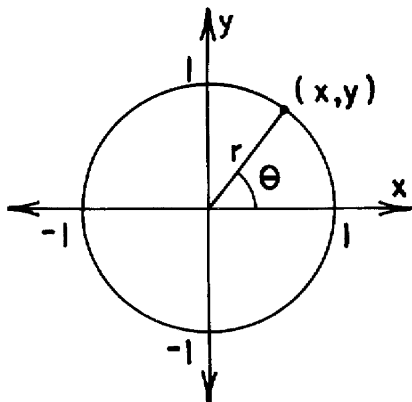


F.TF.A.2: Unit Circle

- 1 In the accompanying diagram of a unit circle, the ordered pair (x,y) represents the locus of points forming the circle. Which ordered pair is equivalent to (x,y) ?



- 1) $(\sin \theta, \cos \theta)$
- 2) $(\cot \theta, \tan \theta)$
- 3) $(\tan \theta, \cot \theta)$
- 4) $(\cos \theta, \sin \theta)$

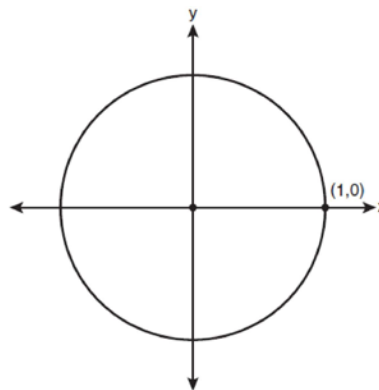
- 2 The terminal side of θ , an angle in standard position, intersects the unit circle at $P\left(-\frac{1}{3}, -\frac{\sqrt{8}}{3}\right)$.

What is the value of $\sec \theta$?

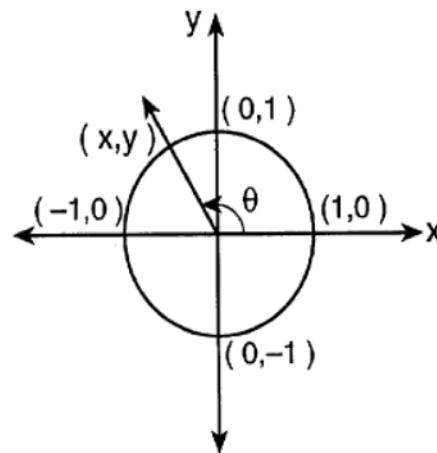
- 1) -3
- 2) $-\frac{3\sqrt{8}}{8}$
- 3) $-\frac{1}{3}$
- 4) $-\frac{\sqrt{8}}{3}$

- 3 Point $A\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$ is on the unit circle whose center is the origin. If θ is an angle in standard position whose terminal ray passes through point A , what is the value of $\sin \theta$?

- 4 On the unit circle shown in the diagram below, sketch an angle, in standard position, whose degree measure is 240° and find the exact value of $\sin 240^\circ$.



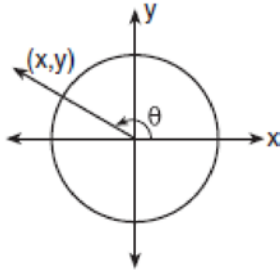
- 5 In the accompanying diagram of a unit circle, the ordered pair (x,y) represents the point where the terminal side of θ intersects the unit circle.



If $m\angle\theta = 120$, what is the value of x in simplest form?

- 1) $\frac{\sqrt{3}}{2}$
- 2) $-\frac{\sqrt{3}}{2}$
- 3) $-\frac{1}{2}$
- 4) $\frac{1}{2}$

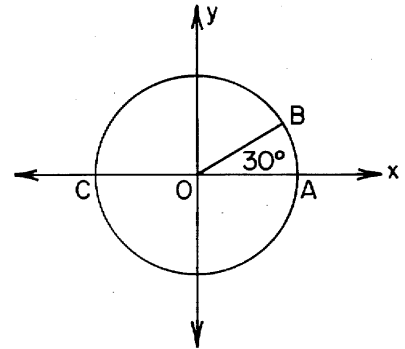
- 6 In the accompanying diagram of a unit circle, the ordered pair (x,y) represents the point where the terminal side of θ intersects the unit circle.



