

MATH 150 - WEEK-IN-REVIEW 11  
SANA KAZEMIPROBLEM STATEMENTS  
EXAM 3 REVIEW

1. Verify the following identities.

a.  $\frac{3 \cot^3 t}{\csc t} = 3 \cos t (\csc^2 t - 1)$

b.  $\tan x - \cot x = \sec x (2 \sin x - \csc x)$

c.  $\frac{\sec \theta \cdot \sin \theta}{\tan \theta + \cot \theta} = \sin^2 \theta$

2. Find all solutions for:

(a)  $\sec(3x) - \cos(3x) = 0$

(b)  $2 \sin^2 x = 7 \cos x + 5$

(c)  $4 \sin x \cos x = \sqrt{3}$  on  $[0, 2\pi)$



(d)  $\frac{\cos(2x)}{\cos^2 x} = 1$  on  $[0, 2\pi)$

3. Find the exact value for  $\sin(2\theta)$ ,  $\cos(2\theta)$ , and  $\tan(2\theta)$ , if  $\cos(\theta) = -\frac{6}{11}$  and  $\theta$  is in QII.

4. Find the exact value of  $\sin\left(\frac{5\pi}{12}\right)$  if  $\frac{5\pi}{12} = \frac{5\pi}{3} - \frac{5\pi}{4}$ .

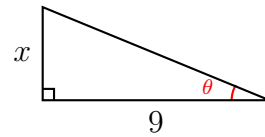
5. Find the exact value of  $\cos(115^\circ)\cos(5^\circ) - \sin(115^\circ)\sin(5^\circ)$ .

6. Find the exact value of  $\frac{\tan(\pi/15) + \tan(4\pi/15)}{1 - \tan(\pi/15)\tan(4\pi/15)}$ .

7. Rewrite  $\sin(x)\cos(3x) + \sin(3x)\cos(x)$  as a single expression.

8. Use the reference angle to find the value for  $\tan\left(-\frac{2\pi}{3}\right) =$ .

9. Use an inverse trig function to write  $\theta$  as a function of  $x$ .

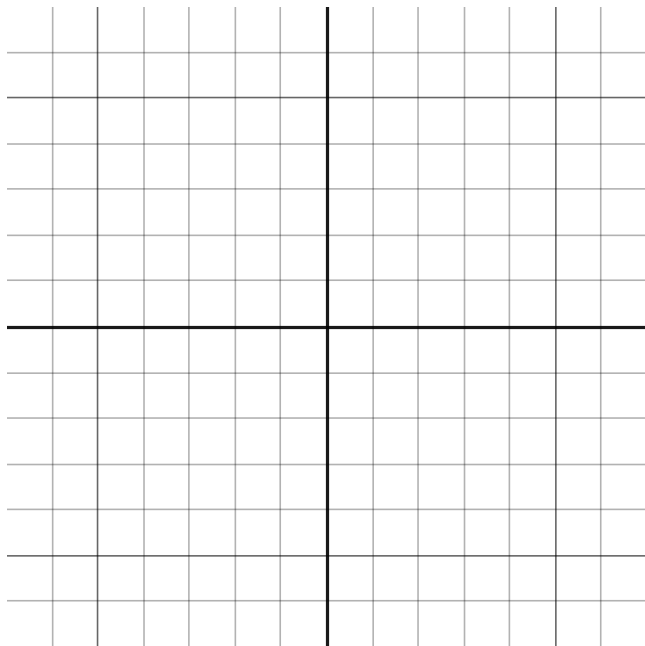


10. Given  $\csc(\theta) = -\frac{7}{5}$  and  $\tan(\theta) < 0$ , find the value of  $\sec(\theta)$ .

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11. Emmy chooses a horse that is 10 feet from the center of a merry-go-round. The merry-go-round makes  $\frac{9}{2}$  rotations per minute. Determine Jack's angular velocity in radians per second. How far has Emmy travelled in 5 minutes?

12. Given  $t$  corresponds to the point  $\left(\frac{1}{5}, -\frac{\sqrt{6}}{5}\right)$  on a circle, find the value of  $\sin(t)$ ,  $\sec(t)$ , and  $\tan(t)$ .

13. Given  $y = \frac{3}{2} \sin(5x - \pi) - 2$ , state the amplitude, period and phase shift of the graph. Sketch the graph.



14. State the domain and range of  $y = \tan(x)$
15. State the domain and range of  $f(x) = \arcsin(x)$ ,  $g(x) = \arccos(x)$ , and  $h(x) = \arctan(x)$ .
16. From his hotel room window on the sixth floor, Saleh notices some window washers high above him on the hotel across the street. Curious as to their height above the ground, he quickly estimates the buildings are 50 ft apart and the angle of elevation to the workers is  $80^\circ$ . Leave all answers in exact form.
- a) How far apart are Saleh and the window washers?
- b) If Saleh's hotel floor is 60ft above ground, how far are the window washers from the ground?





17. Simplify each composition, if possible.

$$\tan \left[ \arctan(-\sqrt{3}) \right] = \underline{\hspace{2cm}}$$

$$\arcsin \left[ \sin \left( \frac{5\pi}{6} \right) \right] = \underline{\hspace{2cm}}$$

$$\arcsin [\cos(0)] = \underline{\hspace{2cm}}$$

$$\tan \left[ \arcsin \left( \frac{\sqrt{x^2 - 25}}{x} \right) \right] = \underline{\hspace{2cm}}$$

18. Evaluate the following
- (a) convert  $53^\circ$  to radians.

- (b) convert  $\frac{4\pi}{15}$  Rad to degrees.

- (c) Supplementary angle for  $53^\circ$ .

- (d) Complementary angle for  $53^\circ$

19. solve the following system of equations.

$$(a) \begin{cases} (x+4)^2 + y^2 = 4 \\ y - \sqrt{x} = 0 \end{cases}$$

$$(b) \begin{cases} x^2 + y^2 = 25 \\ xy = 12 \end{cases}$$