Quotient

The *quotient* is the result of a division, so a/b is called the *quotient* of a by b.

Sometimes, one is interested in the number of times one thing can be divided 'exactly' into another, giving a quotient and a *remainder*.

For example, when working in the integers, 13 divided by 3 has a quotient of 4 and a remainder of 1.

As another example, $x^4 + x^2 - x$ divided by $x^2 + 3$ has a quotient of $x^2 - 2$ and a remainder of $-x + 6$.

If a divided by b has a quotient of q and a remainder of r, then $a = bq + r$. Normally, one requires r to be 'smaller' than b in some sense. When dividing integers, we require $0 \leq r < |b|$. When dividing polynomials, we require $r = 0$ or the degree of r to be less than the degree of b.

The remainder of a division is 0 if and only if b is a factor of a.