1. Given that $x = 5\tan\theta$, sketch right triangle involving θ and label all the sides. Then determine expressions for all 6 trigonometric functions of θ.

$\sin\theta =$ $\csc\theta =$

$\cos\theta =$ $\sec\theta =$

$\tan\theta = \dfrac{x}{5}$ $\cot\theta =$

2. Given the following information, sketch and label a right triangle involving θ.
In each case, write down the resulting radical expression ($\sqrt{}$) that appears on one of the sides.

Given	Triangle	Radical Expression ($\sqrt{}$)
(a). $x = a\sin\theta$		
(b). $x = a\tan\theta$		
(c). $x = a\sec\theta$		
(d). $x = \dfrac{a}{b}\sin\theta$		
(e). $x = \dfrac{a}{b}\tan\theta$		
(f). $x = \dfrac{a}{b}\sec\theta$		

3. [Do together as class.] Consider a circle with radius a, i.e. $x^2 + y^2 = a^2$.

(a). Sketch the top half of this circle in the xy-plane. Shade the area bounded by this semi-circle and the x-axis.

(b). What is the equation (function) for this top half of the circle.

$y =$

(c). **Set up, but do not evaluate**, the integral to find the area of this shaded region.

(d). Evaluate the integral in part (c).

Table of Trigonometric Substitutions:

Expression	Substitution	Identity
$\sqrt{a^2 - x^2}$		$1 - \sin^2\theta = \cos^2\theta$
$\sqrt{a^2 - b^2x^2}$		
$\sqrt{a^2 + x^2}$		$1 + \tan^2\theta = \sec^2\theta$
$\sqrt{a^2 + b^2x^2}$		
$\sqrt{x^2 - a^2}$		$\sec^2\theta - 1 = \tan^2\theta$
$\sqrt{b^2x^2 - a^2}$		