Honors Finite Math Name:_____
Trig Review Homework

Triangle Trigonometry…

#1. From a 60-foot tall observation tower on the coast, a Coast Guard officer sights a boat in difficulty. The angle of depression from the top of the tower to the boat is $4.5°$. How far is the boat from the shoreline?

#2. A 30-meter line is used to tether a helium-filled balloon. Because of a breeze, the line makes an angle of approximately $75°$ with the ground. What is the height of the balloon?

#3. Use the given information to solve the triangle (find all remaining sides or angles).

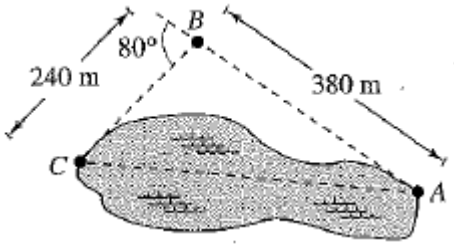
$m\angle A = 60°,\ a = 10,\ b = 4$

#4. The angles of elevation to an airplane from two points A and B on the ground are $55°$ *and* $72°$ respectively. The points A and B are 2.2 miles apart, and the airplane is east of both points in the same vertical plane. Find the altitude of the airplane.

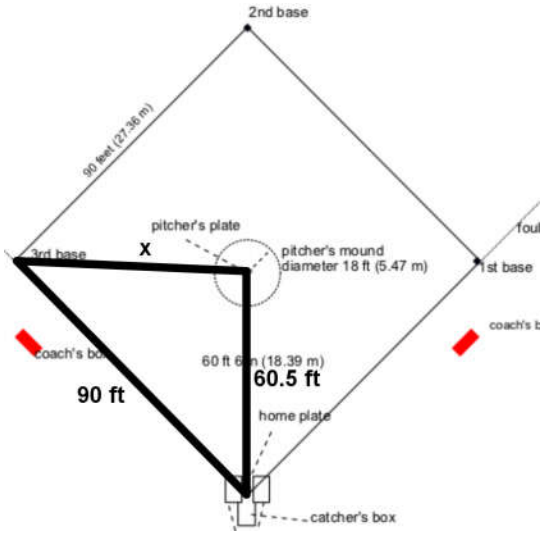
#5. Use the given information to solve the triangle (find all remaining sides or angles).

$a = 9, \quad b = 12, \quad c = 15$

#6. To approximate the length of a marsh, a surveyor walks 380 meters from point A to point B, then turns $80°$ and walks 240 meters to point C (see picture). What is the distance AC across the marsh?

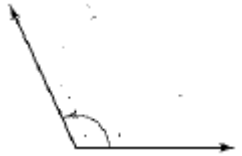


#7. On a baseball diamond with 90-foot sides, the pitcher's mound is 60.5 feet from home plate. How far is it from the pitcher's mound to 3rd base?



General angles, Arc length, Unit circle definitions of Sine and Cosine…

#8. Estimate the measure of this angle to the nearest one-half radian:



#9. Determine two coterminal angles in radian measure (one positive and one negative) for the given angle:

(a) $\frac{2\pi}{3}$ (b) $-\frac{11\pi}{4}$

#10. Determine two coterminal angles in degree measure (one positive and one negative) for the given angle:

(a) $114°$ (b) $-390°$

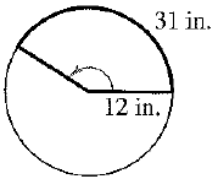
#11. Without using a calculator:

(a) Convert $315°$ to radians. (b) Convert $-\frac{7\pi}{6}$ to degrees.

#12. Determine the quadrant in which these angles lie:

(a) $282°$ (b) $-\frac{5\pi}{4}$

#13. Find the angle in radians:



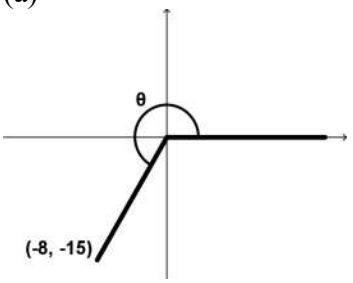
#14. Find the length of the arc on a circle with radius of 9 feet intercepted by a central angle of $60°$.

