

Trigonometry

Activity 3d - Double Angle Formulas

1. Alternate Versions of the Pythagorean Theorem

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

Subtract $\cos^2 \theta$ from both sides to get a formula for $\sin^2 \theta$

$$\sin^2 \theta =$$

Subtract $\sin^2 \theta$ from both sides to get a formula for $\cos^2 \theta$

$$\cos^2 \theta =$$

2. Double Angle Formula for Sine

$$\sin(A + B) = \sin A \cos B + \cos A \sin B$$

$$\sin(2\theta) = \sin(\theta + \theta) =$$

=

3. Double Angle Formula for Cosine

$$\cos(A + B) = \cos A \cos B - \sin A \sin B$$

$$\cos(2\theta) = \cos(\theta + \theta) =$$

=

Find two more formulas for $\cos(2\theta)$ by using the Alternate Versions of the Pythagorean Theorem

$$\cos(2\theta) =$$

$$\cos(2\theta) =$$

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4. Double Angle Formula for Tangent

$$\tan(A + B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$$

$$\tan(2\theta) = \tan(\theta + \theta) =$$

=

5. Half Angle Formula for Sine

Begin with $\cos(2A) = 1 - 2\sin^2(A)$. Let $2A = \theta$. Rewrite the equation in terms of θ and solve for $\sin(\frac{\theta}{2})$.

$$\cos(\theta) =$$

6. Half Angle Formula for Cosine

Begin with $\cos(2A) = 2\cos^2(A) - 1$. Let $2A = \theta$. Rewrite the equation in terms of θ and solve for $\cos(\frac{\theta}{2})$.

$$\cos(\theta) =$$

7. Half Angle Formula for Tangent

Simplify as much as possible:

$$\tan\left(\frac{\theta}{2}\right) = \frac{\sin(\frac{\theta}{2})}{\cos(\frac{\theta}{2})} =$$