

Midterm Review  
Chapter 6

Name Answer Key

Change each degree measure to radian measure in terms of  $\pi$ .

1.  $135^\circ$                       2.  $-312^\circ$                       3.  $1250^\circ$                       4.  $-75^\circ$   
 $\frac{3\pi}{4}$                                    $-\frac{26\pi}{15}$                                    $\frac{125\pi}{18}$                                    $-\frac{5\pi}{12}$

Change each radian measure to degree measure. Round to the nearest tenth if necessary.

5. 17                                  6.  $\frac{11\pi}{3}$                                   7. -3.5                                  8.  $-\frac{\pi}{6.2}$   
974.0°                                  660°                                  -200.5°                                  -29.0°

9. Determine the angular velocity if 11.3 revolutions are completed in 3.9 seconds. Round to the nearest tenth.

$$18.2 \text{ rad/sec}$$

10. Determine the linear velocity of a point rotating at 15 revolutions per minute at a distance of 3.04 meters from the center of a rotating object. Round to the nearest tenth.

$$286.5 \text{ m/min}$$

11. A gyroscope of radius 18 cm rotates 35 times per minute. Find the linear velocity of a point on the edge of the gyroscope. Express in centimeters per second.

$$1080 \text{ cm/sec}$$

12. A ferris wheel rotates one revolution every 50 seconds. What is its angular velocity in radians per second?

$$0.1 \text{ rad/sec}$$

13. A clothes dryer is rotating at 500 revolutions per minute. Determine its angular velocity in radians per second.

$$52.4 \text{ rad/sec}$$

14. The diameter of a circle is 22 inches. If a central angle measures  $78^\circ$ , find the length of the intercepted arc.

$$15.0 \text{ in}$$

15. Find the degree measure of the central angle associated with an arc that is 13.8 cm long in a circle with a radius of 6 cm.

$$131.8^\circ$$

16. Find the area of a sector if the central angle measures  $30^\circ$  and the radius of the circle is 15 cm.

$$58.9 \text{ cm}^2$$

17. Write an equation of the sine function with amplitude 5, period  $3\pi$ , and phase shift  $-\pi$ .

$$y = \pm 5 \sin\left(\frac{2}{3}\theta + \frac{2\pi}{3}\right)$$

18. Write an equation of the tangent function with period  $\frac{\pi}{4}$ , phase shift  $\pi$ , and vertical shift 1.

$$y = \tan(4\theta - 4\pi) + 1$$

19. State the amplitude, period and phase shift of the function  $y = -0.4 \sin(10x + \frac{\pi}{2})$

$$\text{amp} = 0.4 \quad \text{period} = \frac{\pi}{5} \quad \text{PS} = -\frac{\pi}{20}$$

20. State the period and phase shift of the function  $y = 3 \tan(4x - \frac{\pi}{3})$

$$\text{amp} = 3 \quad \text{period} = \frac{\pi}{4} \quad \text{PS} = \frac{\pi}{12}$$

21. State the amplitude, period and phase shift of the function  $y = \frac{1}{3} \sin(2x - \frac{\pi}{3})$

$$\text{amp} = \frac{1}{3} \quad \text{period} = \pi \quad \text{PS} = \frac{\pi}{6}$$

22. State the period and phase shift of the function  $y = \frac{1}{2} \cot(2x - \frac{\pi}{4})$

$$\text{period} = \frac{\pi}{2} \quad \text{PS} = \frac{\pi}{8}$$

23. What is the equation for the inverse of  $y = \cos x + 1$ ?

$$\arccos(x-1) = y$$

24. What is the equation for the inverse of  $y = \frac{1}{2} \sin x$ ?

$$\arcsin 2x = y$$

25. Evaluate  $\cos(\tan^{-1} \frac{\sqrt{3}}{3} + \sin^{-1} \frac{1}{2})$

$$\frac{1}{2}$$

26. Evaluate  $\cos^{-1}(\tan \frac{\pi}{4})$

$$0$$

27. Find the values of  $x$  for which the equation  $\cos x = 1$  is true.

$$2\pi k$$

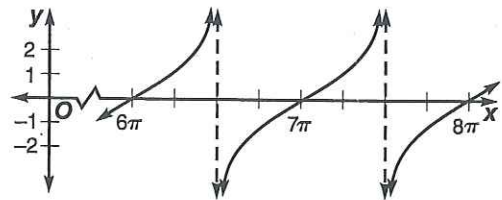
28. What is the equation of the graph shown at the right?

a.  $y = \tan x$

B.  $y = \cot x$

C.  $y = \cot 2x$

D.  $y = \tan 2x$



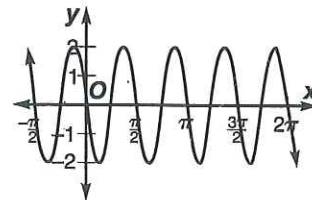
29. What is the equation of the graph shown at the right?

A.  $2 \cos \frac{x}{4}$

B.  $y = 2 \cos 4x$

B.  $y = -2 \sin \frac{x}{4}$

D.  $y = -2 \sin 4x$



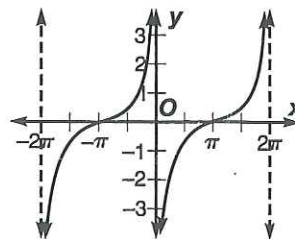
30. What is the equation of the graph shown at the right?

