

Trigonometry Chapter 5

Section 1

I. Fundamental Identities

Complete each Identity:

1. RECIPROCAL IDENTITIES:

a) _____ = $\frac{1}{\csc(\theta)}$

d) $\csc(\theta) =$ _____

b) $\cos(\theta) =$ _____

e) $\sec(\theta) =$ _____

c) $\tan(\theta) =$ _____

f) _____ = $\frac{1}{\tan(\theta)}$

2. QUOTIENT IDENTITIES:

a) _____ = $\frac{\sin(\theta)}{\cos(\theta)}$

b) $\cot(\theta) =$ _____

3. PYTHAGOREAN IDENTITIES:

a) $\sin^2(\theta) + \cos^2(\theta) =$ _____

b) $\tan^2(\theta) + 1 =$ _____

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

OTHER FORMS OF THESE:

d) _____

f) _____

h) _____

e) _____

g) _____

i) _____

II. Write each expression in terms of $\sin(\theta)$ and $\cos(\theta)$, then simplify the expression. Express your answers in terms of $\sin(\theta)$ and $\cos(\theta)$.

Example:

a) $\tan(\theta) \cos(\theta)$

b) $\sin^2(\theta)(\csc^2(\theta) - 1)\sec(\theta)$

Solution:

a)

$$\begin{aligned} \tan(\theta) \cos(\theta) &= \frac{\sin(\theta)}{\cos(\theta)} \cdot \frac{\cos(\theta)}{1} \\ &= \frac{\sin(\theta)}{\cancel{\cos(\theta)}} \cdot \frac{\cancel{\cos(\theta)}}{1} \\ &= \frac{\sin(\theta)}{1} \\ &= \boxed{\sin(\theta)} \end{aligned}$$

b)

$$\begin{aligned} \sin^2(\theta)(\csc^2(\theta) - 1)\sec(\theta) &= \sin^2(\theta) \cot^2(\theta) \sec(\theta) \\ &= \frac{\sin^2(\theta)}{1} \cdot \frac{\cos^2(\theta)}{\sin^2(\theta)} \cdot \frac{1}{\cos(\theta)} \\ &= \frac{\cancel{\sin^2(\theta)}}{1} \cdot \frac{\cancel{\cos^2(\theta)}}{\cancel{\sin^2(\theta)}} \cdot \frac{1}{\cancel{\cos(\theta)}} \\ &= \boxed{\cos(\theta)} \end{aligned}$$

4. $\sin(\theta) \cot(\theta)$

5. $\sec(\theta) \cot(\theta) \sin(\theta)$

6. $\tan^2(\theta) \csc^2(\theta) \cos^2(\theta)$

7. $(\tan^2(\theta) + 1) \cos^4(\theta) \tan(\theta)$

8. $\frac{(\sec(\theta)+1)(\sec(\theta)-1)}{\sin^2(\theta)}$

9. $\tan^2(\theta)\cot(\theta)\csc(\theta)$