Name: _____ Class Period: _____

Precalculus – Unit 1 Day 5

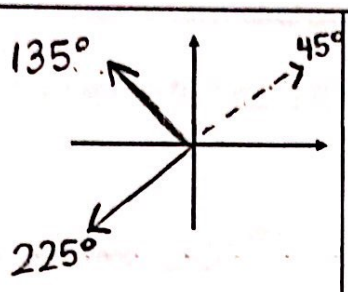
Unit Circle

Find the exact value of each of the trigonometric functions given. Watch signs!

1. $\cos\left(-\frac{5\pi}{6}\right)$ $-\frac{\sqrt{3}}{2}$	2. $\tan\frac{3\pi}{2}$ undefined	3. $\sin 450°$ 1	4. $\tan\frac{7\pi}{6}$ $\frac{\sqrt{3}}{3}$
5. $\cos(-390°)$ $\frac{\sqrt{3}}{2}$	6. $\cot\pi$ undefined	7. $\sec\frac{5\pi}{3}$ 2	8. $\sin\left(-\frac{3\pi}{2}\right)$ 1
9. $\csc\left(\frac{7\pi}{4}\right)$ $-\sqrt{2}$	10. $\sec\frac{5\pi}{6}$ $-\frac{2\sqrt{3}}{3}$	11. $\cot\left(-\frac{2\pi}{3}\right)$ $\frac{\sqrt{3}}{3}$	12. $\cos\left(\frac{7\pi}{3}\right)$ $\frac{1}{2}$
13. $\csc\left(-\frac{\pi}{3}\right)$ $-\frac{2\sqrt{3}}{3}$	14. $\tan 240°$ $\sqrt{3}$	15. $\sin\left(-\frac{7\pi}{6}\right)$ $\frac{1}{2}$	16. $\sec 1440°$ 1
17. $\sin\frac{5\pi}{4}$ $-\frac{\sqrt{2}}{2}$	18. $\cot\left(-\frac{11\pi}{3}\right)$ $\frac{\sqrt{3}}{3}$	19. $\csc(-495°)$ $-\sqrt{2}$	20. $\cos(7\pi)$ -1
21. $\tan\left(-\frac{9\pi}{2}\right)$ undefined	22. $\sec\left(\frac{35\pi}{6}\right)$ $\frac{2\sqrt{3}}{3}$	23. $\cos(-120°)$ $-\frac{1}{2}$	24. $\sin\frac{3\pi}{4}$ $\frac{\sqrt{2}}{2}$

Find *TWO* solutions of the equation. Give you answers in degrees ($0° \le \theta < 360°$) and radians ($0 \le \theta < 2\pi$).

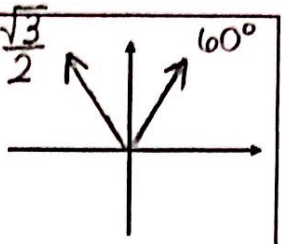
25. $\cos\theta = -\frac{\sqrt{2}}{2}$



$\theta = 135°$ $\theta = \frac{3\pi}{4}$

$\theta = 225°$ $\theta = \frac{5\pi}{4}$

26. $\csc\theta = \frac{2\sqrt{3}}{3}$ $\sin\theta = \frac{\sqrt{3}}{2}$

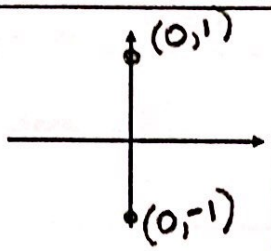


$\theta = 60°$ $\theta = \frac{\pi}{3}$

$\theta = 120°$ $\theta = \frac{2\pi}{3}$

27. *$\sec\theta$ is undefined*

$\sec\theta = \frac{1}{0}$ $\cos\theta = 0$

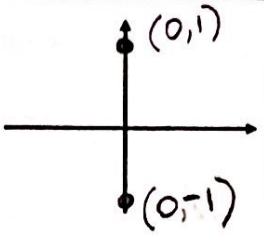


$\theta = 90°$ $\theta = \frac{\pi}{2}$

$\theta = 270°$ $\theta = \frac{3\pi}{2}$

28. *$\tan\theta$ is undefined*

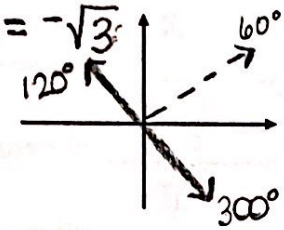
$\tan\theta = \frac{1}{0} = \frac{y}{x}$



