

## Trig Identities Packet

|                                                 |                                       |                                                 |                                       |
|-------------------------------------------------|---------------------------------------|-------------------------------------------------|---------------------------------------|
| $\sin \theta = \frac{1}{\csc \theta}$           | $\csc \theta = \frac{1}{\sin \theta}$ | $\cos \theta = \frac{1}{\sec \theta}$           | $\sec \theta = \frac{1}{\cos \theta}$ |
| $\tan \theta = \frac{\sin \theta}{\cos \theta}$ | $\tan \theta = \frac{1}{\cot \theta}$ | $\cot \theta = \frac{\cos \theta}{\sin \theta}$ | $\cot \theta = \frac{1}{\tan \theta}$ |
| $\cos^2 \theta + \sin^2 \theta = 1$             | $\sin^2 \theta = 1 - \cos^2 \theta$   | $\cos^2 \theta = 1 - \sin^2 \theta$             |                                       |
| $1 + \tan^2 \theta = \sec^2 \theta$             | $\tan^2 \theta = \sec^2 \theta - 1$   | $-\tan^2 \theta = 1 - \sec^2 \theta$            |                                       |
| $1 + \cot^2 \theta = \csc^2 \theta$             | $\cot^2 \theta = \csc^2 \theta - 1$   | $-\cot^2 \theta = 1 - \csc^2 \theta$            |                                       |

### Advanced Math – March 2018

| Sunday    | Monday                                     | Tuesday                                           | Wednesday                                         | Thursday                                          | Friday                                   | Saturday  |
|-----------|--------------------------------------------|---------------------------------------------------|---------------------------------------------------|---------------------------------------------------|------------------------------------------|-----------|
| <b>4</b>  | <b>5</b><br><b>Quiz 6.6</b>                | <b>6</b><br>Trig Identities [D1]<br>HW: Worksheet | <b>7</b><br>Trig Identities [D2]<br>HW: Worksheet | <b>8</b><br>Trig Identities [D3]<br>HW: Worksheet | <b>9</b><br>Review Trig Identities: Odds | <b>10</b> |
| <b>11</b> | <b>12</b><br>Review Trig Identities: Evens | <b>13</b><br><b>Quiz Trig Identities</b>          | <b>14</b><br>Next Concept: Sine & Cosine Graphs   | <b>15</b>                                         | <b>16</b>                                | <b>17</b> |

$$\tan \theta =$$

$$\cot \theta =$$

$$\csc \theta =$$

$$\sec \theta =$$

**Pythagorean Identity**

Solve the Pythagorean Identity for  $\cos^2 \theta$

Solve the Pythagorean Identity for  $\sin^2 \theta$

Take the Pythagorean Identity and divide every single term by  $\cos^2 \theta$

$$\cos^2 \theta + \sin^2 \theta = 1$$

Solve the above equation for  $\tan^2 \theta$

Take the Pythagorean Identity and divide every single term by  $\sin^2 \theta$

$$\cos^2 \theta + \sin^2 \theta = 1$$

Solve the above equation for  $\cot^2 \theta$

**Some other identities:**

$$\sin \theta =$$

$$\cos \theta =$$

$$\tan \theta =$$

$$\sin \theta = \frac{1}{\csc \theta}$$

$$\csc \theta = \frac{1}{\sin \theta}$$

$$\cos \theta = \frac{1}{\sec \theta}$$

$$\sec \theta = \frac{1}{\cos \theta}$$

$$\tan \theta = \frac{\sin \theta}{\cos \theta}$$

$$\tan \theta = \frac{1}{\cot \theta}$$

$$\cot \theta = \frac{\cos \theta}{\sin \theta}$$

$$\cot \theta = \frac{1}{\tan \theta}$$

$$\cos^2 \theta + \sin^2 \theta = 1$$

$$\sin^2 \theta = 1 - \cos^2 \theta$$

$$\cos^2 \theta = 1 - \sin^2 \theta$$

$$1 + \tan^2 \theta = \sec^2 \theta$$

$$\tan^2 \theta = \sec^2 \theta - 1$$

$$-\tan^2 \theta = 1 - \sec^2 \theta$$

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

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

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

**Example 1:** Use Trigonometric Identities to write each expression in terms of a single trigonometric identity or a constant.

a.  $\tan \theta \cos \theta$

b.  $\frac{1 - \cos^2 \theta}{\cos^2 \theta}$

c.  $\cos \theta \csc \theta$

d.  $\frac{\sin \theta \sec \theta}{\tan \theta}$

**Example 2:** Simplify the complex fraction.

a.  $\frac{\frac{2}{3}}{\frac{4}{15}}$

b.  $\frac{\frac{4}{5}}{\frac{4}{35}}$

c.  $\frac{\frac{2}{5}}{\frac{3}{5}}$

d.  $\frac{\frac{1}{2}}{2}$

$$\sin \theta = \frac{1}{\csc \theta}$$

$$\csc \theta = \frac{1}{\sin \theta}$$

$$\cos \theta = \frac{1}{\sec \theta}$$

$$\sec \theta = \frac{1}{\cos \theta}$$

$$\tan \theta = \frac{\sin \theta}{\cos \theta}$$

$$\tan \theta = \frac{1}{\cot \theta}$$

$$\cot \theta = \frac{\cos \theta}{\sin \theta}$$

$$\cot \theta = \frac{1}{\tan \theta}$$

$$\cos^2 \theta + \sin^2 \theta = 1$$

$$\sin^2 \theta = 1 - \cos^2 \theta$$

$$\cos^2 \theta = 1 - \sin^2 \theta$$

$$1 + \tan^2 \theta = \sec^2 \theta$$

$$\tan^2 \theta = \sec^2 \theta - 1$$

$$-\tan^2 \theta = 1 - \sec^2 \theta$$

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

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

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

**Example 3:** Simplify the complex fraction.

a.  $\frac{\csc \theta}{\cot \theta}$

b.  $\frac{1 - \cos^2 \theta}{\tan^2 \theta}$

c.  $\frac{\cos \theta \sec \theta}{\tan \theta}$

d.  $\frac{\sin \theta}{\csc \theta}$

Use Trigonometric Identities to write each expression in terms of a single trigonometric identity or a constant.

1.  $\cot \theta \sin \theta$

2.  $\frac{1 - \sin^2 \theta}{\sin^2 \theta}$

1.) \_\_\_\_\_

2.) \_\_\_\_\_

3.  $\sin \theta \sec \theta$

4.  $\frac{\cos \theta \csc \theta}{\cot \theta}$

3.) \_\_\_\_\_

4.) \_\_\_\_\_

Simplify the complex fraction.

5.  $\frac{\sec \theta}{\tan \theta}$

6.  $\frac{1 - \sin^2 \theta}{\cot^2 \theta}$

5.) \_\_\_\_\_

6.) \_\_\_\_\_

7.  $\frac{\sin \theta \csc \theta}{\cot \theta}$

8.  $\frac{\cos \theta}{\sec \theta}$

7.) \_\_\_\_\_

8.) \_\_\_\_\_