Multiple Choice

1. Graph the following circle.

\[ x^2 + y^2 = 2 \]

\[ \text{a.} \quad \text{d.} \quad \text{b.} \quad \text{e.} \]
2. Find the distance between the following points:

\[(0, 7), (24, 0)\]

a. 22  
b. 29  
c. 26  
d. 25  
e. 23

3. Graph the circle \(x^2 + y^2 = 1\) with your graphing calculator. Use the feature on your calculator that allows you to evaluate a function from the graph to find the coordinates of all points on the circle that have the given \(x\)-coordinate.

\[x = -\frac{\sqrt{2}}{2}\]

a. \((0.7071, -0.7071), (-0.7071, -0.7071)\)  
b. \((0.7071, 0.7071), (0.7071, -0.7071)\)  
c. \((-0.7071, 0.7071), (-0.7071, -0.7071)\)  
d. \((-0.7071, -0.7071)\)  
e. \((0.7071, 0.7071), (0.7071, 0.7071)\)

4. Find the distance between the points:

\[(-2, -4), (-10, 7)\]

a. \(\sqrt{181}\)  
b. \(\sqrt{145}\)  
c. \(\sqrt{89}\)  
d. \(\sqrt{202}\)  
e. \(\sqrt{185}\)
5. There is an angle in standard position whose terminal side contains the point \( (2, -1) \). Find the distance from the origin to this point.

   a. \( \sqrt{17} \)
   b. \( \sqrt{41} \)
   c. 4
   d. 31
   e. \( \sqrt{5} \)

6. Find \( y \) if the point \((8, y)\) is on the terminal side of \( \theta \) and \( \cos \theta = \frac{8}{17} \).

   a. \( y = \pm 16 \)
   b. \( y = 23 \)
   c. \( y = \pm 15 \)
   d. \( y = 10 \)
   e. \( y = \pm 18 \)

7. Use a ratio identity to find \( \cot \theta \) if

   \[ \sin \theta = \frac{9}{\sqrt{181}} \text{ and } \cos \theta = \frac{10}{\sqrt{181}}. \]

   a. \( \cot \theta = \frac{9}{10} \)
   b. \( \cot \theta = \frac{10\sqrt{181}}{9} \)
   c. \( \cot \theta = \frac{10}{9\sqrt{181}} \)
   d. \( \cot \theta = \frac{9}{10\sqrt{181}} \)
   e. \( \cot \theta = \frac{10}{9} \)
8. For this problem, recall that \( \sin^2 \theta \) means \((\sin \theta)^2\).

If \( \sin \theta = \frac{1}{\sqrt{17}} \), find \( \sin^2 \theta \).

\begin{align*}
a. \quad \sin^2 \theta &= \frac{1}{17} \\
b. \quad \sin^2 \theta &= \frac{1}{289} \\
c. \quad \sin^2 \theta &= 17 \\
d. \quad \sin^2 \theta &= \frac{1}{17\sqrt{17}} \\
e. \quad \sin^2 \theta &= \sqrt{17}
\end{align*}


\((\sin \theta - \cos \theta)^2\)

\begin{align*}
a. \quad 1 \\
b. \quad \sin^2 \theta - \cos \theta \\
c. \quad 1 - 2 \sin \theta \cos \theta \\
d. \quad \sin^2 \theta - \cos^2 \theta \\
e. \quad 1 + 2 \sin \theta \cos \theta
\end{align*}

10. Write the following in terms of \( \sin \theta \) and \( \cos \theta \) and then simplify if possible.

\[
\frac{\csc \theta}{\cot \theta}
\]

\begin{align*}
a. \quad \cos \theta \\
b. \quad \frac{1}{\cos \theta} \\
c. \quad \sin \theta \\
d. \quad \frac{1}{\sin \theta} \\
e. \quad \frac{1}{\cos^2 \theta}
\end{align*}
Numeric Response

11. Find \( r \) if \( AB = 24 \) and \( AD = 36 \).

12. Solve for \( x \).

\[ \sqrt{65} = x + 3 \]

13. An isosceles triangle is a triangle in which two sides are equal in length. The angle between the two equal sides is called the vertex angle, while the other two angles are called the base angles. If the vertex angle is \( 140^\circ \), what is the measure of the base angles?

\[ \text{____________}^\circ \]

14. Find \( A \) if \( \beta = 20^\circ \) and \( \alpha + \beta = 120^\circ \).

\[ A = \text{_______}^\circ \]

*Remember:* The sum of the three angles in any triangle is always \( 180^\circ \).
15. Find an angle \( \theta \) in the first quadrant for which \( \tan \theta = 1 \). Look for an angle between \( 0^\circ \) and \( 360^\circ \).

\[ \boxed{45^\circ} \]

Short Answer

16. Find the remaining sides of a \( 45^\circ - 45^\circ - 90^\circ \) triangle if the longest side is 6.

17. Graph the circle \( x^2 + y^2 = 1 \) with your graphing calculator. Use the feature on your calculator that allows you to evaluate a function from the graph to find the coordinates of all points on the circle that have the given \( x \)-coordinate. Write your answers as ordered pairs and round to four places past the decimal point when necessary.

\[ x = \frac{\sqrt{2}}{2} \]

18. For this problem, recall that \( \sin^2 \theta \) means \( (\sin \theta)^2 \).

If \( \sin \theta = \frac{1}{\sqrt{17}} \), find \( \sin^2 \theta \).

Simplify the answer. Do not convert to decimal form.

19. Find \( \csc \theta \) if \( \cot \theta = -\frac{3}{4} \) and \( \sin \theta > 0 \).

20. Use the reciprocal identities for the following problem.

If \( \tan \theta = 11a \), \( (a \neq 0) \) find \( \cot \theta \).

21. Give the reciprocal of the given number.

\[ -\frac{\sqrt{6}}{7} \]
22. Simplify the expression \( \sqrt{x^2 - 4} \) as much as possible after substituting \( 2 \sec \theta \) for \( x \).

23. Multiply.

\((1 - \cot \theta)(1 + \cot \theta)\)

24. Multiply.

\((5 \cos \theta + 6)(4 \cos \theta - 3)\)

25. Add or subtract as indicated. Then simplify your answer if possible. Leave the answer in terms of \( \sin \theta \) and/or \( \cos \theta \).

\(\sin \theta + \frac{1}{\cos \theta}\)
Answer Section

MULTIPLE CHOICE
1. D  
2. D  
3. C  
4. E  
5. E  
6. C  
7. E  
8. A  
9. C  
10. B  

NUMERIC RESPONSE
11. 15  
12. 4  
13. 20  
14. 40  
15. 45  

SHORT ANSWER
16. $3 \cdot \sqrt{2}, 3 \cdot \sqrt{2}$  
17. $(0.7071, 0.7071), (0.7071, -0.7071)$  
18. $\frac{1}{17}$  
19. $\csc(\theta) = \frac{5}{4}$  
20. $\cot(\theta) = \frac{-1}{11a}$  
21. $\frac{-7}{\sqrt{6}}$  
22. $2 \cdot |\tan(\theta)|$  
23. $1 - \cot^2(\theta)$  
24. $20 \cdot \cos^2(\theta) + 9 \cdot \cos(\theta) - 18$  
25. $\frac{\sin(\theta) \cdot \cos(\theta) + 1}{\cos(\theta)}$