1. Solving Trig Equations - Part II

2. You should be familiar with finding values and angles from the unit circle, both in degrees and radians. You should also be familiar with inverse trig functions, and with algebraic techniques to solve polynomial equations.

   In this lesson, we continue the discussion of how to find solutions to trig equations, except here the angle may be a more complicated angle than simply θ.

3. (a) Here are more examples of solving trig equations. In this example, the angle is 3θ, rather than θ. We will solve this equation similar to solving for a simple angle. What we have is an equation that says the sine of a certain angle is $-\frac{\sqrt{3}}{2}$. We begin by making a list of angles whose sine is $-\frac{\sqrt{3}}{2}$.
   (b) In this case, the list contains the possible angles for 3θ. We can then divide each angle by 3 ...
   (c) to get the answers for θ.

4. (a) Here is an example involving secant. Instead of doing the secant problem, lets restate the problem in terms of cosine.
   (b) If $\sec 2\theta = 2$, then $\cos 2\theta = 1/2$.
   (c) We can then make a list of angles 2θ by looking up values from the unit circle and adding and subtracting full circles to get a complete set of answers for 2θ.
   (d) and divide by 2 to get a complete list of answers for θ.

5. (a) Here is an example where the angle is shifted.
   (b) We can make a list of angles whose tangent is -1
   (c) then add $\frac{\pi}{2}$ which is $\frac{2\pi}{4}$ to each answer.

6. (a) Finally, there are some equations with no solution
   (b) $\sin\theta$ must be between -1 and 1. We will never find an angle whose sine is 2.

7. To recap: First, think of expressions like the sine of a complicated angle as single variables, and use algebraic techniques to solve these equations for the trig functions. Then make a complete list of possible angles. When the angle is not a simple angle, continue to solve for the angle.