If You See…	You Should Think…
A square term Examples: 1) $(1 + \tan^2\theta)(1 - \cos^2\theta)$ 2) $(2\cos^2\theta - 1)\tan 2\theta$	**Pythagorean identity OR cos2θ (double angle) formula** In example 1), $1 + \tan^2\theta = \sec^2\theta$ and $1 - \cos^2\theta = \sin^2\theta$, giving $(\sec^2\theta)(\sin^2\theta) = \tan^2\theta$. In example 2), $2\cos^2\theta - 1 = \cos 2\theta$, giving $\cos 2\theta \tan 2\theta = \sin 2\theta$.
Fractional terms Example: $\frac{\sin\theta}{\cos\theta} + \frac{\cos\theta}{\sin\theta}$	**Perform fraction operations:** addition, subtraction, multiplication, division, cancelation, etc. In the example, find a common denominator and add: $\frac{\sin^2\theta}{\sin\theta\cos\theta} + \frac{\cos^2\theta}{\sin\theta\cos\theta} = \frac{\sin^2\theta + \cos^2\theta}{\sin\theta\cos\theta} = \frac{1}{\sin\theta\cos\theta} = \csc\theta\sec\theta$
A common factor Example: $\cos^2\theta\tan^2\theta + \cos^2\theta$	**Factoring a common factor often simplifies the remaining expression.** The remaining expression may then be further simplified by the other techniques. In the example, factor $\cos^2\theta$, giving $\cos^2\theta(\tan^2\theta + 1) = \cos^2\theta(\sec^2\theta) = 1$.
A polynomial factor Example: $2\sin^2\theta - 3\sin\theta + 1$	**Factor as with other polynomials**. In the example, factor in the same manner as one would factor $2x^2 - 3x + 1 = (2x - 1)(x - 1)$. In this case, the factors are $(2\sin\theta - 1)(\sin\theta - 1)$.
A mixture of different trigonometric functions Example: $\tan\theta\cos\theta$	**Rewrite all functions in terms of sinθ and cosθ.** In the example, $\tan\theta\cos\theta = \frac{\sin\theta}{\cos\theta}\cos\theta = \sin\theta$
Sum or difference Example: $2\sin(x + y) + 2\sin(x - y)$	**Use the sum/difference formulas.** In the example, $\sin(x + y) = \sin x \cos y + \sin y \cos x$ and $\sin(x - y) = \sin x \cos y - \sin y \cos x$. Adding and multiplying by 2 gives $2 \sin x \cos y$.
Double angle Example: $\sin 2\theta \sec\theta$	**Use the double angle formulas to get all functions in terms of the same variable (θ).** In the example, $\sin 2\theta = 2\sin\theta\cos\theta$, which gives $(2\sin\theta\cos\theta)\sec\theta = 2\sin\theta$.
Special denominator Example: $\frac{1}{1-\cos\theta}$	**Multiply top and bottom by the conjugate of the denominator.** In the example, $\frac{1}{1-\cos\theta} = \frac{1}{1-\cos\theta}\left(\frac{1+\cos\theta}{1+\cos\theta}\right) = \frac{1+\cos\theta}{1-\cos^2\theta} = \frac{1+\cos\theta}{\sin^2\theta}$