If $\theta = 150^\circ$, what is the value of x ?

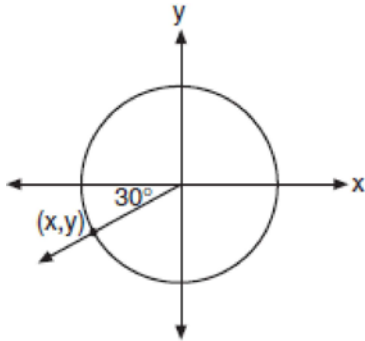
- 1) 1
 - 2) $-\frac{\sqrt{3}}{2}$
 - 3) $-\frac{1}{2}$
 - 4) $-\frac{\sqrt{2}}{2}$
- 7 Point $M\left(t, \frac{4}{7}\right)$ is located in the second quadrant on the unit circle. Determine the exact value of t .

- 8 In the accompanying diagram of circle O , \overline{COA} is a diameter, O is the origin, $\overline{OA} = 1$, and $m\angle BOA = 30^\circ$. What are the coordinates of B ?



- 1) $\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$
- 2) $\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$
- 3) $\left(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$
- 4) $\left(\frac{\sqrt{2}}{2}, \frac{1}{2}\right)$

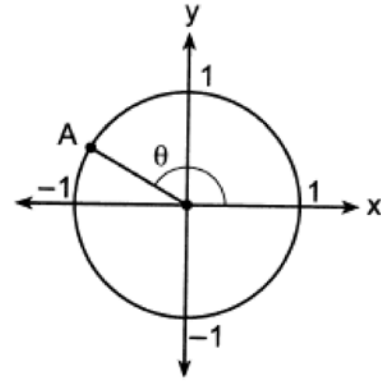
- 9 In the unit circle shown in the accompanying diagram, what are the coordinates of (x,y) ?



- 1) $\left(-\frac{\sqrt{3}}{2}, -0.5\right)$
 - 2) $\left(-0.5, -\frac{\sqrt{3}}{2}\right)$
 - 3) $(-30, -210)$
 - 4) $\left(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$
- 10 What is the image of $(1,0)$ after a counterclockwise rotation of 60° ?

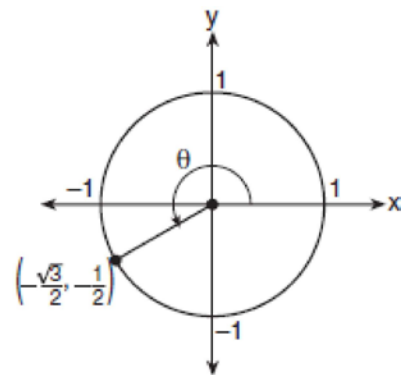
- 1) $\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$
- 2) $\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$
- 3) $\left(\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$
- 4) $\left(-\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$

- 11 In the diagram of a unit circle below, point A $\left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$, represents the point where the terminal side of θ intersects the unit circle.



What is $m\angle\theta$?

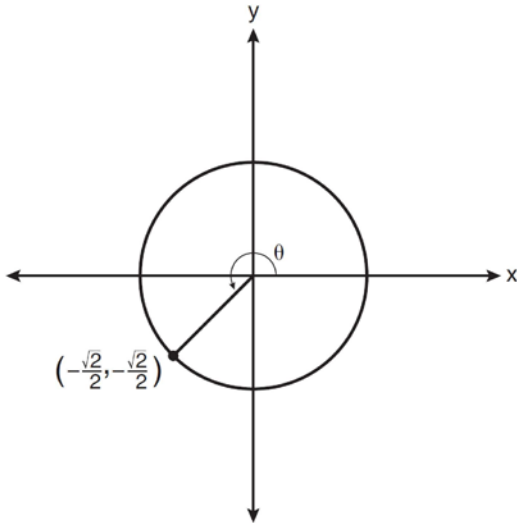
- 1) 30°
 - 2) 120°
 - 3) 135°
 - 4) 150°
- 12 In the accompanying diagram of a unit circle, the ordered pair $\left(-\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$ represents the point where the terminal side of θ intersects the unit circle.