$\theta = 90°$ $\theta = \frac{\pi}{2}$

$\theta = 270°$ $\theta = \frac{3\pi}{2}$

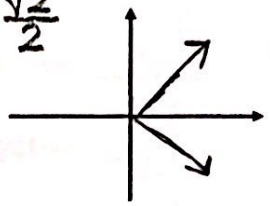
29. $\cot\theta = -\frac{\sqrt{3}}{3}$ $\tan\theta = -\sqrt{3}$



$\theta = 120°$ $\theta = \frac{2\pi}{3}$

$\theta = 300°$ $\theta = \frac{5\pi}{3}$

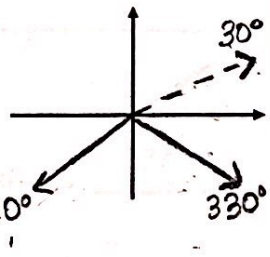
30. $\sec\theta = \sqrt{2}$ $\cos\theta = \frac{\sqrt{2}}{2}$



$\theta = 45°$ $\theta = \frac{\pi}{4}$

$\theta = 315°$ $\theta = \frac{7\pi}{4}$

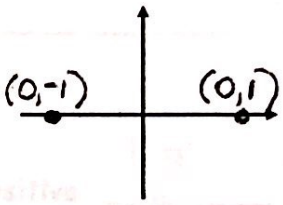
31. $\sin\theta = -\frac{1}{2}$



$\theta = 210°$ $\theta = \frac{7\pi}{6}$

$\theta = 330°$ $\theta = \frac{11\pi}{6}$

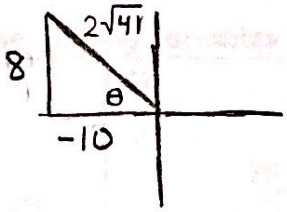
32. $\tan\theta = 0 = \frac{0}{1} = \frac{y}{x}$



$\theta = 0°$ $\theta = 0$

$\theta = 180°$ $\theta = \pi$

33. The point $(-10,8)$ is on the terminal side of an angle in standard position. Determine the exact values of sine, cosine, and tangent.

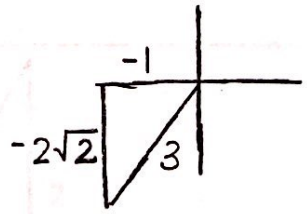


$\sin\theta = \frac{4\sqrt{41}}{41}$

$\cos\theta = \frac{-5\sqrt{41}}{41}$

$\tan\theta = -\frac{4}{5}$

34. Given $\cos\theta = -\frac{1}{3}$ and $\sin\theta < 0$, find the values of the six trigonometric functions of θ.



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

$\csc\theta = \frac{-3\sqrt{2}}{4}$

$\sec\theta = -3$

$\tan\theta = 2\sqrt{2}$

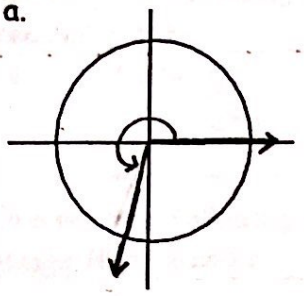
$\cot\theta = \frac{\sqrt{2}}{4}$

For numbers 35-40 complete the following:

a) Draw the angle in standard position
b) Give one positive and one negative coterminal angle to the given angle
c) Give the reference angle
(answers should be in the same units in which the given angle is measured)

35. $265°$

a.



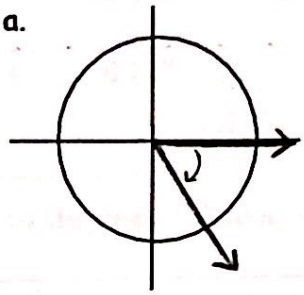
b. Positive: $625°$

Negative: $-95°$

c. Ref. angle: $85°$

36. $-\frac{2\pi}{5}$

a.



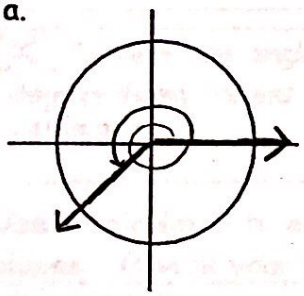
b. Positive: $\frac{8\pi}{5}$

Negative: $-\frac{12\pi}{5}$

c. Ref. angle: $\frac{2\pi}{5}$

37. $\frac{10\pi}{3}$

a.



