

Name (print) _____ Tu/Th Discussion (circle) 12 1 2

(1) There are *seven questions* on this exam. (2) *Return* this exam copy with your exam booklet. (3) *Write* your TA's name, discussion time, and solutions to problems, in your exam booklet. (4) *Show* your work. You must give complete explanations, not just answers, for full credit. (5) Give *exact answers* whenever possible; otherwise give answers accurate to **three** decimal places. Sketch any calculator graph you use including the axes with a scale. (6) If you use a calculator it must be *your own*. (7) *You are expected to abide by the University's rules concerning academic honesty.*

1. (10 pts.) Find the **exact value** (for example $\frac{1}{2}$, $\frac{\sqrt{7}}{10}$, not 0.571) of the following trigonometric expressions:

(a) $\tan\left(\frac{4\pi}{3}\right)$ (b) $\cos\left(\frac{3\pi}{4}\right)$ (c) $\sec(3\pi)$.

2. (20 pts.) Which of the following statements are identities? In each case answer *yes* or *no*. If your answer is *no*, find a specific x for which the statement is false.

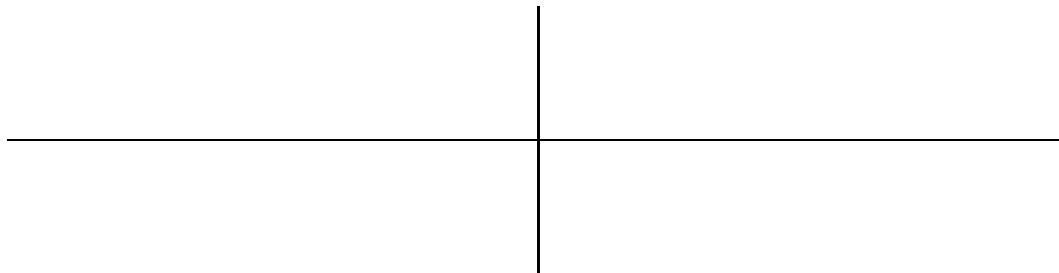
(a) $\tan(x + \pi) = \tan(x)$

(b) $\sin^2(x) + \sec^2(x) = 1$.

(c) $\cos(\pi + x) = \cos(x)$.

(d) $1 + \cot^2(x) = \csc^2(x)$.

3. (20 pts.) The following figure is part of the graph of the periodic function $f(t) = A \sin(bt + c)$. Find the (a) *period*, (b) *amplitude*, and (c) *phase shift* of $f(t)$ and determine the function $f(t)$.



Over for Problems 4–7.

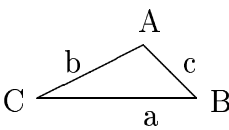
4. (10 pts.) Given that $(3, -8)$ lies on the terminal side of the angle in standard position whose radian measure is t , find the **exact value** of

(a) $\sin(t)$, (b) $\cos(t)$, and (c) $\tan(t)$.

5. (10 pts.) Given that $\tan(t) = -\frac{5}{9}$ and $\sin(t) < 0$, find the **exact value** of

(a) $\sin(t)$, (b) $\sec(t)$, and (c) $\cot(t)$.

6. (15 pts.) The following information is given about a triangle: $a = 23$ cm, $b = 7$ cm, and $C = 40^\circ$. Find (a) c , (b) B , and then (c) A . (Recall that the labeling convention for

triangles is ).

7. (15 pts.) George is on top of a 120 foot lighthouse looking east at two boats. The lighthouse and boats lie on the same straight line. The angles of depression from the top of the lighthouse to the boats are 52° and 13° respectively. How far apart are the boats? [Hint: Draw a picture!]