

Trig practice final #2

Use only the formulas listed on the study guide.

No calculators!

1. Let  $\theta = -\frac{13\pi}{3}$ .

- (a) Determine the value of  $\theta$  in degrees.
  - (b) State the value of the positive co-terminal angle (in radians) that is less than  $2\pi$ .
  - (c) Give the exact value of  $\sec \theta$ .
  - (d) Give the exact value of  $\tan \theta$ .
2. A triangle has angle  $C = 135^\circ$ ,  $a = 4\text{ cm}$ ,  $b = 6\text{ cm}$ . Determine the exact length of  $c$  and the exact measure of the angle  $A$  (you will need to use  $\sin^{-1}$ ).
3. Determine the exact value of each of these. Circle your answer. Show your work.

(a)  $\sin \left( \arccos \frac{-4}{5} \right)$

(d)  $\sin^{-1} \left( \frac{\sqrt{3}}{2} \right)$

(b)  $\arccos \left( \sin \frac{7\pi}{6} \right)$

(e)  $\sec \left( \frac{13\pi}{2} \right)$

(c)  $\tan \left( \frac{5\pi}{3} \right)$

4. Consider the function  $f(x) = 3 \tan(2x) - 4$ .

- (a) What is the period of  $f(x)$ ?
- (b) What is the horizontal shift?
- (c) What is the vertical shift?
- (d) Where is the first positive asymptote?

5. Find all solutions  $x$  on the interval  $[0, 2\pi)$  (in radians). Show your work.

$$2 \cos^2 x + \cos x - 1 = 0$$

6. Let  $\mathbf{u} = \langle 3, -1 \rangle$  and  $\mathbf{v} = \langle -2, 5 \rangle$ . Determine the magnitude and direction angle of the resultant  $\mathbf{r} = \mathbf{u} + \mathbf{v}$ .
7. Consider an obtuse angle A ( $90^\circ < A < 180^\circ$ ) and an acute angle B ( $0^\circ < B < 90^\circ$ ). Determine the (exact & simplified) values of  
 $\cos(A + B) =$   
 $\tan \frac{A}{2} =$
8. Write each complex number in trigonometric form (use degrees with  $0^\circ \leq \theta < 360^\circ$  and  $r \geq 0$ ).  
(a)  $z_1 = -2 + 2i$       (c)  $z_1 \cdot z_2$   
(b)  $z_2 = 1 - \sqrt{3}i$       (d)  $z_1^4$
9. (a) Convert  $(-4, 4)$  from rectangular to polar coordinates.  
(b) Convert  $(-3, 7\pi/6)$  from polar to rectangular coordinates.  
(c) Rewrite  $2x - y + 3 = 0$  in polar form (i.e.  $r =$  some function of  $\theta$ )
10. For this problem, sketch the situation, label your drawing, set up an equation, and state the answer in exact form including units.

A tightrope wire is strung from the ground to the top of a building which is 120 horizontal feet away. The wire makes a  $30^\circ$  angle with the ground. How long is the wire?