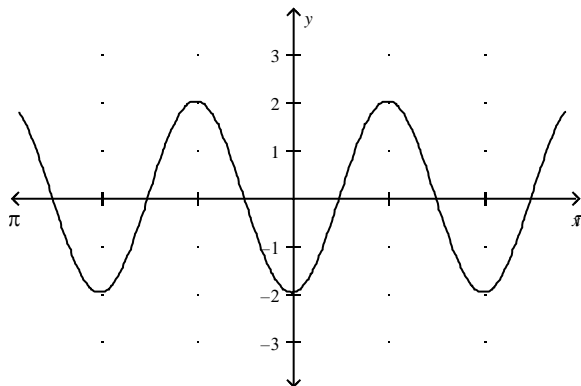
a. zw

b. $\frac{z}{w}$

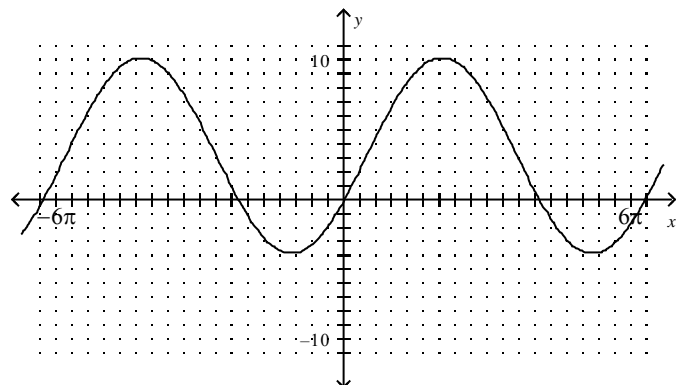
35. Evaluate:

$$(-3 + 3i)^5$$

39. Find a function for the graph below.



40. What is the rule of a function of the form $f(t) = a \sin(bt + c) + d$ whose graph appears to be identical to the given graph?



41. What are the values of $\sin \theta$ and $\cos \theta$ for the acute angle θ in standard position if

$$\tan \theta = \frac{5}{4\sqrt{6}}?$$

42. Find all solutions of $\tan^2 x = -\frac{1}{6}\sqrt{3} \sec x$ in $(0, 2\pi)$.
43. θ is an angle in standard position with point $P(-4, 2)$ on the terminal side. Which statement is *not* correct?
44. Solve triangle ABC given that $a = 12$, $b = 18$, and $c = 19$.
45. Solve triangle ABC given that $A = 40^\circ$, $B = 49^\circ$, and $b = 75$.
46. Express the number in polar form.
 $-2 + 2\sqrt{3}i$
50. Graph the polar equation $r = 5 - 4 \cos \theta$ for $0 \leq \theta \leq 2\pi$.
51. Identify the name of the graph for the equation $r = \cos 8\theta$, as either cardioid, rose, circle, lemniscate, or limaçon.
52. Identify the name of the graph for the equation $r = 3 \cos \theta$, as either cardioid, rose, circle, lemniscate, or limaçon.
53. Identify the name of the graph for the equation $r^2 = -49 \sin 2\theta$, as either cardioid, rose, circle, lemniscate, or limaçon.
54. Identify the name of the graph for the equation $r = 2 + 2 \cos \theta$, as either cardioid, rose, circle, lemniscate, or limaçon.
55. Plot $-\sqrt{3} - i$ in the complex plane.

Pre-AP Precalculus Final Review Answer Section

MULTIPLE CHOICE

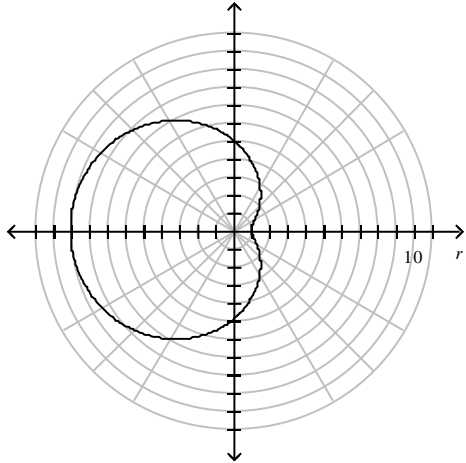
- 2. D
- 3. B

SHORT ANSWER

- 4. 8.24
- 5. 62°
- 6. 11 m
- 7. $c \approx 24.7$
- 8. $\approx 11.5 \text{ ft}^2$
- 9. 1167°
- 10. $\frac{8}{5}\pi$
- 11. 2948.1 feet
- 12. $-\frac{\sqrt{2}}{2}$
- 13. $-\sin \theta$
- 14. $\frac{\pi}{4} + n\pi$
- 15. $g(t) = \frac{1}{4} \sec(t-8) - 8$
- 16. $f(t) = 5 \sin \frac{7t}{3}$
- 17. amplitude: 3 period: $\frac{1}{4}\pi$
- 18. amplitude: $\frac{2}{3}$
phase shift: $-\frac{3}{4}\pi$
period: $\frac{1}{2}\pi$
- 19. $0.93 + 2k\pi$ or $5.35 + 2k\pi$
- 20. $\frac{1}{3}\pi$
- 21. $\pm \frac{3}{8}\pi + k\pi$
- 22. $x = \frac{1}{3}\pi, x = \frac{5}{3}\pi, x = 0$
- 23. 64.6 ft

24. $\frac{1 + \sec x}{\sec x}$
25. $-\cos x$
26. 3.61
27. $\frac{\sqrt{2} - \sqrt{6}}{4}$
28. $\frac{-\sqrt{2 - \sqrt{2}}}{2}$
29. $-\frac{77}{36}$
30. $\frac{3\pi}{4}, \frac{5\pi}{4}$
31. $\frac{\pi}{12}, \frac{7\pi}{12}, \frac{13\pi}{12}, \frac{19\pi}{12}$
32. $\frac{4}{3}\pi$
33. $8\left(\cos \frac{2\pi}{3} + i \sin \frac{2\pi}{3}\right)$
34. a. $zw = 50\left(\cos \frac{5\pi}{12} + i \sin \frac{5\pi}{12}\right)$
 b. $\frac{z}{w} = 2\left(\cos \frac{5\pi}{36} + i \sin \frac{5\pi}{36}\right)$
35. $972 - 972i$
39. $f(t) = -2 \cos 3t$
40. $7 \sin \left(\frac{1}{3}t - \frac{\pi}{6}\right) + 3$
41. $\sin \theta = \frac{5}{11}, \cos \theta = \frac{4\sqrt{6}}{11}$
42. $x = \frac{5\pi}{6}, \frac{7\pi}{6}$
43. $\cos \theta = \frac{\sqrt{5}}{5}$
44. $A \approx 37.7^\circ, B \approx 66.6^\circ, C \approx 75.6^\circ$
45. $C = 91^\circ, a \approx 63.87, c \approx 99.36$
46. $4\left(\cos \frac{2\pi}{3} + i \sin \frac{2\pi}{3}\right)$

50.



51. rose

52. circle

53. lemniscate

54. cardioid

55. .

