

5-5: Double Angle Practice, CP Precalculus – Homework Sheet

1. $\sin A = \frac{3}{4}$ in Quadrant I. Find:

a) $\sin 2A$

b) $\cos 2A$

c) $\tan 2A$

2. $\tan A = \frac{-8}{15}$ in Quadrant IV. Find:

a) $\sin 2A$

b) $\cos 2A$

c) $\tan 2A$

3. $\tan A = \frac{7}{24}$ in Quad III and $\sec B = \frac{17}{8}$ in Quad IV. Find each (exact):

a) $\sin 2B$

b) $\cos 2B$

c) $\sin (A+B)$

d) $\cos (B - A)$

SIDE 1 Double Angle formulas

Use the information given about the angle θ , $0 \leq \theta < 2\pi$, to find the exact value of the indicated trigonometric function.

1) $\sin \theta = \frac{15}{17}$, $0 < \theta < \frac{\pi}{2}$

Find $\cos(2\theta)$.

A) $\frac{161}{289}$

B) $\frac{240}{289}$

C) $-\frac{161}{289}$

D) $-\frac{159}{289}$

2) $\cos \theta = \frac{12}{13}$, $\frac{3\pi}{2} < \theta < 2\pi$

Find $\sin(2\theta)$.

A) $\frac{120}{169}$

B) $\frac{119}{169}$

C) $-\frac{119}{169}$

D) $-\frac{120}{169}$

3) $\tan \theta = \frac{21}{20}$, $\pi < \theta < \frac{3\pi}{2}$

Find $\sin(2\theta)$.

A) $-\frac{840}{841}$

B) $\frac{41}{841}$

C) $-\frac{41}{841}$

D) $\frac{840}{841}$

4) $\csc \theta = \frac{13}{5}$, $\frac{\pi}{2} < \theta < \pi$

Find $\cos(2\theta)$.

A) $\frac{120}{169}$

B) $-\frac{120}{169}$

C) $-\frac{119}{169}$

D) $\frac{119}{169}$

5) $\csc \theta = -\frac{4}{3}$, $\tan \theta > 0$

Find $\cos(2\theta)$.

A) $\frac{1}{8}$

B) $-\frac{3\sqrt{7}}{8}$

C) $-\frac{1}{8}$

D) $\frac{3\sqrt{7}}{8}$

6) $\sec \theta = -\frac{4\sqrt{7}}{7}$, $\csc \theta > 0$

Find $\sin(2\theta)$.

A) $\frac{1}{8}$

B) $-\frac{1}{8}$

C) $\frac{3\sqrt{7}}{8}$

D) $-\frac{3\sqrt{7}}{8}$

7) $\sin \theta = \frac{4\sqrt{3}}{7}$, $\tan \theta < 0$

Find $\sin(2\theta)$.

A) $\frac{8\sqrt{3}}{49}$

B) $\frac{47}{49}$

C) $-\frac{8\sqrt{3}}{49}$

D) $-\frac{47}{49}$

8) $\cos \theta = -\frac{1}{5}$, $\csc \theta < 0$

Find $\cos(2\theta)$.

A) $\frac{4\sqrt{6}}{25}$

B) $-\frac{23}{25}$

C) $\frac{23}{25}$

D) $-\frac{4\sqrt{6}}{25}$

9) $\sin \theta = -\frac{4}{5}$, $\frac{3\pi}{2} < \theta < 2\pi$

Find $\cos(2\theta)$.

A) $-\frac{7}{25}$

B) $\frac{7}{25}$

C) $\frac{24}{25}$

D) $-\frac{24}{25}$

Double Angle Formulas:

Derive $\sin(2x) = \sin(x+x) =$ _____

$=$ _____

Derive $\cos(2x) = \cos(x+x) =$ _____

$=$ _____

$=$ _____ or _____

Evaluate

1. $2\sin 15 \cos 15 =$ _____ $=$ _____

2. $1 - 2\sin^2 67.5 =$ _____ $=$ _____

3. $\cos^2 22.5 - \sin^2 22.5 =$ _____ $=$ _____

4. $2\cos^2 \frac{\pi}{12} - 1 =$ _____ $=$ _____

5. Given $0 < X < \frac{\pi}{2}$, AND $\sin x = \frac{4}{5}$; evaluate each

Sin 2x

Cos 2x

Tan 2x

Prove each identity

1. $\sin 2x \sec x = 2 \sin x$

2. $\frac{\sin 2x}{2 \sin^2 x} = \cot x$

3. $\frac{\cos 2x}{\cos x - \sin x} = \cos x + \sin x$ 4. $(\cos x - \sin x)^2 = 1 - \sin 2x$

4)

Practice Double Angle Formulas

1. $\sin 105 = \sin (\quad) =$ _____

2. $\sin A = \frac{7}{25}$ in Q1, $\sin B = \frac{-5}{13}$ in Q3

Find $\sin (A+B) =$ _____

3. $\sin A = \frac{15}{17}$ in Q2, $\cos B = \frac{4}{5}$ in Q1

Find $\cos (A+B) =$ _____

4. $\sin A = \frac{-8}{17}$ in Q3, find:

$\sin 2A$

$\cos 2A$

$\tan 2A$

5. $\cos A = \frac{12}{13}$ in Q4, find:

$\sin 2A$

$\cos 2A$

$\tan 2A$

Double Angle Worksheet

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Use a double-angle identity to find the exact value of each expression.

1) $\tan \theta = \frac{3}{4}$ and $180^\circ < \theta < 270^\circ$

Find $\sin 2\theta$

2) $\cos \theta = \frac{4}{5}$ and $270^\circ < \theta < 360^\circ$

Find $\tan 2\theta$

3) $\cos \theta = -\frac{12}{13}$ and $180^\circ < \theta < 270^\circ$

Find $\sin 2\theta$

4) $\cos \theta = -\frac{2\sqrt{29}}{29}$ and $180^\circ < \theta < 270^\circ$

Find $\tan 2\theta$

6

$$5) \cos \theta = \frac{\sqrt{231}}{20} \text{ and } 0^\circ < \theta < 90^\circ$$

Find $\cos 2\theta$

$$6) \cos \theta = \frac{4}{5} \text{ and } 0^\circ < \theta < 90^\circ$$

Find $\sin 2\theta$

$$7) \sin \theta = -\frac{3}{5} \text{ and } 180^\circ < \theta < 270^\circ$$

Find $\cos 2\theta$

$$8) \cos \theta = \frac{2\sqrt{6}}{5} \text{ and } 270^\circ < \theta < 360^\circ$$

Find $\cos 2\theta$

$$9) \sin \theta = -\frac{\sqrt{2}}{2} \text{ and } 270^\circ < \theta < 360^\circ$$

Find $\sin 2\theta$

$$10) \tan \theta = -\frac{4\sqrt{105}}{105} \text{ and } 270^\circ < \theta < 360^\circ$$

Find $\tan 2\theta$