

### Chapter 5: Multiple Choice

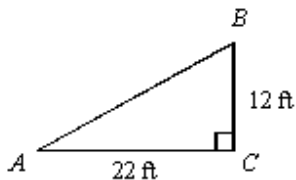
\_\_\_\_\_ 1) Give the angle measure represented by 120 rotations clockwise.

- a)  $43,199^\circ$                       b)  $-43,203^\circ$   
c)  $-43,200^\circ$                       d)  $43,201^\circ$

\_\_\_\_\_ 2) Find the least positive angle measurement that is co-terminal with  $-230^\circ$ .

- a)  $140^\circ$                               b)  $135^\circ$   
c)  $130^\circ$                               d)  $132^\circ$

\_\_\_\_\_ 3) Find the values of sine, cosine and tangent for  $\angle A$ .



- a)  $\sin A = \frac{\sqrt{157}}{11}$ ,  $\cos A = \frac{\sqrt{157}}{6}$ ,  $\tan A = \frac{11}{6}$   
b)  $\sin A = \frac{6\sqrt{157}}{157}$ ,  $\cos A = \frac{11\sqrt{157}}{157}$ ,  $\tan A = \frac{6}{11}$   
c)  $\sin A = \frac{\sqrt{157}}{6}$ ,  $\cos A = \frac{\sqrt{157}}{11}$ ,  $\tan A = \frac{6}{11}$   
d)  $\sin A = \frac{11\sqrt{157}}{157}$ ,  $\cos A = \frac{6\sqrt{157}}{157}$ ,  $\tan A = \frac{11}{6}$

\_\_\_\_\_ 4) If  $\tan \theta = \frac{3}{4}$ , find  $\sin \theta$ .

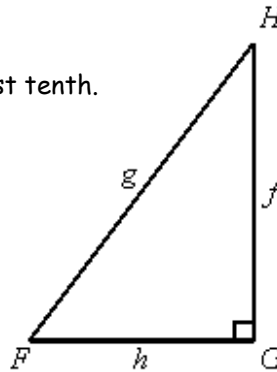
- a)  $\sin \theta = \frac{1}{2}$                               b)  $\sin \theta = \frac{3}{5}$   
c)  $\sin \theta = 2$                               d)  $\sin \theta = \frac{8}{5}$

\_\_\_\_\_ 5) Use the unit circle to find the value of  $\tan(-180^\circ)$

- a) undefined
- b) 0
- c) -1
- d) 1

\_\_\_\_\_ 6) If  $g = 26.4$  and  $F = 35^\circ$ , find  $h$ . Round to the nearest tenth.

- a)  $h = 22.6$
- b)  $h = 24.6$
- c)  $h = 21.6$
- d)  $h = 20.6$



\_\_\_\_\_ 7) Solve the equation  $\cos x = -\frac{1}{2}$ , if  $0^\circ \leq x \leq 360^\circ$ .

- a)  $135^\circ, 225^\circ$
- b)  $210^\circ, 330^\circ$
- c)  $150^\circ, 210^\circ$
- d)  $120^\circ, 240^\circ$

\_\_\_\_\_ 8) Given a triangle with  $a = 19$ ,  $A = 43^\circ$ , and  $B = 26^\circ$ , what is the length of  $c$ ?

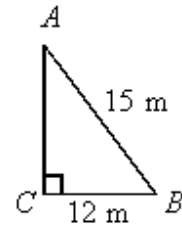
- a) 26
- b) 25
- c) 27
- d) 28

\_\_\_\_\_ 9) Find the area of a triangle with  $a = 18.8$ ,  $b = 11.6$ ,  $c = 13.8$ . Round to the nearest tenth.

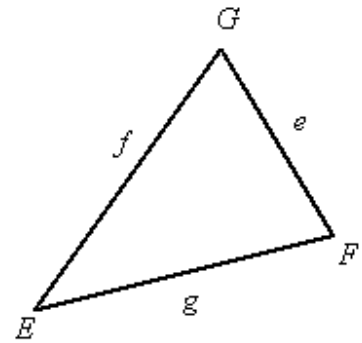
- a)  $79.1 \text{ units}^2$
- b)  $82.7 \text{ units}^2$
- c)  $79.7 \text{ units}^2$
- d)  $80.1 \text{ units}^2$

## Chapter 5: Show Your Work

- 10) Find the values of the six trigonometric ratios for  $\angle A$ .



