

Trig Proofs – Double Angle

Find the exact values for $\sin 2A$, $\cos 2A$, and $\tan 2A$ given the following information”

1. $\sin A = \frac{3}{5}$, angle A is in Quadrant I
2. $\cos A = -\frac{3}{5}$, angle A is in Quadrant II
3. $\tan A = -\frac{3}{4}$, angle A is in Quadrant IV
4. $\tan A = \frac{4}{3}$, angle A is in Quadrant III
5. $\cos A = \frac{-6}{7}$, angle A is in Quadrant II
6. $\sin A = \frac{-2}{7}$, angle A is in Quadrant IV
7. $\csc A = -3$, angle A is in Quadrant III
8. $\sec A = 4$, angle A is in Quadrant I

Prove the following identities:

9. $\sin 2x = \frac{2 \tan x}{1 + \tan^2 x}$
10. $\sec 2x = \frac{\sec^2 x}{2 - \sec^2 x}$
11. $\cos 2A = \frac{1 - \tan^2 A}{1 + \tan^2 A}$
12. $\sin 2A = 2 \cot A \sin^2 A$
13. $\frac{\cos 2x}{\cos x - \sin x} = \cos x + \sin x$
14. $(1 + \tan x) \tan 2x = \frac{2 \tan x}{1 - \tan x}$
15. $\tan x = \frac{1 - \cos 2x}{\sin 2x}$
16. $\tan x = \frac{\sin 2x}{1 + \cos 2x}$
17. $\sin^2 x = \frac{1}{2}(1 - \cos 2x)$
18. $\cos^2 x = \frac{1}{2}(1 + \cos 2x)$

Answers:

	$\sin 2A$	$\cos 2A$	$\tan 2A$
1.	$\frac{24}{25}$	$\frac{7}{25}$	$\frac{24}{7}$
2.	$-\frac{24}{25}$	$-\frac{7}{25}$	$\frac{24}{7}$
3.	$-\frac{24}{25}$	$\frac{7}{25}$	$-\frac{24}{7}$
4.	$\frac{24}{25}$	$-\frac{7}{25}$	$-\frac{24}{7}$
5.	$\frac{-12\sqrt{13}}{49}$	$\frac{23}{49}$	$\frac{-12\sqrt{13}}{23}$
6.	$\frac{-12\sqrt{5}}{49}$	$\frac{41}{49}$	$\frac{-12\sqrt{5}}{41}$
7.	$\frac{4\sqrt{2}}{9}$	$\frac{7}{9}$	$\frac{4\sqrt{2}}{7}$
8.	$\frac{\sqrt{15}}{8}$	$-\frac{7}{8}$	$-\frac{\sqrt{15}}{7}$