120 Most arithmetic expressions can be evaluated. For example, $2+3$ evaluates to 5. Our evaluation rules do not give us any answer for $1/0$. That's because there is no single answer that makes sense. We might look at $\Updownarrow n \cdot 1/(1/n)$, which is ∞. But we might equally well look at $\Updownarrow n \cdot 1/(-1/n)$, which is $-\infty$. We already have some arithmetic expressions that evaluate to a bunch of answers. For example, $4^{1/2}$ evaluates to $2, -2$. So perhaps it makes sense to say $1/0 = \infty, -\infty$. What sense can we make of $0/0$?

After trying the question, scroll down to the solution.

§ As we saw in Exercise 39, we can consistently say $0/0 = 5$, and might try to justify it by noticing that $⇳n\cdot (5/n)/(1/n) = 5$. But by the same reasoning we can say $0/0 = x$ for any x . So we could say $0/0 = xreal$. Or even $0/0 = xcom$ if we define $xcom$ to be the extended complex numbers.

A law in the back of the book says

xreal: 0/0 Division by 0

leaving open the possibility that 0/0 includes more than *xreal* .