

PreCalculus 2nd term Final Review: Name: _____

1. Determine the quadrant of the following angles.

a. $\frac{5\pi}{4}$

b. -450°

2. Write the following angles in radians.

a. 60°

b. 210°

3. Write the following angles in degrees.

a. $\frac{5\pi}{3}$

b. $\frac{5\pi}{6}$

4. Find the exact value of all 6 trigonometric functions at $\theta = \frac{2\pi}{3}$.

Sin $\theta =$

Csc $\theta =$

Cos $\theta =$

Sec $\theta =$

Tan $\theta =$

Cot $\theta =$

5. Give the amplitude, period, and the direction and distance of any shifts or reflections of the graph of the following function.

$y = -2\sin(\pi x + 1) - 3$

Amp =

Period =

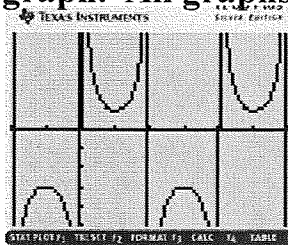
Reflections:

Shifts:

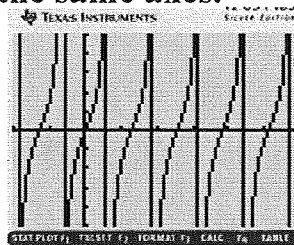
6. Match each equation with its graph. All graphs have the same axes.

a. $\frac{3}{2}\sec\left(\frac{\pi x}{2}\right)$ _____

I.

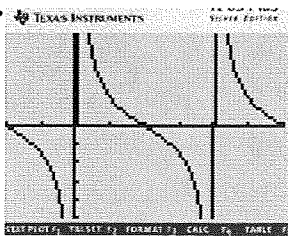


II.

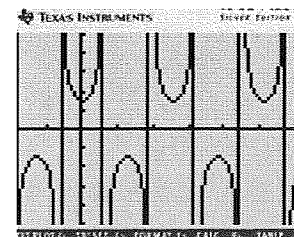


b. $\frac{1}{2}\tan(x)$ _____

III.



IV.

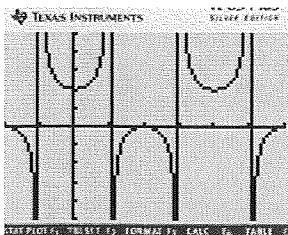


c. $2\csc(x) - 1$ _____

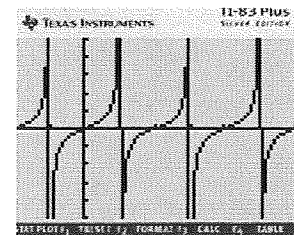
d. $2\tan\left(\frac{\pi x}{2}\right)$ _____

e. $\sec\left(\frac{x}{2}\right) + 1$ _____

V.



VI.

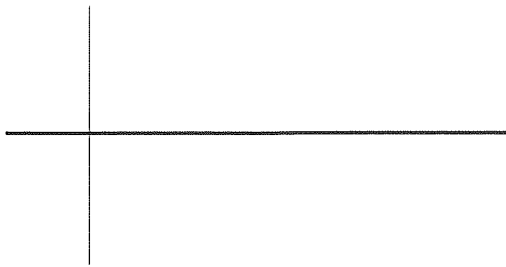


f. $\frac{3}{2}\cot\left(\frac{x}{2}\right)$ _____

7. Sketch the following Graphs including correctly labeling the axes.

a. $y = \frac{x}{2} \sin(4\pi x)$

b. $y = -2\cos\left(\frac{x}{3}\right) + 1$



8. Find the following angles in degrees.

a. $\tan \theta = -\frac{4}{3}$

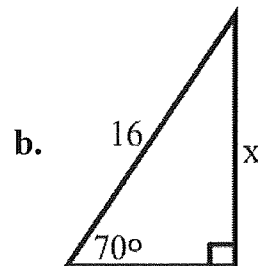
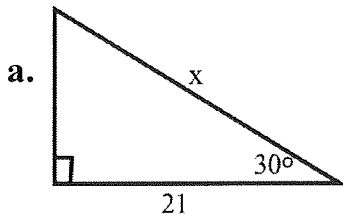
b. $\csc \theta = \frac{6}{5}$

