

Math 101 — Quiz 8
TUTOR HELP NOT OKAY!!

Name: _____

Directions: **Due Wednesday, Mar. 11th**

- You are not to work on this together or get help from mentors/tutors!!
- Show all work.
- Write your solutions on printer paper.
- Only use a calculator if the question specifically says to use one!
- Box off your solutions.
- No credit will be given for sloppy or illegible work.
- Do not write your solutions on this piece of paper.
- Staple your worked out solutions to this piece of paper and use this piece of paper as your top (or cover) sheet.

Exercises

1. Section 3.4

Do problems 20, 28, 36, 42, 48, 58 and 70 on page 216 in the textbook.

$$(20) \sec \theta \cdot \sin \theta = \tan \theta$$

$$\text{LHS} = \sec \theta \cdot \sin \theta = \frac{1}{\cos \theta} \cdot \frac{\sin \theta}{1} = \frac{\sin \theta}{\cos \theta} = \tan \theta \checkmark$$

$$(28) (\csc \theta - 1)(\csc \theta + 1) = \cot^2 \theta$$

$$1 + \cot^2 \theta = \csc^2 \theta$$

subtract 1

$$\cot^2 \theta = \csc^2 \theta - 1$$

$$\text{LHS} = \csc^2 \theta + \csc \theta - \csc \theta - 1 = \csc^2 \theta - 1 = \cot^2 \theta$$

$$(36) \csc^4 \theta - \csc^2 \theta = \cot^4 \theta + \cot^2 \theta$$

$$\text{LHS} = \csc^2 \theta (\csc^2 \theta - 1) = \csc^2 \theta (\cot^2 \theta)$$

$$= (1 + \cot^2 \theta)(\cot^2 \theta)$$

$$= \cot^2 \theta + \cot^4 \theta = \cot^4 \theta + \cot^2 \theta \checkmark$$

$$(42) 1 - \frac{\sin^2 \theta}{1 - \cos \theta} = -\cos \theta$$

$$\text{LHS} = 1 - \frac{1 - \cos^2 \theta}{1 - \cos \theta} = 1 - \frac{(1 + \cos \theta)(1 - \cos \theta)}{1 \cdot (1 - \cos \theta)} = 1 - (1 + \cos \theta)$$

$$= 1 + -1 - \cos \theta = -\cos \theta \checkmark$$

$$(48) \text{RHS} = \frac{1 + \sec \theta}{1 - \sec \theta} = \frac{1 + \frac{1}{\cos \theta}}{1 - \frac{1}{\cos \theta}} = \frac{\frac{\cos \theta}{\cos \theta} + \frac{1}{\cos \theta}}{\frac{\cos \theta}{\cos \theta} - \frac{1}{\cos \theta}}$$

$$= \frac{\frac{\cos \theta + 1}{\cos \theta}}{\frac{\cos \theta - 1}{\cos \theta}} = \frac{\cos \theta + 1}{\cancel{\cos \theta}} \cdot \frac{\cancel{\cos \theta}}{\cos \theta - 1} = \frac{\cos \theta + 1}{\cos \theta - 1}$$

(58)

$$\frac{\sin \theta \cos \theta}{\cos^2 \theta - \sin^2 \theta} = \frac{\tan \theta}{1 - \tan^2 \theta}$$

$$\text{RHS} = \frac{\tan \theta}{1 - \tan^2 \theta} = \frac{\frac{\sin \theta}{\cos \theta}}{1 - (\tan \theta)^2}$$

$$= \frac{\frac{\sin \theta}{\cos \theta}}{1 - \left(\frac{\sin \theta}{\cos \theta}\right)^2} = \frac{\frac{\sin \theta}{\cos \theta}}{1 - \frac{\sin^2 \theta}{\cos^2 \theta}} \cdot \frac{\cos \theta}{\cos \theta}$$

$$= \frac{\frac{\sin \theta}{\cos \theta} \cdot \cos \theta}{\left(1 - \frac{\sin^2 \theta}{\cos^2 \theta}\right) \cos \theta} = \frac{\sin \theta}{\cos \theta - \frac{\sin^2 \theta}{\cos^2 \theta} \cdot \cos \theta}$$

$$= \frac{\sin \theta}{\cos \theta - \frac{\sin^2 \theta}{\cos \theta}} = \frac{\sin \theta}{\frac{\cos^2 \theta}{\cos \theta} - \frac{\sin^2 \theta}{\cos \theta}}$$

$$= \frac{\frac{\sin \theta}{1}}{\frac{\cos^2 \theta - \sin^2 \theta}{\cos \theta}} = \frac{\sin \theta}{1} \cdot \frac{\cos \theta}{\cos^2 \theta - \sin^2 \theta}$$

$$= \frac{\sin \theta \cos \theta}{\cos^2 \theta - \sin^2 \theta} = \text{LHS} \checkmark$$

$$(70) \quad \frac{\sin^2 \theta - \tan \theta}{\cos^2 \theta - \cot \theta} = \tan^2 \theta$$

$$LHS = \frac{\sin^2 \theta - \tan \theta}{\cos^2 \theta - \cot \theta} = \frac{\sin^2 \theta - \frac{\sin \theta}{\cos \theta}}{\cos^2 \theta - \frac{\cos \theta}{\sin \theta}}$$

$$= \frac{\frac{\sin^2 \theta \cdot \cos \theta}{\cos \theta} - \frac{\sin \theta}{\cos \theta}}{\frac{\cos^2 \theta \cdot \sin \theta}{\sin \theta} - \frac{\cos \theta}{\sin \theta}}$$

$$= \frac{\sin^2 \theta \cos \theta - \sin \theta}{\cos^2 \theta \sin \theta - \cos \theta}$$

$$= \frac{\sin^2 \theta \cos \theta - \sin \theta}{\cos^2 \theta \sin \theta - \cos \theta} = \frac{\sin^2 \theta \cos \theta - \sin \theta}{\cos \theta} \cdot \frac{\sin \theta}{\cos^2 \theta \sin \theta - \cos \theta}$$

$$= \frac{(\sin \theta)(\cancel{\sin \theta \cos \theta} - 1)}{\cos \theta} \cdot \frac{\sin \theta}{(\cos \theta)(\cancel{\cos \theta \sin \theta} - 1)}$$

$$= \frac{\sin \theta \cdot \sin \theta}{\cos \theta \cdot \cos \theta} = \frac{(\sin \theta)^2}{(\cos \theta)^2} = \left(\frac{\sin \theta}{\cos \theta} \right)^2$$

$$= (\tan \theta)^2$$

$$= \tan^2 \theta = RHS \checkmark$$