- 11) Find all solutions for the triangle with  $e=37$ ,  $f=34$  and  $E=165^\circ$ . If no solution exists, write *none*. Round to the nearest tenth.



- 12) Find  $\tan \theta$ , if  $\theta$  is an angle in standard position and the point with coordinates  $(-12,5)$  lies on the terminal side of the angle. Draw a diagram to help!
- 13) In the right triangle ABC,  $a=120$  and  $c=140$  and  $\angle C$  is a right angle. Solve the triangle. Round to the nearest tenth, if necessary.
- 14) Given a triangle with  $b=2$ ,  $c=7$  and  $A=42^\circ$ , what is the length of  $a$ ? Round to the nearest tenth.

## Chapter 6: Multiple Choice

\_\_\_\_\_ 15) Change 1.96 radians to degree measure. Round to the nearest tenth.

- a)  $472.3^\circ$                       b)  $112.3^\circ$   
c)  $292.3^\circ$                       d)  $202.3^\circ$

\_\_\_\_\_ 16) For a circle of radius 8 feet, find the arc length  $s$  with a central angle of  $10^\circ$ .

- a)  $s = \frac{16}{9}\pi$  feet                      b)  $s = \frac{8}{9}\pi$   
c)  $s = \frac{4}{9}\pi$                               d)  $s = \frac{2}{9}\pi$

\_\_\_\_\_ 17) Find the area of a sector with a central angle of  $32^\circ$  and a radius of 8.5 millimeters.

- a)  $40.4\text{mm}^2$                       b)  $2.4\text{mm}^2$   
c)  $20.2\text{mm}^2$                       d)  $9.5\text{mm}^2$

\_\_\_\_\_ 18) Jack's bicycle tires have a diameter of 24 inches. If he rides a 10 miles per hour, what is the angular velocity of the wheels in revolutions per minute (rpm)?

- a) 240 rpm                              b) 2.4 rpm  
c) 10 rpm                                d) 140 rpm

\_\_\_\_\_ 19) Write an equation of the cosine function with amplitude of 2 and a period of  $4\pi$ .

- a)  $y = 2\cos\left(\frac{1}{2}x\right)$                       b)  $y = -2\cos\left(\frac{1}{4}x\right)$   
c)  $y = -\frac{1}{2}\cos\left(\frac{1}{2}x\right)$                       d)  $y = \frac{1}{2}\cos\left(\frac{1}{4}x\right)$

\_\_\_\_\_ 20) Write an equation for the given tangent function give the period of  $\frac{1}{3}\pi$ , phase shift of  $-\frac{\pi}{4}$ , vertical shift of -5.

a)  $y = 5 - \tan 6\left(x - \frac{\pi}{4}\right)$     b)  $y = -5 + \tan 6\left(x + \frac{\pi}{4}\right)$

c)  $y = -5 + \tan \frac{1}{3}\left(x - \frac{\pi}{4}\right)$     d)  $y = -5 + \tan \frac{1}{3}\left(x + \frac{\pi}{4}\right)$

\_\_\_\_\_ 21) Evaluate  $\sin\left(\text{Arc cos}-\frac{9}{\sqrt{145}}\right)$ . Assume you do not have to rationalize the denominator.

a)  $\frac{8}{\sqrt{145}}$     b)  $-\frac{\sqrt{145}}{\sqrt{248}}$

c)  $\frac{\sqrt{145}}{\sqrt{248}}$     d)  $-\frac{8}{\sqrt{145}}$

### Chapter 6: Show Your Work

22) Graph  $y = \sin 2x$  A= \_\_\_\_\_ B= \_\_\_\_\_ period = \_\_\_\_\_ C= \_\_\_\_\_ D= \_\_\_\_\_

23) Graph  $y = -3 + 2 \cos(x + 90^\circ)$  A= \_\_\_\_\_ B= \_\_\_\_\_ period = \_\_\_\_\_ C= \_\_\_\_\_ D= \_\_\_\_\_

24) Kyle observes a buoy bobbing up and down through a total amplitude of 6 feet. Beginning at the top of the wave, if the buoy completes a full cycle every 4 seconds, what is the height of the buoy relative to the lowest point after 10 seconds?

