

MTH 30 LECTURE NOTES (Ojakian)

Topic 23: Trigonometric Identities

OUTLINE

(References: 7.1, 7.2)

1. Recall: Identities in general

PROBLEM 1. *One is an identity, one is not. Which is which? (and note: even a NON-identity can be true sometimes ...)*

(a) $x + 12x - 4x = 3x + 6x$

(b) $x + 12x - 4x = 3x + 10x$

PROBLEM 2. *For the true identity, prove it is an identity.*

2. Basic Trig Identities

Two general activities: Proving identities AND using identities for simplification/calculation

PROBLEM 3. *Note the basic trigonometric identities on the sheet. Observe that they are true by evaluating for some angles.*

3. Using Trig Identities in Calculation and Simplification

(a) Section 7.2, exercises 4 - 7

(b) Section 7.1, exercises 16, 17, 18 (simplifying in terms of sin and cos)

(c) Section 7.2, exercises 10 - 13 (simplifying in terms of sin and cos)

4. Proving Trig Identities

PROBLEM 4. *Derive a few other useful trig identities from the basic trig identities.*

(a) $\sin^2 \theta = 1 - \cos^2 \theta$

(b) $\cos^2 \theta = 1 - \sin^2 \theta$

PROBLEM 5. *Section 7.1, exercises 29 - 33, 40 - 42*

PROBLEM 6. *Section 7.2, exercises 49 - 51*

PROBLEM 7. *Prove that $\cos^2 \theta \tan^2 \theta = \sin^2 \theta$.*

PROBLEM 8. $\sec^2(x) - \tan^2(x) = 1$

PROBLEM 9. *Prove that $5 \sin^2 \theta + 4 \cos^2 \theta = \sin^2 \theta + 4$.*

PROBLEM 10. *Prove that $\frac{1 + \sin \theta}{\cos \theta} = \frac{\cos \theta}{1 - \sin \theta}$*