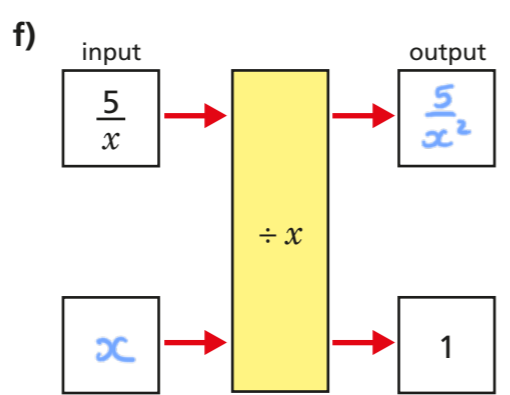
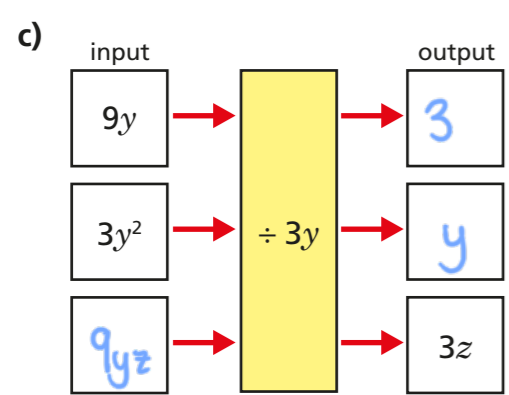
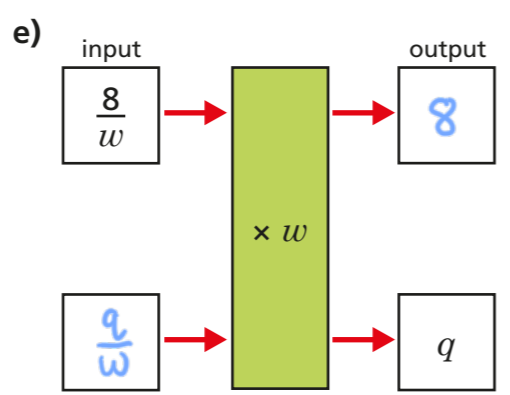
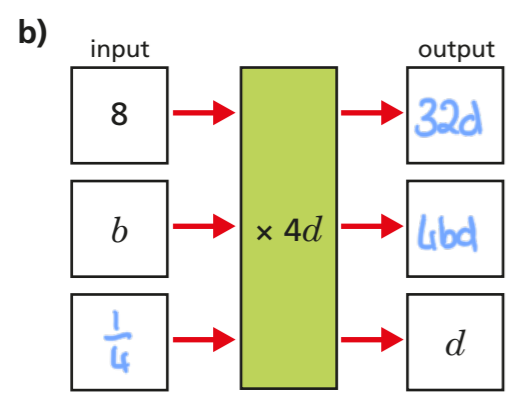
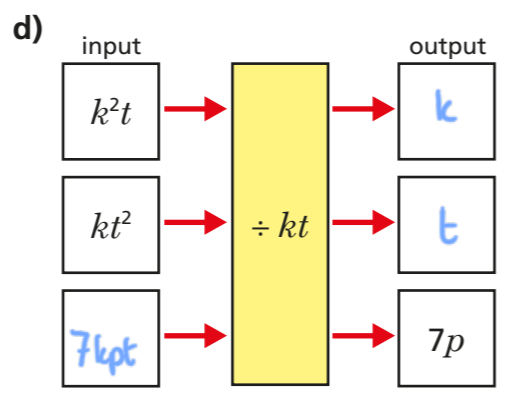
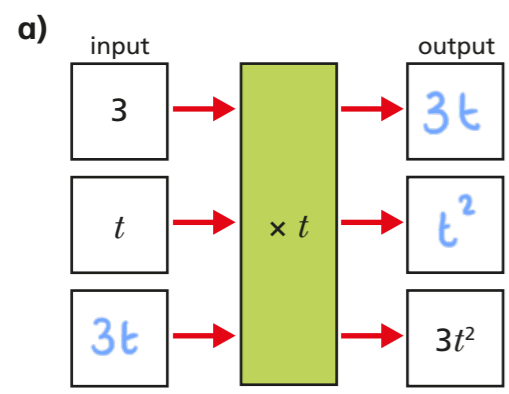


Multiplication and division with algebra

H

1 Complete the function machines.



2 Simplify the expressions.

a) $3 \times 5 = 15$

b) $18xy \div 6 = 3xy$

$3a \times 5 = 15a$

$18xy \div 6x = 3y$

$3 \times 5a = 15a$

$18xy \div xy = 18$

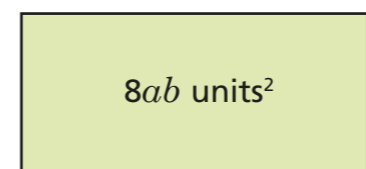
$3a \times 5a = 15a^2$

$18xy \div 3xy = 6$

$3a \times 5b = 15ab$

$18x^2y \div 3xy = 6xc$

3 The area of a rectangle is $8ab$.



Find five possible lengths and widths. Write them in the table.

E.g.

| | | | | | |
|--------|-----|----|----|----|----|
| Length | 8ab | 8a | 8b | 8 | 4a |
| Width | 1 | b | a | ab | 2b |

Discuss your approach with a partner. