

Part 1: Multiple Choice (1 mark each)

Answer each question by circling the best choice.

1. Which would represent an angle of 3 radians in standard position?



B.

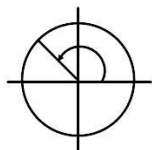


D.

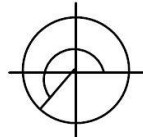


2. Which would represent
- $-\frac{3\pi}{4}$
- radians in standard position?

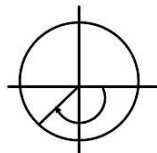
A.



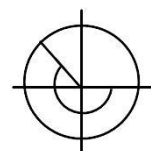
B.



C.



D.



3. Which is equivalent to
- 300°
- ?

A. $\frac{5\pi}{6}$

B. $\frac{5\pi}{3}$

C. $\frac{7\pi}{3}$

D. $\frac{11\pi}{6}$

4. Which is co-terminal with
- $\frac{13\pi}{6}$
- ?

A. -60°

B. -30°

C. 30°

D. 60°

5. Which expression represents all angles co-terminal with
- $\frac{2\pi}{3}$
- ?

A. $\frac{2\pi}{3} + k\pi, k \in R$

B. $\frac{2\pi}{3} + k\pi, k \in I$

C. $\frac{2\pi}{3} + 2k\pi, k \in R$

D. $\frac{2\pi}{3} + 2k\pi, k \in I$

6. What is the measure of an arc subtended by an angle of 210° in a circle with a radius of 6 cm?
- A. 7π
B. 14π
C. 35
D. 70
7. Which coordinates would represent $P\left(\frac{3\pi}{4}\right)$ on the unit circle?
- A. $\left(-\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$
B. $\left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$
C. $\left(-\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$
D. $\left(\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$
8. Which represents a circle centered at the origin with a radius of $3\sqrt{2}$?
- A. $x^2 + y^2 = 3\sqrt{2}$
B. $x^2 + y^2 = 6\sqrt{2}$
C. $x^2 + y^2 = 18$
D. $x^2 + y^2 = 32$
9. Which circle does the point $A(-2,6)$ lie on?
- A. $x^2 + y^2 = 30$
B. $x^2 + y^2 = 40$
C. $x^2 + y^2 = 900$
D. $x^2 + y^2 = 1600$
10. If $\sec\theta = \frac{13}{12}$, $\frac{3\pi}{2} < \theta < 2\pi$, which ratio is true?
- A. $\sin\theta = \frac{12}{13}$
B. $\csc\theta = \frac{5}{12}$
C. $\tan\theta = -\frac{5}{12}$
D. $\cos\theta = -\frac{12}{13}$

11. If $\cot\theta = -1.3475$, $0^\circ \leq \theta \leq 180^\circ$, what is a possible value of θ ?
- A. 36.6°
 - B. 53.4°
 - C. 126.6°
 - D. 143.4°
12. What is the exact value of $\sin \frac{7\pi}{6}$?
- A. $-\frac{\sqrt{3}}{2}$
 - B. $-\frac{1}{2}$
 - C. $\frac{1}{2}$
 - D. $\frac{\sqrt{3}}{2}$
13. If $P\left(\frac{-\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$ is a point on the unit circle, what is the value of the angle of rotation from standard position to point P?
- A. 120°
 - B. 135°
 - C. 150°
 - D. 225°
14. If $\cos\theta < 0$ and $\csc\theta > 0$, in which quadrant would the terminal arm of θ lie?
- A. I
 - B. II
 - C. III
 - D. IV
15. If $\tan\theta = \sqrt{3}$, $0 \leq \theta < 2\pi$, what are the exact values of θ ?
- A. $\left(\frac{\pi}{3}, \frac{4\pi}{3}\right)$
 - B. $\left(\frac{2\pi}{3}, \frac{5\pi}{3}\right)$
 - C. $\left(\frac{\pi}{6}, \frac{7\pi}{6}\right)$
 - D. $\left(\frac{5\pi}{6}, \frac{11\pi}{6}\right)$

Part 2: Constructed Response

Answer each question in the space provided, showing all necessary workings. Partial marks may be awarded for partially correct solutions. Full marks will NOT be given for the answer only.

16. If $P\left(\frac{7}{8}, y\right)$ is a point on the unit circle in quadrant IV, what is the value of y ?

(3 marks)

17. The point $A(7, -24)$ is on the terminal arm of θ which is plotted in standard position. Find all six trigonometric ratios of θ . (4 marks)

18. Show that the exact value of $\csc \frac{\pi}{3} + \cot \frac{11\pi}{4}$ is $\frac{2\sqrt{3}-3}{3}$. (4 marks)

19. Explain why $\sec x = \frac{1}{3}$ has no solutions but $\csc x = 3$ does. (4 marks)

20. Solve: $2 \sin^2 \theta = \sin \theta + 1$, $0^\circ \leq \theta < 360^\circ$ (5 marks)