What is $m\angle\theta$?

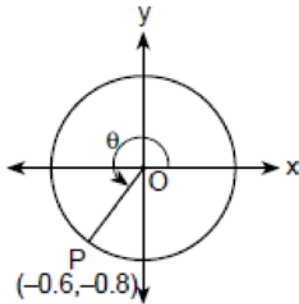
- 1) 210
- 2) 225
- 3) 233
- 4) 240

- 13 In the diagram below of a unit circle, the ordered pair $\left(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$ represents the point where the terminal side of θ intersects the unit circle.



What is $m\angle\theta$?

- 1) 45
 - 2) 135
 - 3) 225
 - 4) 240
- 14 In the accompanying diagram, point $P(-0.6, -0.8)$ is on unit circle O .

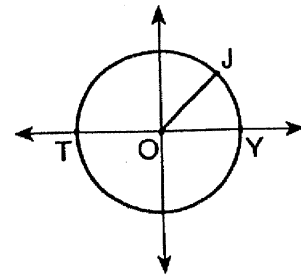


What is the measure of angle θ to the nearest degree?

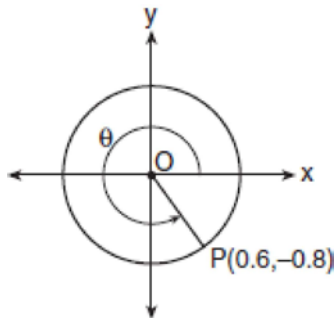
- 1) 143
- 2) 217
- 3) 225
- 4) 233

- 15 If θ is an angle in standard position and its terminal side passes through the point $\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$ on a unit circle, a possible value of θ is
- 1) 30°
 - 2) 60°
 - 3) 120°
 - 4) 150°
- 16 If θ is an angle in standard position and its terminal side passes through point $\left(-\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$ on the unit circle, then a possible value of θ is
- 1) 60°
 - 2) 120°
 - 3) 150°
 - 4) 330°

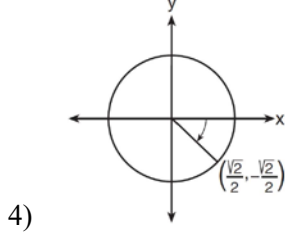
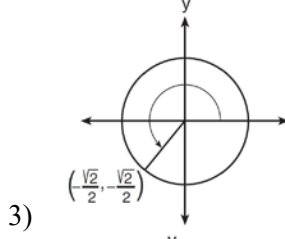
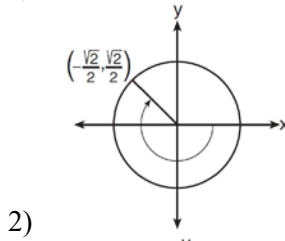
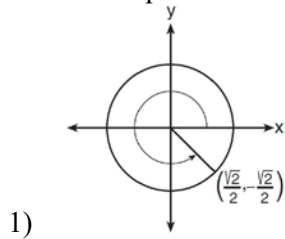
- 17 In the accompanying diagram of circle O , point O is the origin, $YO = 1$, $JO = 1$, and TOY is a diameter. If the coordinates of point J are $\left(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$, how many degrees are in $m\angle JOY$?



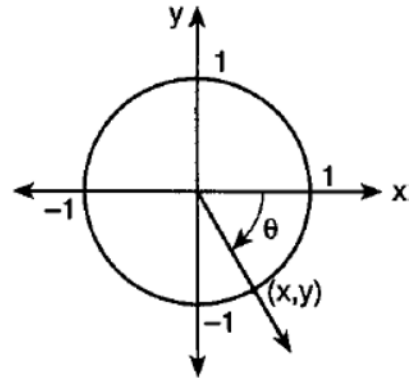
- 18 In the accompanying diagram, point $P(0.6, -0.8)$ is on unit circle O . What is the value of θ , to the nearest degree?



