# Section 7.6

# Double-angle and Half-angle Formulas

## Double-angle Formulas

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

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

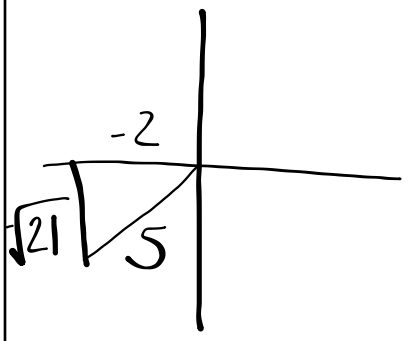
$$\cos(2\theta) = 1 - 2\sin^2\theta$$

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

$$\tan(2\theta) = \frac{2\tan\theta}{1 - \tan^2\theta}$$

**EXAMPLE** **Finding Exact Values Using the Double-angle Formulas**

If $\cos\theta = -\frac{2}{5}, \pi < \theta < \frac{3\pi}{2}$, find the exact value of: (a) $\sin(2\theta)$ (b) $\cos(2\theta)$




a. $\sin(2\theta) = 2\sin\theta\cos\theta$

$= 2\left(-\frac{\sqrt{21}}{5}\right)\left(-\frac{2}{5}\right)$

$= \frac{4\sqrt{21}}{25}$

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

$= 1 - 2\left(-\frac{\sqrt{21}}{5}\right)^2$

$= 1 - 2\left(\frac{21}{25}\right)$

$= 1 - \frac{42}{25}$

$= -\frac{17}{25}$

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