

Discovering Double Angle Trig Identities

Part 1 – Sine

- a. Find $\sin 2\theta$ by using the sum identity for $\sin(\theta + \theta)$ and simplifying.
- b. You have just discovered the “Double Angle Identity for Sine”. 😊 Write the identity in the box below.

$$\sin 2\theta =$$

Part 2 – Tangent

- a. Find $\tan 2\theta$ by using the sum identity for $\tan(\theta + \theta)$ and simplifying.
- b. You have just discovered the “Double Angle Identity for Tangent”. 😊 Write the identity in the box below.

$$\tan 2\theta =$$

Part 3 – Cosine

- a. Find $\cos 2\theta$ by using the sum identity for $\cos(\theta + \theta)$ and simplifying.
- b. You have just discovered the **ONE** “Double Angle Identity for Cosine”. There are **TWO** more!
- c. To find the second “Double Angle Identity for Cosine”, write the first identity below. Use a Pythagorean substitution to replace $\sin^2 \theta$ in your first identity. Simplify. This is a second “Double Angle Identity for Cosine”.
- d. To find the third “Double Angle Identity for Cosine”, write the first identity below. Use a Pythagorean substitution to replace $\cos^2 \theta$ in your first identity. Simplify. This is a third “Double Angle Identity for Cosine”. Write all three identities in the box below.

$$\cos 2\theta =$$

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