**10-1 Study Guide and Intervention**

***Trigonometric Identities***

**Find Trigonometric Values** A **trigonometric identity** is an equation involving trigonometric functions that is true for all values for which every expression in the equation is defined.

|  |  |  |
| --- | --- | --- |
| **Basic Trigonometric Identities** | **Quotient Identities** |   |
| **Reciprocal Identities** |   |
| **Pythagorean Identities** |  = 1 + 1 = + 1 =  |

**Example: Find the exact value of cot *θ* if csc *θ* = and 180° < *θ* < 270°.**

 *θ* + 1 = *θ* Trigonometric identity

 *θ* + 1 = Substitute for csc *θ*.

 *θ* + 1 = Square .

 *θ* = Subtract 1 from each side.

 cot *θ* = ± Take the square root of each side.

Since *θ* is in the third quadrant, cot *θ* is positive. Thus, cot *θ* = .

**Exercises**

**Find the exact value of each expression if 0° < *θ* < 90°.**

 **1.** If cot *θ* = 4, find tan *θ*. **2.** If cos *θ* = , find csc *θ*.

 **3.** If sin *θ* = , find cos *θ*. **4.** If sin *θ* = , find sec *θ*.

 **5.** If tan *θ* = , find cos *θ*. **6.** If sin *θ* = , find tan *θ*.

**Find the exact value of each expression if 90° < *θ* < 180°.**

 **7.** If cos *θ* = , find sec *θ*. **8.** If csc *θ* = , find cot *θ*.

**Find the exact value of each expression if 270° < *θ* < 360°.**

 **9.** If cos *θ* = , find sin *θ*. **10.** If csc *θ* = , find sin *θ*.

**10-1 Study Guide and Intervention** *(continued)*

***Trigonometric Identities***

**Simplify Expressions** The simplified form of a trigonometric expression is written as a numerical value or in terms
of a single trigonometric function, if possible. Any of the trigonometric identities can be used to simplify expressions containing trigonometric functions.

**Example 1: Simplify (1 – *θ*) sec *θ* cot *θ* + tan *θ* sec *θ*  *θ*.**

(1 – *θ*) sec *θ* cot *θ* + tan *θ* sec *θ*  *θ* = *θ* · · + · · *θ*

 = sin *θ* + sin *θ*

 = 2 sin *θ*

**Example 2: Simplify –** .

– = –

 =

 =

 = or 2 *θ*

**Exercises**

**Simplify each expression.**

 **1.** **2.**

 **3.** **4.**

 **5.** + cot *θ* · sin *θ* · tan *θ* · csc *θ* **6.**

 **7.** 3 tan *θ* · cot *θ* + 4 sin *θ* · csc *θ* + 2 cos *θ* · sec *θ* **8.**