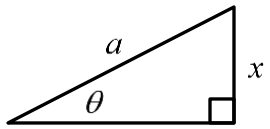
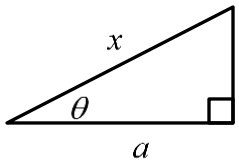
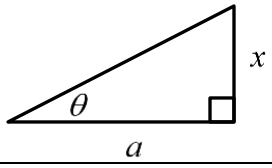
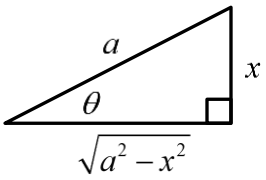
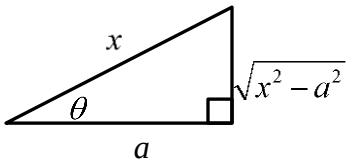
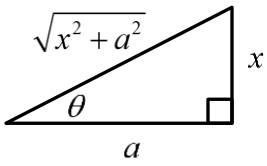
Trig Substitution

Used when you see the following radicals $\sqrt{a^2-x^2}$, $\sqrt{x^2-a^2}$, or $\sqrt{x^2+a^2}$ and inverse trig integrals do not work.

Consider the following three triangles:

Solving the following triangles for the missing sides result in the following:

Now the following substitutions can be made for each triangle:

$\sin(\theta)=\frac{x}{a}$ $x=a\sin(\theta)$ ↓ $dx=a\cos(\theta)\,d\theta$	$\cos(\theta)=\frac{a}{x}$ $x=a\sec(\theta)$ ↓ $dx=a\sec(\theta)\tan(\theta)\,d\theta$	$\tan(\theta)=\frac{x}{a}$ $x=a\tan(\theta)$ ↓ $dx=a\sec^2(\theta)\,d\theta$