A.  $y = \tan(\frac{x}{2} + \pi)$

B.  $y = \tan(\frac{x}{2} + \frac{\pi}{2})$

C.  $y = \tan(\frac{x}{4} + \pi)$

D.  $y = \tan(\frac{x}{4} + \frac{\pi}{4})$



$$1. 135 \times \frac{\pi}{180} = \boxed{\frac{3\pi}{4}}$$

$$11. 35 \times 2\pi = 70\pi$$

$$2. -312 \times \frac{\pi}{180} = \boxed{-\frac{260\pi}{15}}$$

$$V = \frac{70\pi}{60} (18) \approx \boxed{66.0 \text{ cm/sec}}$$

$$3. 1250 \times \frac{\pi}{180} = \boxed{\frac{125\pi}{18}}$$

$$12. \frac{2\pi}{50} \approx \boxed{0.1 \text{ rad/sec}}$$

$$4. -75 \times \frac{\pi}{180} = \boxed{-\frac{5\pi}{12}}$$

$$13. 500 \times 2\pi = 1000\pi$$

$$5. 17 \times \frac{180}{\pi} = \boxed{974.0^\circ}$$

$$\omega = \frac{1000\pi}{60} \approx \boxed{52.4 \text{ rad/sec}}$$

$$6. \frac{11\pi}{3} \times \frac{180}{\pi} = \boxed{660^\circ}$$

$$14. S = r\theta \quad 78 \times \frac{\pi}{180} = \frac{78\pi}{180}$$

$$7. -3.5 \times \frac{180}{\pi} \approx \boxed{-200.5^\circ}$$

$$= 11 \left( \frac{78\pi}{180} \right) \\ \approx \boxed{15.0 \text{ in}}$$

$$8. \frac{-\pi}{6.2} \times \frac{180}{\pi} = \boxed{-29.0^\circ}$$

$$15. S = r\theta$$

$$13.8 = 6\theta$$

$$9. 11.3 \times 2\pi = 22.6 \text{ rad}$$

$$2.3 = \theta$$

$$\omega = \frac{\theta}{t} = \frac{22.6\pi}{3.9} \approx \boxed{18.2 \text{ rad/sec}}$$

$$2.3 \times \frac{180}{\pi} \approx \boxed{131.8^\circ}$$

$$10. 15 \times 2\pi = 30\pi$$

$$16. A = \frac{1}{2} r^2 \theta \quad 30 \times \frac{\pi}{180} = \frac{\pi}{6}$$

$$V = \frac{\theta}{t} r = \frac{30\pi}{1} \cdot (3.04)$$

$$= \frac{1}{2} (15)^2 \left( \frac{\pi}{6} \right)$$

$$\approx \boxed{58.9 \text{ cm}^2}$$

$$\approx \boxed{286.5 \text{ m/min}}$$

$$17. \quad y = \pm 5 \sin\left(\frac{2}{3}\theta + \frac{2\pi}{3}\right)$$

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

$$\frac{c}{2} = -\pi$$

$$3\pi k = 2\pi$$

$$c = -\frac{2\pi}{3}$$

$$k = \frac{2}{3}$$

$$18. \quad y = \tan(4\theta - 4\pi) + 1$$

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

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

$$k = 4$$

$$c = 4\pi$$

$$19. \quad \begin{array}{l} \text{amp} = 0.4 \\ \text{period} = \frac{\pi}{5} \\ \text{p.s.} = -\frac{\pi}{20} \end{array}$$

$$\frac{2\pi}{k} = \frac{2\pi}{10} = \frac{\pi}{5}$$

$$\frac{c}{k} = \frac{-\pi}{\frac{2}{10}} = -\frac{\pi}{20}$$

$$20. \quad \begin{array}{l} \text{amp} = \frac{3}{4} \\ \text{period} = \frac{\pi}{4} \\ \text{p.s.} = \frac{\pi}{12} \end{array}$$

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

$$\frac{c}{k} = \frac{\frac{\pi}{3}}{4} = \frac{\pi}{12}$$

$$21. \quad \begin{array}{l} \text{amp} = \frac{1}{3} \\ \text{period} = \pi \\ \text{p.s.} = \frac{\pi}{6} \end{array}$$

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

$$\frac{c}{k} = \frac{\frac{\pi}{3}}{2} = \frac{\pi}{6}$$

$$22. \quad \begin{array}{l} \text{period} = \frac{\pi}{2} \\ \text{p.s.} = \frac{\pi}{8} \end{array}$$

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

$$\frac{c}{k} = \frac{\frac{\pi}{4}}{2} = \frac{\pi}{8}$$

$$23. y = \cos x + 1$$

$$x = \cos y + 1$$

$$x - 1 = \cos y$$

$$\cos^{-1}(x-1) = y$$

$$\boxed{\text{Arccos}(x-1) = y}$$

28. A

29. D

30. B

$$24. y = \frac{1}{2} \sin x$$

$$x = \frac{1}{2} \sin y$$

$$2x = \sin y$$

$$\sin^{-1} 2x = y$$

$$\boxed{\text{Arcsin} 2x = y}$$

$$25. \cos(\tan^{-1} \frac{\sqrt{3}}{3} + \sin^{-1} \frac{1}{2})$$

$$\cos(30^\circ + 30^\circ)$$

$$\cos 60^\circ$$

$$\boxed{\frac{1}{2}}$$

$$26. \cos^{-1}(\tan \frac{\pi}{4})$$

$$\cos^{-1}(1)$$

$$\boxed{0}$$

$$27. \cos x = 1$$

$$x = \boxed{0 + 2\pi k}$$

