Precalculus
4.1-4.3 Test Review

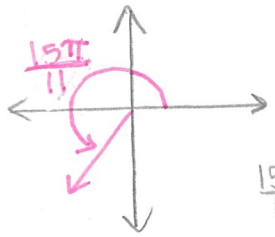
Name Key
Period _____ Date _____

a) Sketch the angle in standard position, b) determine the quadrant in which the angle lies, and c) determine two coterminal angles (one positive and one negative).

1. $\frac{15\pi}{11} \approx 245.45°$

b) Quad III

c) $\frac{37\pi}{11}$ & $-\frac{7\pi}{11}$



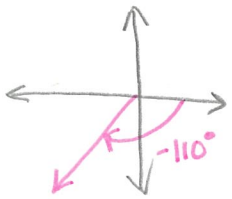
$\frac{15\pi}{11} + 2\pi = \frac{37\pi}{11}$

$\frac{15\pi}{11} - 2\pi = -\frac{7\pi}{11}$

2. $-110°$

b) Quad III

c) $250°$ & $-470°$



$-110° + 360° = 250°$

$-110° - 360° = -470°$

Convert the degree measure to radian measure. Leave answer in terms of π.

3. $450°$

$450°\left(\frac{\pi}{180°}\right) = \frac{5\pi}{2}$

4. $190°$

$190°\left(\frac{\pi}{180°}\right) = \frac{19\pi}{18}$

5. $-16°$

$-16°\left(\frac{\pi}{180°}\right) = -\frac{4\pi}{45}$

6. $-112°$

$-112°\left(\frac{\pi}{180°}\right) = -\frac{28\pi}{45}$

Convert the radian measure to degree measure. Round to three decimal places, if necessary.

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

$\frac{3\pi}{10}\left(\frac{180°}{\pi}\right) = 54°$

8. $-\frac{11\pi}{6}$

$-\frac{11\pi}{6}\left(\frac{180°}{\pi}\right) = -330°$

9. -3.5

$-3.5\left(\frac{180°}{\pi}\right) = -200.535°$

10. 5.7

$5.7\left(\frac{180°}{\pi}\right) = 326.586°$

Convert the angle measure to D°M′S" form.

11. $198.4°$ $198°24'$

$(.4)(60) = 24$

12. $-5.96°$ $-5°57'36"$

$(.96)(60) = 57.6$
$(.6)(60) = 36$

Convert to decimal degrees form.

13. $10°13'30"$ $10.225°$

$10 + \frac{13}{60} + \frac{30}{3600}$

14. $122°4'15"$ $122.0708333°$

$122 + \frac{4}{60} + \frac{15}{3600}$

15. Find the radius of a circle with a central angle of 138° and an intercepted arc length of 43 inches.

$s = r\theta$

Radians: $(138°)\left(\frac{\pi}{180°}\right) = \frac{23\pi}{30}$

$43 = r\left(\frac{23\pi}{30}\right)$ $\quad r = 43\left(\frac{30}{23\pi}\right)$

$r \approx 17.85$ inches

16. A water sprinkler sprays water on a lawn over a distance of 25 feet and rotates through and angle of 130°. Find the area of the lawn watered by the sprinkler.

$(130°)\left(\pi/180°\right) = \frac{13\pi}{18}$

Radians $\quad A = \frac{1}{2}(25)^2\left(\frac{13\pi}{18}\right)$

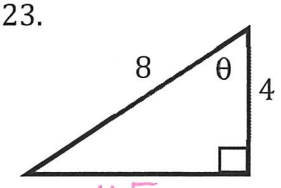
$A = \frac{1}{2}r^2\theta$ $\quad A = 709.04\ ft^2$

Use a calculator to evaluate the trigonometric function. Round your answer to four decimal places. (Be sure the calculator is in the correct mode.)

17. $\sec\frac{12\pi}{5}$ $\quad \frac{1}{\cos 12\pi/5}$ $\quad 3.2361$	18. $\cos 78°11'58"$ $\quad .2045$
19. $\sec 79.3°$ $\quad \frac{1}{\cos 79.3°}$ $\quad 5.3860$	20. $\tan 33$ $\quad -75.3130$
21. $\sin\left(-\frac{\pi}{9}\right)$ $\quad -.3420$	22. $\cot 15°14'$ $\quad \frac{1}{\tan 15°14'}$ $\quad 3.6722$

Find the exact value of the six trigonometric functions of angle θ.

23.



$4^2 + x^2 = 8^2$

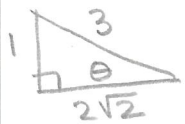
$\sin\theta = \frac{4\sqrt{3}}{8} = \frac{\sqrt{3}}{2}$ $\quad \csc\theta = \frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$

$\cos\theta = \frac{4}{8} = \frac{1}{2}$ $\quad \sec\theta = 2$

$\tan\theta = \frac{4\sqrt{3}}{4} = \sqrt{3}$ $\quad \cot\theta = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$

Use the given function value to find the exact value of the other five trigonometric functions.