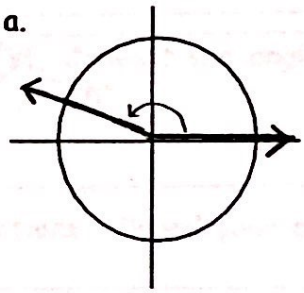
b. Positive: $\frac{4\pi}{3}$

Negative: $\frac{-2\pi}{3}$

c. Ref. angle: $\frac{\pi}{3}$

38. $\frac{7\pi}{8}$

a.



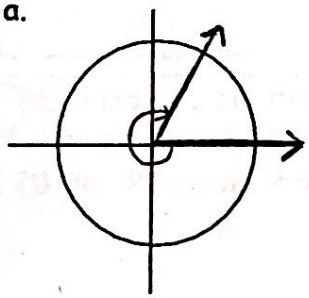
b. Positive: $\frac{23\pi}{8}$

Negative: $-\frac{9\pi}{8}$

c. Ref. angle: $\frac{\pi}{8}$

39. $-290°$

a.



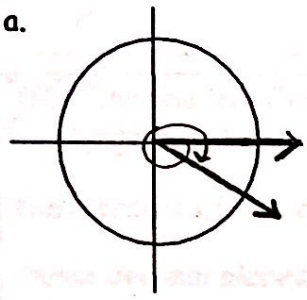
b. Positive: $70°$

Negative: $-650°$

c. Ref. angle: $70°$

40. $-\frac{13\pi}{6}$

a.



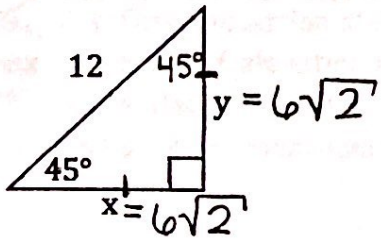
b. Positive: $\frac{11\pi}{6}$

Negative: $-\frac{\pi}{6}$

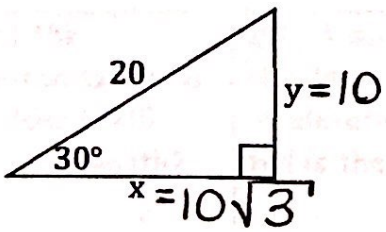
c. Ref. angle: $\frac{\pi}{6}$

Find the exact value of the missing variables.

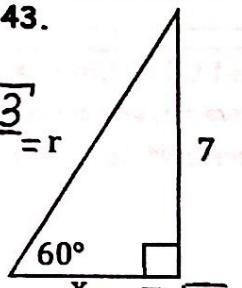
41.



42.



43.



Convert the following angle measures from degrees to radians in terms of π.

1. $-250° \cdot \frac{\pi}{180} = \frac{-25\pi}{18}$

2. $36° \cdot \frac{\pi}{180} = \frac{\pi}{5}$

Convert the following angles measures from degrees to radians. Round your answer to three decimal places.

3. $-115° \cdot \frac{\pi}{180} = \frac{-23\pi}{36} \approx 2.007$

4. $83.7° \cdot \frac{\pi}{180} = \frac{93\pi}{200} \approx 1.461$

Convert the following angle measures from radians to degrees. Round your answer to three decimal places if applicable.

5. $\frac{3}{16} \cdot \frac{180}{\pi} = \frac{135}{4\pi} \approx 10.743°$

6. $-\frac{17\pi}{3} \cdot \frac{180}{\pi} = -1020°$

7. **Convert the angle measure to decimal degree form (*round to three decimal places*):** 85°18'30"

8. **Convert the angle measure to D°M'S" form:** 310.75°

Use a calculator to evaluate the trigonometric functions. Round your answer to three decimal places. (Check your MODE.)

9. $\sec 235°$
$\frac{1}{\cos 235} \approx -1.743$

10. $\csc\left(-\frac{8\pi}{9}\right)$
$\frac{1}{\sin\left(\frac{-8\pi}{9}\right)} \approx -2.934$

11. $\cos 30$
$\frac{\sqrt{3}}{2} \approx .866$

12. $\tan 245°$
≈ 2.145

13. Find the length of the intercepted arc for a central angle of 72° in a circle with a diameter of 20 cm. *Round to three decimal places.*

14. Find the length of the radius of a circle if the length of the intercepted arc is 15 feet and the measure of the central angle is $\frac{11\pi}{12}$. *Round three decimal places.*

15. A safety regulation states that the maximum angle of elevation for a rescue ladder is 72°. A fire department's longest ladder is 110 feet. What is the maximum safe rescue length?

16. A surveyor is standing 50 feet from the base of a large tree. The surveyor measures the angle of elevation to the top of the tree as 71.5°. How tall is the tree?