3 formulas on test

PreCalculus Class Notes TEI7 Double Angle Identities

Recall: Pythagorean Identities

$\sin^2\theta+\cos^2\theta=1$ → $\sin^2\theta=1-\cos^2\theta$ $\quad\cos^2\theta=1-\sin^2\theta$

Double Angle Identities are derived from the sum of angle identities (A2)

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

Use Pythagorean identities to derive two equivalent forms for $\cos 2\theta=\cos^2\theta-\sin^2\theta$

$\cos 2\theta=\cos^2\theta-\sin^2\theta$	$\cos 2\theta=\cos^2\theta-\sin^2\theta$
$=\cos^2\theta-(1-\cos^2\theta)$	$=1-\sin^2\theta-\sin^2\theta$
$=\cos^2\theta-1+\cos^2\theta$	$\cos 2\theta=1-2\sin^2\theta$
$\cos 2\theta=2\cos^2\theta-1$	

Using substitution to write equivalent forms.

Complete each statement

$\sin 6\theta$	$\cos 12t$
$\sin 2\theta=2\sin\theta\cos\theta$	$\cos 2\theta=\cos^2\theta-\sin^2\theta$
$\sin 6\theta=2\sin 3\theta\cos 3\theta$	$\cos 12t=\cos^2 6t-\sin^2 6t$

$\sin^2\theta=\frac{1-\cos 2\theta}{2}$, so $\sin^2 16t=$

$$\sin^2\theta=\frac{1-\cos 2\theta}{2}$$

$$\sin^2 16t=\frac{1-\cos 32t}{2}$$

$\sin 2\theta = 2\sin\theta\cos\theta$ ÷2 on test

$\cos 2\theta = \cos^2\theta - \sin^2\theta$ on test

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

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

Rewrite the following using double-angle identities.

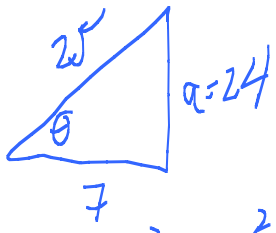
$2\sin 6\theta\cos 6\theta$ $\sin 12\theta$	$1 - 2\sin^2 4\theta$ $\cos 8\theta$
$4\sin 3\theta\cos 3\theta$ $2(2\sin 3\theta\cos 3\theta)$ $2(\sin 6\theta)$ $2\sin 6\theta$	$4\cos^2 2\theta - 4\sin^2 2\theta$ $4(\cos^2 2\theta - \sin^2 2\theta)$ $4(\cos 4\theta)$ $4\cos 4\theta$
$\frac{1}{2}(2\sin 5x\cos 5x)$ $\frac{1}{2}\sin 10x$	$\cos^4\theta - \sin^4\theta$ $(\cos^2\theta - \sin^2\theta)(\cos^2\theta + \sin^2\theta)$ $\cos 2\theta \cdot 1$ $\cos 2\theta$

$\sin 2\theta = 2\sin\theta\cos\theta$

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

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

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

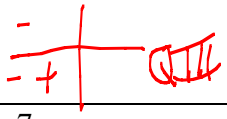


$a^2 + 7^2 = 25^2$

$a^2 + 49 = 625$

$a^2 = 576$

$a = 24$



Find $\sin 2\theta, \cos 2\theta, \tan 2\theta$ for the given information

	$\sin\theta = \frac{12}{13}$ and $\cos\theta = \frac{5}{13}$	$\cos\theta = \frac{-7}{25}$ and $\tan\theta > 0$
$\sin 2\theta$	$\sin 2\theta = 2\sin\theta\cos\theta$ $= 2\left(\frac{12}{13}\right)\left(\frac{5}{13}\right)$ $= \frac{120}{169}$	$\sin 2\theta = 2\left(\frac{-24}{25}\right)\left(\frac{-7}{25}\right)$ $= \frac{+336}{625}$
$\cos 2\theta$	$\cos 2\theta = \cos^2\theta - \sin^2\theta$ $\left(\frac{5}{13}\right)^2 - \left(\frac{12}{13}\right)^2$ $\frac{25}{169} - \frac{144}{169} = \frac{-119}{169}$	$2\cos^2\theta - 1$ $2\left(\frac{-7}{25}\right)^2 - 1$ $\frac{98}{625} - 1 = \frac{-527}{625}$
$\tan 2\theta$	$\frac{\sin 2\theta}{\cos 2\theta}$ $\frac{120}{169} \cdot \frac{169}{-119} = \frac{-120}{119}$	$\frac{336}{625} \cdot \frac{625}{-527}$ $\frac{-336}{527}$