e) `b*=((++a)+b)` → `b*=(6+2)` → `b*=8` → 16.

f) `a-(a*(+(-b)))` → `5-(5*(+(-2)))` → `5-(5*(+–2))` → `5-(5*–2)` → `5-–10` → 15.

i) `(b++)+(--a)` → 2+4 → 6.

Solution to Exercise 16. For any positive d, we can uniquely write n in the form

$$n = xd + y,$$

where $x, y \in \mathbb{N}$ and $y < d$. In fact, these define div and mod via $x = n \operatorname{div} d$ and $y = n \bmod d$.

For $n = a, d = bc$, we get

$$a = pbc + q,$$

where $p, q \in \mathbb{N}$ and $q < bc$. In particular, $p = a \operatorname{div}(bc)$. It remains to prove that

$$(a \operatorname{div} b) \operatorname{div} c = p.$$

To this end, we use $n = q, d = b$ to get

$$q = rb + s,$$

where $r, s \in \mathbb{N}, s < b$ and $r < c$ (since $rb \leq q < cb$). Then we have

$$a = (pc + r)b + s, s < b,$$

and this means that

$$a \operatorname{div} b = pc + r, r < c.$$

This in turn means that $p = (a \operatorname{div} b) \operatorname{div} c$.

The implication holds as long as the mathematical value of the expression `b*c` is representable as an `unsigned int` value. This holds since the other operations involving `/` are always error-free. If there is an overflow in `b*c`, the expressions `a/b/c` and `a/(b*c)` might yield different values.