### Chapter 7: Multiple Choice

\_\_\_\_\_ 25) If  $\csc \theta = -\frac{5}{4}$  and  $0^\circ \leq \theta \leq 270^\circ$ , find  $\tan \theta$ .

a)  $-\frac{4}{3}$

b)  $\frac{3}{4}$

c)  $\frac{4}{3}$

d)  $-\frac{4}{5}$

\_\_\_\_\_ 26) Simplify  $\frac{\tan^2 x \csc^2 x - 1}{\tan^2 x}$

a)  $\csc^2 x$

b) -1

c)  $\tan^2 x$

d) 1

\_\_\_\_\_ 27) Which of the following is a trigonometric identity?

a)  $\sin^2 x - \cos^2 x = 1$

b)  $\cot^2 x + \csc^2 x = 1$

c)  $\tan^2 x + \sec^2 x = 1$

d)  $\cot^2 x = \csc^2 x - 1$

\_\_\_\_\_ 28) The principal values for *sine* are in which quadrant(s)?

a) I

b) II

c) I, II

d) I, IV

## Chapter 7: Show Your Work

29) Use a sum and difference identity to find the exact value of  $225^\circ$

30) Use a half-angle identity to find the exact value of  $\cos 165^\circ$

31) Verify  $\csc^2 x = \cot^2 x + \sin x \csc x$

32) Given  $\cos \theta = \frac{2}{7}$ ,  $0^\circ < \theta < 90^\circ$ , find  $\sin 2\theta$ ,  $\cos 2\theta$ , and  $\tan 2\theta$ .

33) Solve  $\sin^2 x \csc x - 1 = 0$  for  $0^\circ \leq x \leq 360^\circ$

34) Solve  $2 \cos^2 x - 5 \cos x + 2 = 0$  for the principal values of  $x$ .

## Chapter 8: Multiple Choice

\_\_\_\_\_ 35) Identify the ordered pair that represents the vector from  $A(5,6)$  to  $B(6, -2)$  and the magnitude of  $\overrightarrow{AB}$ .

a)  $\langle -9, 3 \rangle; \sqrt{61}$       b)  $\langle 1, -8 \rangle; \sqrt{65}$

c)  $\langle 2, -9 \rangle; \sqrt{67}$       d)  $\langle 2, -3 \rangle; \sqrt{72}$

\_\_\_\_\_ 36) Find the horizontal velocity of an object fired  $30^\circ$  from the ground with a velocity of 45 ft/sec

a) 39.0 ft/sec      b) 22.5 ft/sec

c) 26.0 ft/sec      d) 21.2 ft/sec

\_\_\_\_\_ 37) Which of the following parametric equations properly models the position of an object launched with a velocity of 32 ft/s at an angle of  $14^\circ$  from the ground.

a)  $x = 32\cos 14$       b)  $x = 32\cos 14t$   
 $y = 32 \sin 14$        $y = 32\sin 14t$

c)  $x = 32 \cos 14t$       d)  $x = 32\cos 14t$   
 $y = 32\sin 14t - 16t^2$        $y = 32\sin 14t - 4.9t^2$

\_\_\_\_\_ 38) Find the inner product of  $\vec{a}$  and  $\vec{b}$  if  $\vec{a} = \langle 2, 6, -1 \rangle$  and  $\vec{b} = \langle -7, 4, 10 \rangle$  and state whether the vectors are perpendicular.

a) 0; yes      b) -44; no

c) 20; no      d) -5; no

\_\_\_\_\_ 39) Write a vector equation of the line that passes through  $P(-1,6)$  and is parallel to  $\langle 3, -1 \rangle$ .

a)  $\langle x + 7, y + 8 \rangle = t \langle 5, 1 \rangle$       b)  $\langle x - 5, y - 14 \rangle = t \langle 8, 5 \rangle$

c)  $\langle x + 1, y - 6 \rangle = t \langle 3, -1 \rangle$       d)  $\langle x + 14, y + 13 \rangle = t \langle -1, 8 \rangle$

## Chapter 8: Show Your Work

- 40) A hiker leaves her camp and walks for 15 miles in a direction  $50^\circ$  north of due east. Find the magnitude of her vertical and horizontal components.
- 41) Let  $\vec{m} = \langle 2, -3 \rangle$  and  $\vec{p} = \langle -2, 4 \rangle$ . Find  $2\vec{m} + 3\vec{p}$
- 42) Find the inner product of  $\vec{a}$  and  $\vec{b}$  if  $\vec{a} = \langle -4, 2, 5 \rangle$  and  $\vec{b} = \langle 3, 6, 1 \rangle$ . Are the two vectors perpendicular?
- 43) Find the cross product of  $\vec{v}$  and  $\vec{w}$  if  $\vec{v} = \langle 5, 2, 3 \rangle$  and  $\vec{w} = \langle -2, 5, 0 \rangle$ . Write your answer as a sum of unit vectors.
- 44) For your solution in #43, verify that the resulting vector is perpendicular to the two original vectors.