#15. Evaluate the six trigonometric functions for the given angle:

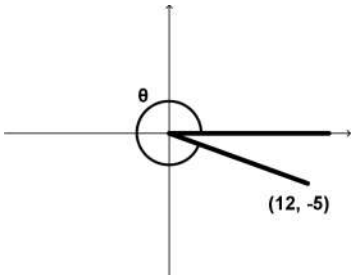
(a) $\theta = \frac{5\pi}{6}$ (b) $\theta = -\frac{3\pi}{2}$ (c) $\theta = 2.3$

#16. Determine the exact values of the six trigonometric functions of the angle θ:

(a)



(b)



#17. State the quadrant in which θ lies:

(a) $\sin\theta < 0$ *and* $\cos\theta < 0$ (b) $\tan\theta > 0$ *and* $\csc\theta < 0$ (c) $\sec\theta > 0$ *and* $\cot\theta < 0$

#18. Find the reference angle for the given angle:

(a) $\theta = 208°$ (b) $\theta = \frac{17\pi}{6}$ (c) $\theta = 3.5$

#19. Find $\cos\theta$ if $\sin\theta = -\frac{3}{5}$ and θ is in quadrant IV.

#20. Find $\sec\theta$ if $\cot\theta = -3$ and $\frac{\pi}{2} < \theta < \pi$.

#21. Find $\cot\theta$ if $\csc\theta = -2$ and $\frac{3\pi}{2} < \theta < 2\pi$.

Trigonometric Identities…

#22. Use the given values to evaluate the remaining trigonometric functions:

(a) $\tan\theta = 4,\ \sin\theta < 0$ (b) $\sec\theta = -3,\ \tan\theta < 0$

#23. Use identities to simplify the expression:

(a) $\cos\beta\tan\beta$ (b) $\dfrac{\cot x}{\csc x}$ (c) $\dfrac{\tan^2\theta}{\sec^2\theta}$

(Do #24 and #25 on a separate piece of paper):

#24. Use identities to simplify the expression:

(a) $\sec^2\theta\tan^2\theta + \sec^2\theta$ (b) $\tan^4 x + 2\tan^2 x + 1$ (c) $\sin^4 t - \cos^4 t$

#25 (a). Let u and v be angles in the 3rd quadrant with $\cos u = -\dfrac{15}{17}$ *and* $\tan v = \dfrac{3}{4}$.

Evaluate $\cos(u+v)$ (answer in exact form).

#25 (b). If $\cos x = \dfrac{24}{25}$ and x is in quadrant IV, find $\cos(2x)$.

#25 (c). If $\cos x = \dfrac{24}{25}$ and x is in quadrant IV, find $\tan\left(\dfrac{1}{2}x\right)$.

Inverse trigonometric functions, Solving trigonometric equations…

#26. A skateboard ramp requires a rise of one foot for each three feet of horizontal length. What is the angle of elevation of the ramp?

#27. A 50-meter line is used to tether a helium-filled balloon. A breeze blows the balloon so that it is not above the tether point on the ground. If the balloon is 35 meters above the ground, what is the angle between the line and the ground?

#28. Find all the solutions to the equation $2\cos x + 1 = 0$

#29. Find all the solutions to the equation $\csc^2 x - 2 = 0$ in the interval $[0, 2\pi)$.

#30. Find all the solutions to the equation $\cos x(\cos x - 1) = 0$ in the interval $[0, 2\pi)$.

#31. Find all the solutions to the equation $\cos^3 x = \cos x$ in the interval $[0, 2\pi)$.

#32. Find all the solutions to the equation $\cos x + \sin x \tan x = 2$ in the interval $[0, 2\pi)$.

#33. Find all the solutions to the equation $2\sin^2 t + 3\sin t + 1 = 0$ in the interval $[0, 2\pi)$.

#34. Find all the solutions to the equation $\dfrac{1+\sin x}{\cos x} + \dfrac{\cos x}{1+\sin x} = 4$ in the interval $[0, 2\pi)$.

Additional problems:

#S1. Let u and v be angles in the third quadrant and let $\cos u = \frac{-15}{17}$ and $\tan v = \frac{3}{4}$.

Use a sum formula to evaluate $\cos(u+v)$. Leave your answer in exact form.

#S2. If $\cos x = \frac{24}{25}$ and x is in quadrant IV, find the following:

a) $\cos(2x) =$

b) $\tan(2x) =$