## Indefinite integrals of x raised to a power – Khan Academy

$$\frac{\partial}{\partial x} \left[ \frac{x^{n+1}}{n+1} + C \right]$$

$$n \neq -1$$

And we're going to assume here, because we want this expression to be defined, we're going to assume that n does not equal negative 1. If it equaled negative 1, we'd be dividing by 0, and we haven't defined what that means. So let's take the derivative here.

Let's take the derivative here.

$$\frac{\partial}{\partial x} \left[ \begin{array}{c} \sqrt{1 + 1} \\ \sqrt{1 + 1} \end{array} \right] = \left( \frac{1}{1 + 1} \right) \chi^{2} + 0 = \chi^{2} \chi^{2}$$

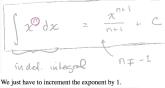
So the derivative of this thing— and this is a very general terms— is equal to x to the n. So given that, what is the antiderivative— let me switch colors here. What is the antiderivative of x to the n?

$$\int \chi^n d\chi = \frac{\chi^{n+1}}{n+1} + C$$
indef integral  $n \neq -1$ 

n does not equal negative 1. Once again, this thing would be undefined if n were equal to negative 1. So let's do a couple of examples just to apply this—you could call it the reverse power rule if you want, or the anti-power rule.

$$\int \chi^5 dx$$

What is the antiderivative of x to the fifth? Well, all we have to say is, well, look, the 5 is equal to the n.



$$\int \chi^5 dx = \frac{\chi}{5+1} + C$$