Division of zero

A fraction really represents the division of its numerator by its denominator. For example, the fraction

$$\frac{3}{8}$$

means "3 divided by 8," or "3 parts out of 8 equal parts."

One of the important things to remember about fractions is that we can never divide by 0. Since we're always dividing by whatever is in the denominator, this just means that we can't have 0 in the denominator of a fraction. It's just one of those weird things in math that we can't do. And so if we ever have 0 in the denominator, all we can say is that the fraction is "undefined," which means we never want to put 0 in the denominator of a fraction.

Consider the idea of "parts of a whole." The fraction $4/0$ could be read as, "4 parts out of 0 equal parts." But that doesn't make sense. How can we take 4 parts if the whole is 0, or empty? We can't, it's impossible; and this is one explanation of why $4/0$ is undefined.

Keep in mind that this is totally different than having 0 in the numerator of a fraction. If we have 0 in the numerator, the value of the fraction is 0. So something like

$$\frac{0}{6}$$

is equal to 0.

Example

Find the value of $3/0$.

Because we can't have 0 in the denominator of a fraction, all we can say is that this fraction is "undefined." The value isn't 0, it isn't 3, it's just undefined.