45) Find the initial horizontal velocity and vertical velocity of a ball kicked with an initial velocity of 21 feet per second at an angle of  $40^\circ$ .

46) A discus is thrown from a height of 4 feet with an initial velocity of 65 ft/s at an angle of  $44^\circ$  with the horizontal. How long will it take for the discus to reach the ground?

**Chapter 9: Multiple Choice**

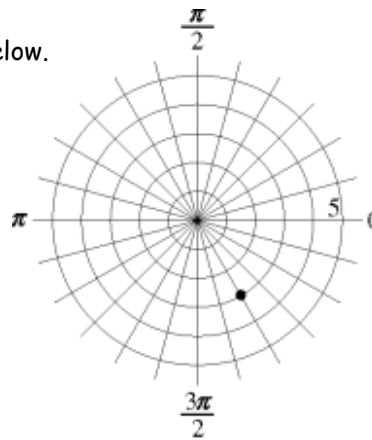
\_\_\_\_\_ 47) Name the polar coordinates of the point graphed below.

a)  $\left(3, \frac{5\pi}{3}\right)$

b)  $\left(4, \frac{5\pi}{3}\right)$

c)  $\left(3, \frac{5\pi}{4}\right)$

d)  $\left(4, \frac{5\pi}{4}\right)$



\_\_\_\_\_ 48) Find the distance between  $P(3, -195^\circ)$  and  $Q(-4, -94^\circ)$

a) 4.519 units

b) 5.919 units

c) 3.019 units

d) 6.919 units

\_\_\_\_\_ 49) Find the rectangular coordinates of  $(9, 150^\circ)$ .

a)  $\left(-\frac{9\sqrt{3}}{2}, -\frac{9}{2}\right)$       b)  $\left(-\frac{9\sqrt{3}}{2}, \frac{9}{2}\right)$

c)  $\left(\frac{9\sqrt{3}}{2}, \frac{9}{2}\right)$       d)  $\left(\frac{9\sqrt{3}}{2}, -\frac{9}{2}\right)$

\_\_\_\_\_ 50) Write the polar equation of  $r = -12 \sin \theta$  in rectangular form.

a)  $y = x + 6$       b)  $(x + 6)^2 + y^2 = 36$

c)  $y = 12x$       d)  $x^2 + (y + 6)^2 = 36$

\_\_\_\_\_ 51) Write the equation  $-2x + 6y = 7$  in polar form.

a)  $7\sqrt{10} = r \cos(\theta - 108^\circ)$       b)  $\frac{\sqrt{10}}{20} = r \cos(\theta - 108^\circ)$

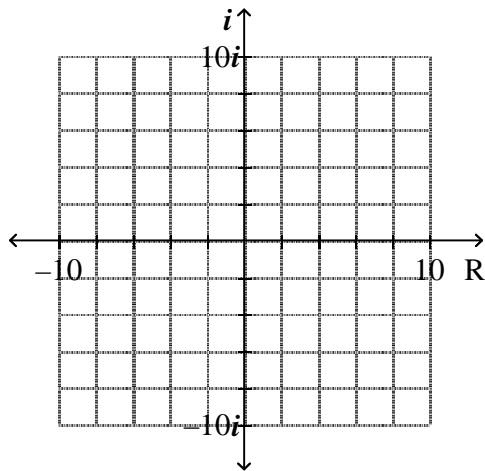
c)  $\frac{7\sqrt{10}}{\sqrt{20}} = r \sin(\theta - 108^\circ)$       d)  $\frac{7\sqrt{10}}{20} = r \cos(\theta - 108^\circ)$

### Chapter 9: Show Your Work

52) Find the rectangular coordinates of  $(7, 30^\circ)$ .

53) Write the product  $(-3 + 5i)(-2 + 4i)$  in the form  $a + bi$ .

54) Graph the number  $-5 + 3i$  in the complex plane and find its absolute value.



55) Express  $16 \left( \cos \frac{4}{3} \pi + i \sin \frac{4}{3} \pi \right)$  in rectangular form.

56) Express  $3 - 2i$  in polar form.

57) Graph the sinusoidal function  $y = 1 - \cos \theta$ ; use the sinusoidal function to graph the polar equation  $r = 1 - \cos \theta$ .