- 19 Which diagram represents an angle of $\frac{7}{4}\pi$ radians in standard position?



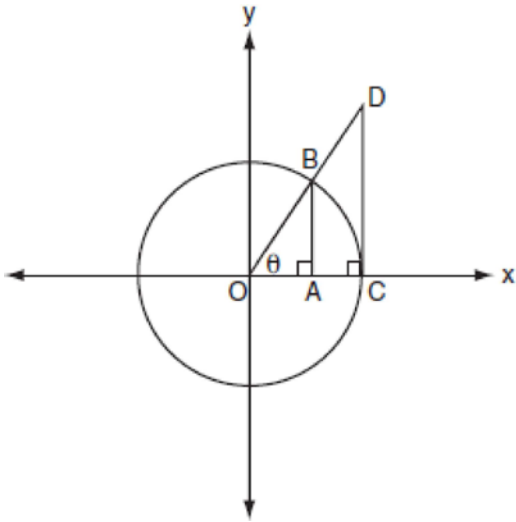
- 20 In the accompanying diagram of a unit circle, the ordered pair (x,y) represents the point where the terminal side of θ intersects the unit circle.



If $\theta = -\frac{\pi}{3}$, what is the value of y ?

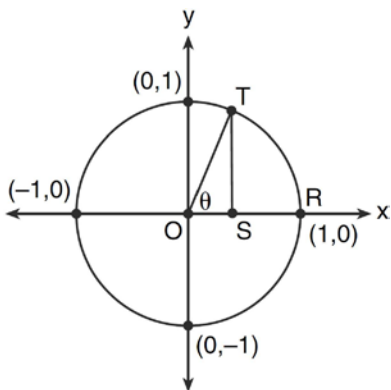
- 1) $-\frac{\sqrt{3}}{2}$
- 2) $-\frac{\sqrt{2}}{2}$
- 3) $-\sqrt{3}$
- 4) $-\frac{1}{2}$

- 21 The accompanying diagram shows unit circle O , with radius $OB = 1$.



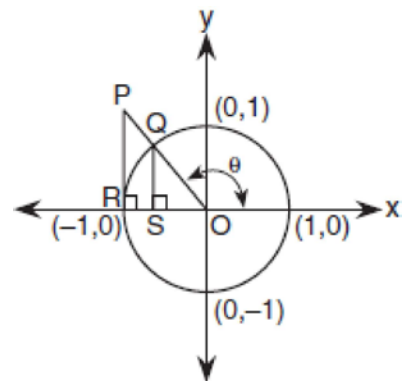
Which line segment has a length equivalent to $\cos \theta$?

- 1) \overline{AB}
 - 2) \overline{CD}
 - 3) \overline{OC}
 - 4) \overline{OA}
- 22 In the diagram below, the length of which line segment is equal to the exact value of $\sin \theta$?



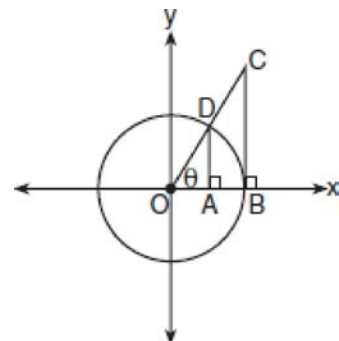
- 1) \overline{TO}
- 2) \overline{TS}
- 3) \overline{OR}
- 4) \overline{OS}

- 23 In the accompanying diagram, \overline{PR} is tangent to circle O at R , $\overline{QS} \perp \overline{OR}$, and $\overline{PR} \perp \overline{OR}$.



Which measure represents $\sin \theta$?

- 1) SO
 - 2) RO
 - 3) PR
 - 4) QS
- 24 The accompanying diagram shows unit circle O , with radius $OD = 1$.



Which line segment has a length equivalent to $\tan \theta$?

