Pre-Calculus 12 **Name:** _____

Ch.5 - Trigonometry

1-5.3 Practice Questions

Multiple Choice

Identify the choice that best completes the statement or answers the question.

1. Convert 3π radians to degrees.

   a. $0.16°$
   b. $9.42°$
   c. $540°$
   d. $1080°$

$\frac{\pi}{180°} = \frac{3\pi}{x} \longrightarrow x = \frac{3\pi \cdot 180}{\pi}$

$x = 3 \cdot 180° = \boxed{540°}$

2. Convert $420°$ to radians.

   a. $\frac{\pi}{6}$
   b. $\frac{\pi}{3}$
   c. $\frac{4\pi}{3}$
   d. $\frac{7\pi}{3}$

$\frac{\pi}{180°} = \frac{x}{420°} \longrightarrow x = \frac{420° \cdot \pi}{180°}$

$x = \frac{42\pi}{18} = \boxed{\frac{7\pi}{3}}$

3. Given a circle with radius 10 cm, calculate the length of the arc which contains a sector angle $\theta = 2$ radians.

   a. 5π cm
   b. 10π cm
   c. 10 cm
   d. 20 cm

use $a = r\theta$

$\therefore a = (10\text{cm})(2)$

$a = \boxed{20\text{cm}}$

4. A circle has a radius of 4 cm. If the length of arc AB is 3π cm, determine the measure of the central angle in radians.

   a. $\frac{3\pi}{4}$
   b. $\frac{4\pi}{3}$
   c. $\frac{3\pi}{2}$
   d. 3π

$r = 4\text{cm}$

$a = 3\pi$ cm

$\theta = \frac{a}{r} = \frac{3\pi\text{ cm}}{4\text{ cm}} = \boxed{\frac{3\pi}{4}}$

5. A circle has a radius of 20 cm. Determine the length of the arc subtended by a central angle of 135°.

   a. $\frac{3\pi}{4}$ cm
   b. $\frac{80}{3\pi}$ cm
   c. 5π cm
   d. 15π cm

$135° \times \frac{\pi}{180°} = \frac{135\pi}{180} = \frac{27\pi}{36} = \frac{3\pi}{4}$

$a = 20\text{cm} \cdot \frac{3\pi}{4} = 15\pi\text{ cm}$

6. What is the reference angle of $\frac{4\pi}{3}$?

   a. $\frac{\pi}{6}$
   b. $\frac{\pi}{3}$
   c. $\frac{2\pi}{3}$
   d. $\frac{4\pi}{3}$

located in quad III

$\pi/3$ below π $\left(\frac{3\pi}{3}\right)$

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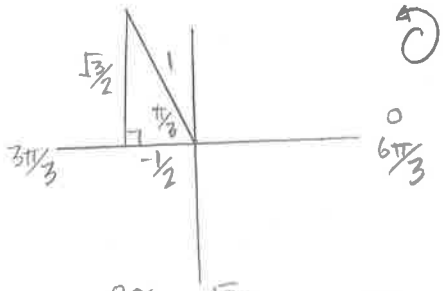
7. Find the reference angle for 210°.

located in quad. III
30° passed 180°

a. 30°
b. $\frac{7\pi}{6}$
c. 150°
d. $\frac{5\pi}{6}$

8. Determine the exact value of $\tan\frac{8\pi}{3}$

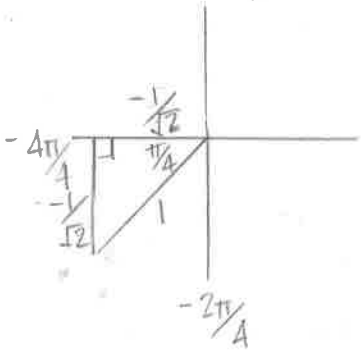
a. $-\sqrt{3}$
b. $-\frac{1}{\sqrt{3}}$
c. $\frac{1}{\sqrt{3}}$
d. $\sqrt{3}$



$\tan\frac{8\pi}{3} = \frac{\sqrt{3}/2}{-1/2} = -\sqrt{3}$

9. Determine the exact value of $\sin\left(-\frac{3\pi}{4}\right)$.

a. $-\sqrt{2}$
b. $-\frac{1}{\sqrt{2}}$
c. $\frac{1}{\sqrt{2}}$
d. $\sqrt{2}$

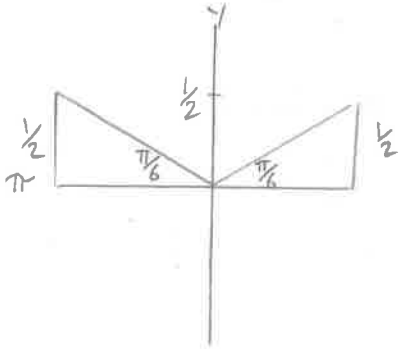


10. Solve: $\csc x = 2,\ 0 \le x < 2\pi$

a. $x = \frac{\pi}{6}, \frac{5\pi}{6}$
b. $x = \frac{\pi}{6}, \frac{11\pi}{6}$
c. $x = \frac{\pi}{3}, \frac{2\pi}{3}$
d. $x = \frac{\pi}{3}, \frac{4\pi}{3}$

if $\csc x = 2$

then $\frac{1}{\sin x} = 2$ which means $\sin x = \frac{1}{2}$



$\therefore\ x = \pi/6$ and $x = \pi - \pi/6 = 5\pi/6$

QUAD I QUAD II

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11. What is (are) the restriction(s) for the expression $\frac{\sec x}{\sin x}$?