9. Draw the appropriate triangle and use it to solve the following expressions.

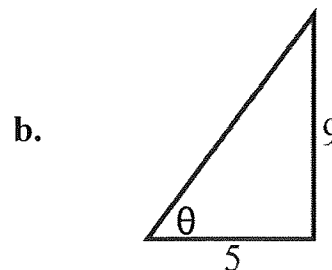
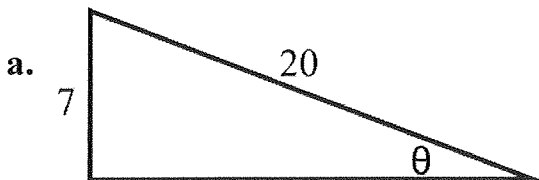
a. $\sec(\sin^{-1}(\frac{3}{5}))$

b. $\cos(\arctan(x))$

10. Solve for x.



11. Find the angles.



12. A person is seated on a Ferris Wheel with a diameter of 80ft that makes one rotation every 90 seconds. Find the equation that represents the harmonic motion of the person's height compared to the height of the center of the wheel at any time t. Assume the Ferris wheel travels at a uniform speed and that the person is at the bottom of the wheel when the ride officially begins (t=0).

13. Verify the following identities.

a. $\sin(\alpha)\csc(\alpha)$

b. $\cos^2(\beta) - \sin^2(\beta) = 1 - 2\sin^2(\beta)$

c. $\csc(\phi) + \sin(\phi) = \frac{\cos^2(\phi)}{\sin(\phi)}$

d. $(1 + \sin(\theta))(1 - \sin(\theta)) = \cos^2(\theta)$

14. Find the solutions to the equations in the interval $[0 - 2\pi]$.

a. $2\cos(x) + 1 = 0$

b. $\tan(x)(\tan(x) - 1) = 0$

15. Find all the solutions to the equations.

a. $2\sin(x) - 1 = 0$

b. $\sin(x)\cos(x) - \frac{1}{2}\sin(x) = 0$

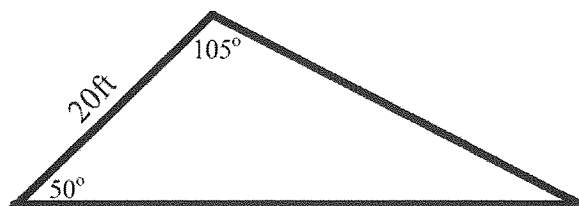
16. Find the exact value of $\cos(75^\circ)$.

$30^\circ + 45^\circ = 70^\circ$

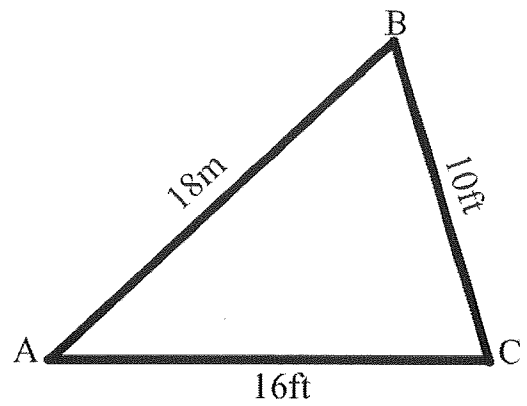
17. Find the exact value of $\tan(105^\circ)$.

$60^\circ + 45^\circ = 105^\circ$

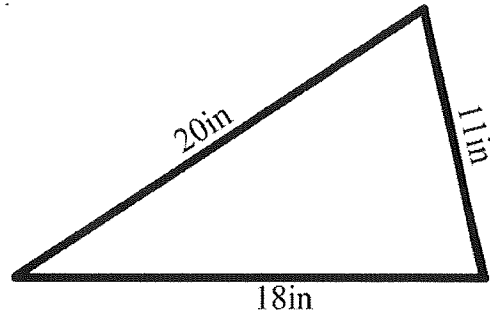
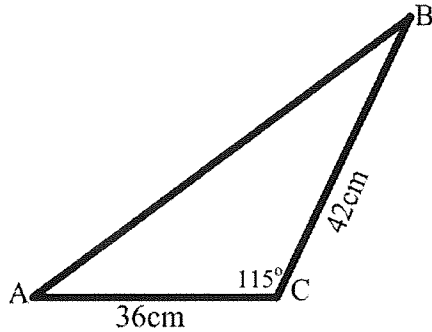
18. Solve the following triangle.