24. $\sin\theta = \frac{1}{3}$ $\quad \frac{\text{opp}}{\text{hyp}}$



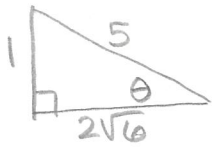
$\csc\theta = 3$

$\sec\theta = \frac{3}{2\sqrt{2}} = \frac{3\sqrt{2}}{4}$

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

$\tan\theta = \frac{1}{2\sqrt{2}} = \frac{\sqrt{2}}{4}$

25. $\csc\theta = 5$ $\quad \frac{\text{hyp}}{\text{opp}}$



$1^2 + x^2 = 5^2$

$x^2 = 24$

$x = \sqrt{24}$

$x = 2\sqrt{6}$

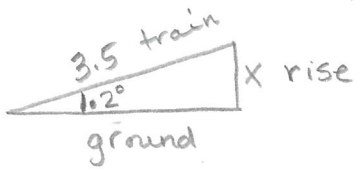
$\sin\theta = 1/5$

$\cos\theta = \frac{2\sqrt{6}}{5}$ $\quad \sec\theta = \frac{5}{2\sqrt{6}} = \frac{5\sqrt{6}}{12}$

$\tan\theta = \frac{1}{2\sqrt{6}} = \frac{\sqrt{6}}{12}$ $\quad \cot\theta = 2\sqrt{6}$

$\sqrt{24}$ 4.6

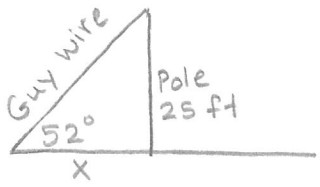
26. A train travels 3.5 kilometers on a straight track with a grade of 1.2°. What is the vertical rise?



$\sin 1.2^\circ = \frac{x}{3.5}$

$x = .0733$ Kilometers

27. A guy wire runs from the ground to the top of a 25-foot telephone pole. The angle formed between the wire and the ground is 52°. How far from the base of the pole is the guy wire anchored to the ground? Assume the pole is perpendicular to the ground.



$\tan 52^\circ = \frac{25}{x}$

$x = \frac{25}{\tan 52^\circ}$ $x = 19.53$ ft

Find the exact value of the following functions. Use the unit circle.

28. $\sin \frac{7\pi}{6}$ $= -1/2$	29. $\cos\left(-\frac{\pi}{3}\right)$ $= \frac{1}{2}$	30. $\tan(-\pi)$ $= \frac{0}{-1} = 0$
31. $\cos(-180^\circ)$ $= -1$	32. $\cot \frac{3\pi}{2}$ $= \frac{0}{-1} = 0$	33. $csc(-420^\circ) = 2$ $\frac{1}{\sin\theta}$

34. In what quadrants will tangent be a positive value? I & III

A negative value? II & IV

35. If $\cos\theta = -\frac{1}{2}$ and θ is in Q II, what is θ in radians?

$\frac{2\pi}{3}$

36. If $\sin\theta = -\frac{\sqrt{3}}{2}$ and θ is in Q IV, what is θ in degrees?

300°

37. In which quadrant would θ be located if:

a) $\tan\theta > 0$ and $\cos\theta < 0$? I & III II & III III

b) $\sin\theta < 0$ and $\cos\theta < 0$? III & IV II & III III

c) $\sin\theta > 0$ and $\tan\theta > 0$? I & II I & IV I

Find the complement and supplement of each angle if possible.

38. $\frac{\pi}{12}$

complement $\frac{\pi}{2} - \frac{\pi}{12} = \frac{5\pi}{12}$

supplement $\pi - \frac{\pi}{12} = \frac{11\pi}{12}$

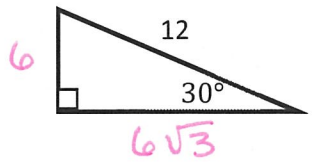
39. $\frac{\pi}{4}$

complement $\frac{\pi}{2} - \frac{\pi}{4} = \frac{\pi}{4}$

supplement $\pi - \frac{\pi}{4} = \frac{3\pi}{4}$

Using your special triangle patterns, find the exact value of the indicated variables.

40.



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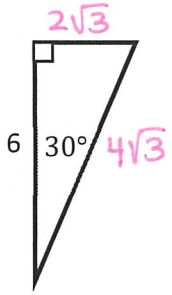

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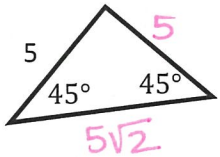

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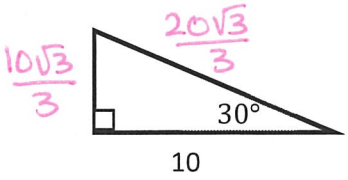

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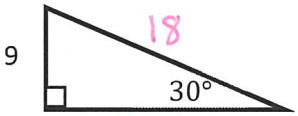
44.



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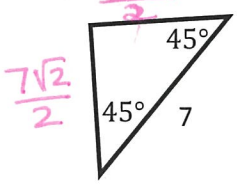

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