$\frac{\frac{1}{\cos x}}{\sin x}$

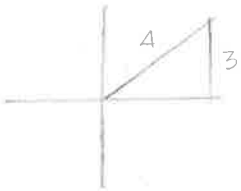
a. $\sec x \neq 0$
b. $\sin x \neq 0$
c. $\cos x \neq 0$
d. $\sin x \neq 0,\ \cos x \neq 0$

12. If csc x > 0 and cot x < 0 , in which quadrant does the terminal side of position angle x lie?

a. I
b. II
c. III
d. IV

csc x is +ve in quad I, II
cot x is -ve in quad II, IV

13. If $\sin x = \frac{3}{4}$, determine the smallest positive angle x, in radians.



if $\sin x = 3/4$
then $x = \sin^{-1}(3/4)$
$x = 0.85$

a. 0.68
b. 0.72
c. 0.85
d. 1.47

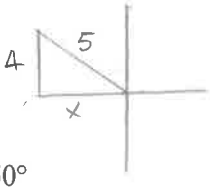
14. For what value of x is $\frac{\sin x}{1+\cos x}$ undefined, where $0 \le x < 2\pi$.

$1+\cos x \neq 0$
$\cos x \neq -1$
$x \neq \pi$

a. 0
b. $\frac{\pi}{2}$
c. π
d. $\frac{3\pi}{2}$

15. Given $\sin\theta = \frac{4}{5}$ and $\sec\theta < 0$, determine the ratio for $\cot\theta$.

$\sin\theta = 4/5$ in quad I or II
$\sec\theta < 0$ means $\cos\theta < 0$
∴ quad II or III
∴ terminal arm is in quad II



$x^2 = 5^2 - 4^2$
$x^2 = 25 - 16$
$x^2 = 9$
∴ $x = -3$

$\cot\theta = \frac{-3}{4}$

a. $-\frac{4}{3}$
b. $-\frac{3}{4}$
c. $\frac{3}{4}$
d. $\frac{4}{3}$

Short Answer (SHOW YOUR WORK)

16. Determine one positive and one negative coterminal angle to –250°

$-250° + 360° = 110°$

$-250 - 360° = -610°$

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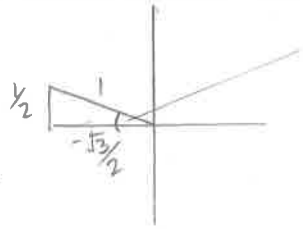
17. Determine one positive and one negative coterminal angle to $\frac{7\pi}{15}$

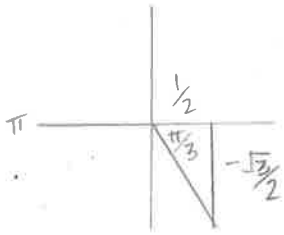
$\frac{7\pi}{15} + 2\pi = \frac{7\pi}{15} + \frac{30\pi}{15} = \boxed{\frac{37\pi}{15}}$ $\frac{7\pi}{15} - 2\pi = \frac{7\pi}{15} - \frac{30\pi}{15} = \boxed{\frac{-23\pi}{15}}$

18. Determine the exact value of $\tan\frac{5\pi}{6}$ without a calculator.



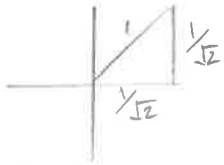
ref. angle $= \pi/6$ $\therefore \tan\frac{5\pi}{6} = \frac{1/2}{-\sqrt{3}/2} = \boxed{\frac{-1}{\sqrt{3}}}$

19. Determine the exact value of $\csc\frac{5\pi}{3}$ without a calculator.



$\csc\theta = \frac{1}{\sin\theta} = \frac{1}{-\sqrt{3}/2} = \boxed{-\frac{2}{\sqrt{3}}}$

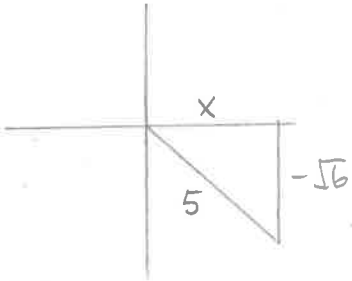
20. Find the exact value of $2\cos^2\frac{\pi}{4}$



$= 2\left(\cos\frac{\pi}{4}\right)^2 = 2\left(\frac{1}{\sqrt{2}}\right)^2 = 2\left(\frac{1}{2}\right) = \boxed{1}$

21. Determine the exact values of the coordinates of the point that is 5 units from the origin in the quadrant IV, if θ is a positive angle and $\csc\theta = -\frac{5}{\sqrt{6}}$.

$\csc\theta = \frac{H}{O}$



$x^2 + (-\sqrt{6})^2 = 5^2$

$x^2 + 6 = 25$

$x^2 = 25 - 6$

$x^2 = 19$

$x = \sqrt{19}$

coordinate is $(\sqrt{19}, -\sqrt{6})$