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. Use the given substitution to rewrite the given radical expression in terms of trigonometric functions. Then simplify as much as possible using trig identities.
[Helpful identities for simplifying: $\cos^2\theta + \sin^2\theta = 1$ and $1 + \tan^2\theta = \sec^2\theta$.]

(a). Use $x = 5\tan\theta$ to rewrite $\dfrac{x}{\sqrt{x^2+25}}$ Then simplify.

(b). Use $x = a\sin\theta$ to rewrite $x^3\sqrt{a^2 - x^2}$ Then simplify.

(c). Use $x = \dfrac{a}{b}\sec\theta$ to rewrite $\sqrt{b^2x^2 - a^2}$ Then simplify.

4. 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.