19. Solve the following triangle.

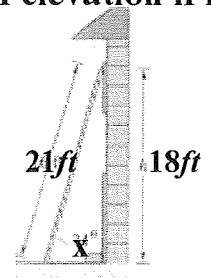


20. Find the area of the following triangles.

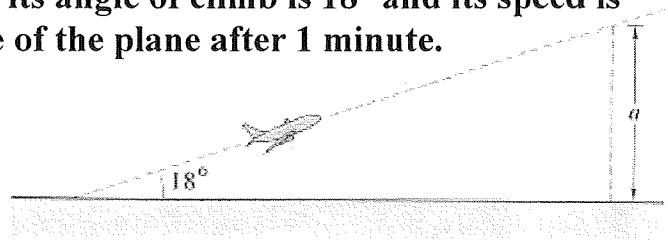


21. How many triangles satisfy the conditions: $A = 50^\circ$, $b = 16\text{in}$, $a = 11\text{in}$?

22. A 21ft ladder leans against the side of a house. What is the angle of elevation if it reaches 18ft up the side of the house?



23. When an airplane leaves the runway, its angle of climb is 18° and its speed is 300 feet per second. Find the altitude of the plane after 1 minute.



24. Find the exact value of the trig functions given that.

$$\sin u = \frac{12}{13} \quad 0 < u < \frac{\pi}{2} \quad \text{and} \quad \cos v = \frac{3}{5} \quad 0 < v < \frac{\pi}{2}$$

a. $\sin(u + v)$

b. $\tan(u - v)$

25. Find the exact values of the trig functions given that.

$$\sin u = \frac{5}{13} \quad 0 < u < \frac{\pi}{2}$$

a. $\sin(2u)$

b. $\cos(2u)$

c. $\tan(2u)$

26. Use the Power-Reducing Formulas to solve the expressions using the first power of cos. Show your work.

a. $\sin^2 45^\circ \cos^2 60^\circ$

27. Use the half angle formulas to determine the exact values.

$$u = 270^\circ$$

a. $\cos(135^\circ)$

28. Use the Product-to-Sum formulas to write the product as a sum.

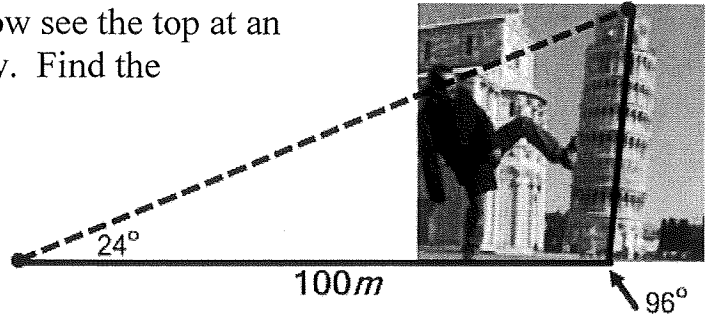
a. $\cos 45^\circ \sin 15^\circ$

29. Use the Sum-to-Product formulas to write the sum as a product.

a. $\sin 90^\circ - \sin 60^\circ$

30. The following information about of a triangular parcel of land is given at a zoning board meeting. “One side is 2400 ft long, and another is 1200 ft . The angle opposite the shorter side is 35° .” Could this be true?

31. Oops, Mr. Chadwick has accidentally knocked the leaning tower of Pisa 6° out of perpendicular. You can now see the top at an angle of elevation of 24° from 100m away. Find the length of the tower.



32. The Scappoose Canoe Regatta was supposed to be two even legs. However, the current has moved the half-way buoy 9° from perpendicular. The buoy is on the end of a $2k$ boom. If the boom is attached $5k$ from the start and the finish, find the distance of the legs x and y .