- 1) \overline{AD}
- 2) \overline{BC}
- 3) \overline{OA}
- 4) \overline{OB}

F.TF.A.2: Unit Circle

Answer Section

1 ANS: 4 REF: 068724siii

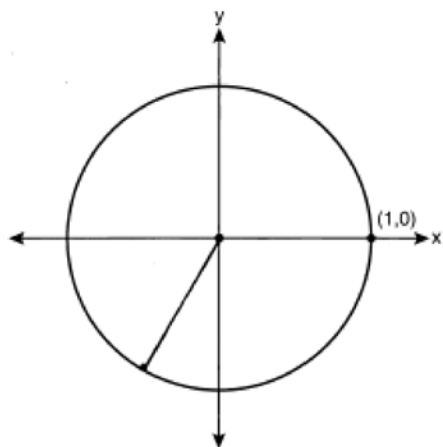
2 ANS: 1 REF: 011815aii

3 ANS:

$$\frac{\sqrt{3}}{2}$$

REF: 018514siii

4 ANS:



$$-\frac{\sqrt{3}}{2}$$

REF: 061033a2

5 ANS: 3 REF: 069728siii

6 ANS: 2 REF: 010226siii

7 ANS:

$$t^2 + \left(\frac{4}{7}\right)^2 = 1 \quad -\frac{\sqrt{33}}{7}$$

$$t^2 + \frac{16}{49} = \frac{49}{49}$$

$$t^2 = \frac{33}{49}$$

$$t = \frac{\pm\sqrt{33}}{7}$$

REF: 011931aii

8 ANS: 2 REF: 068926siii

9 ANS: 1

$$\cos(180^\circ + 30^\circ) = -\frac{\sqrt{3}}{2}$$

$$\sin(180^\circ + 30^\circ) = -0.5$$

REF: 010718b

10 ANS: 1 REF: 089028siii

11 ANS: 4 REF: 082205aii

12 ANS: 1

$$\cos \theta = -\frac{\sqrt{3}}{2}$$

$$\theta = \cos^{-1}\left(-\frac{\sqrt{3}}{2}\right) = \pm 150^\circ$$

. Since the terminal side of θ lies in Quadrant III, $\theta = -150^\circ$. Coterminal anglesdiffer by multiples of 360° . $-150 + 360 = 210$. or

$$\sin \theta = -\frac{1}{2}$$

$$\theta = \sin^{-1}\left(-\frac{1}{2}\right) = -30^\circ$$

$$\sin(-30) = -\sin 30 = \sin(180 + 30) = \sin 210.$$

REF: 080510b

13 ANS: 3 REF: 011104a2

14 ANS: 4 REF: 060028siii

15 ANS: 2

$$\cos \theta = \frac{1}{2} \quad \sin \theta = \frac{\sqrt{3}}{2}$$

$$\theta = \cos^{-1}\frac{1}{2} \text{ or } \theta = \sin^{-1}\frac{\sqrt{3}}{2}$$

$$\theta = 60^\circ \quad \theta = 60^\circ$$

REF: 010205b

16 ANS: 2 REF: 069932siii

17 ANS:

45

REF: 089502siii

18 ANS:

$$\cos \theta = 0.6$$

307. $\theta = \cos^{-1} 0.6$. Since the terminal side of θ lies in Quadrant IV,
 $\theta \cong 53^\circ$

$$\begin{aligned} \cos \theta &= \cos(360^\circ - \theta) \\ &= \cos(360 - 53) \quad \text{or} \\ &= \cos 307 \\ \theta &= 307^\circ \end{aligned}$$

$$\sin \theta = -0.8$$

$\theta = \sin^{-1}(-0.8)$. Coterminal angles differ by multiples of 360° . $-53 + 360 = 307$.

$$\theta \cong -53^\circ$$

REF: 010422b

19 ANS: 1

REF: 081609a2

20 ANS: 1

REF: 019828siii

21 ANS: 4

REF: 080618b

22 ANS: 2

REF: 011315a2

23 ANS: 4

REF: 060520b

24 ANS: 2

REF: 080335siii