

Trigonometric Substitutions (HW #2)

What are the derivatives for $f(x) = \arcsin(x)$ and $g(x) = \arctan(x)$?

Trig substitution is really a section about substituting an inverse trig function such as $u = \arcsin(x)$. Such a substitution would be made if the integral had its derivative in it. But people typically don't remember the derivative of inverse functions unless it is $\ln(x)$, so a technique developed where we use $\sin(u) = x$, $\tan(u) = x$, or $\sec(u) = x$ instead depending if we have the form $1 - x^2$, $1 + x^2$ or $x^2 - 1$ respectively.

Evaluate $\int_0^{1.5} \frac{x^2 dx}{\sqrt{9 - x^2}}$ using a trig substitution.

Evaluate the following integrals.

$$\int \frac{dx}{4+x^2}$$

$$\int \frac{dx}{\sqrt{25x^2-4}}$$

We can make the problem more difficult by requiring a completed square.

$$\int_3^{3.5} \frac{dt}{\sqrt{t^2 - 6t + 13}}$$