Practice Final Exam

See the Chapter Reviews for summaries of basic information and additional problems. Show all your work. Full credit is based on work shown!

- 1. a. Draw a sketch of the angle  $\frac{7\pi}{12}$ .
- b. What is this angle expressed in degrees?
- 2. **Evaluate** (without a calculator) giving the **exact value** for each of the following. (Draw and label the sides of the reference triangle.)

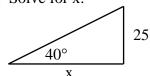
b. 
$$\sin \frac{5\pi}{4} =$$
\_\_\_\_\_

- 3. a. If  $\tan \theta = \frac{4}{11}$  and  $\cos \theta < 0$ , angle  $\theta$  is in what quadrant?
  - b. Draw and label the sides of the reference triangle. c. Determine the remaining five
    - c. Determine the remaining five trigonometric functions of  $\theta$ .

d.  $\sin 2\theta$ 

e.  $\sin(\theta/2)$ 

4. Solve for x.



- 5. Evaluate without a calculator. (Give answers in radian measure in terms of  $\pi$ .)
  - a. sin<sup>-1</sup> 1

- b.  $\cos^{-1}(-\frac{1}{2})$
- c. tan<sup>-1</sup> (-1)

6. Find the exact value of this expression. (Draw and label the sides of a right triangle.)

$$\tan\left(\cos^{-1}\left(\frac{-4}{5}\right)\right)$$

7. For each of the following functions, graph at least two periods (one period in the positive x direction and one period in the negative x direction.) Find the pertinent information (amplitude, period, divisions of period, etc.) **Label the axes with appropriate values**.

Asymptotes should be dashed lines.

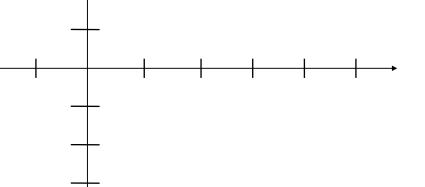
a.  $y = 2\sin(x - \frac{\pi}{2})$ 

period: \_\_\_\_\_

amplitude: \_\_\_\_\_

\_\_\_\_

b.  $y = 2\csc(x - \frac{\pi}{2})$ 



8. Use the sum or difference identities to write the expression as a function of a single angle. Then give the exact value of the trigonometric function.

a. 
$$\frac{\tan 100^{\circ} - \tan 40^{\circ}}{1 + \tan 100^{\circ} \tan 40^{\circ}} = \underline{\hspace{1cm}}$$

b.  $\sin 35^{\circ} \cos 25^{\circ} + \cos 35^{\circ} \sin 25^{\circ} =$ \_\_\_\_\_

= \_\_\_\_\_

=

9. Use the sum or difference formulas or half angle formulas to determine the **exact value** of the sin 15°.

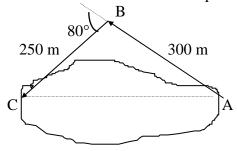
- 10. Verify the following identities.
  - a.  $2 \sin x \cos x \sec 2x = \tan 2x$
- b.  $\tan \theta \cot \theta \sin^2 \theta = \cos^2 \theta$

- 11. Solve the following trigonometric equations in the interval  $0 \le \theta < 2\pi$ .
  - a.  $\cos(2\theta)=0$

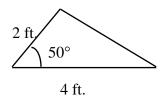
b.  $2\sin^2 x + 3\cos x - 3 = 0$ 

12. Solve the triangle for all sides and angles not given. If two solutions exist, find both.  $A=58^{\circ}$ , a=4.5 inches, and b=5 inches.

13. To approximate the length of a marsh, a surveyor walks 300 meters from point A to point B, then turns 80° and walks 250 meters to point C. Calculate the approximate the length AC across the marsh.



14. Find the area of this triangle.



16.a. Continue this sequence by filling in the next three terms.

6, 11, 16, 21, 26, 31, \_\_\_\_\_, \_\_\_\_\_

- b. Write the nth term of this sequence. That is, write a formula for  $a_n$ .
- c. What is the 50<sup>th</sup> term in this sequence?
- d. Find the sum of the first fifty terms.
- 17. Write the first five terms of the sequence defined by  $a_1 = 25$  and  $a_{k+1} = -\frac{3}{5}a_k$ .
- 18. Find the sum.  $\sum_{k=1}^{\infty} 4 \left(\frac{2}{3}\right)^{k-1}$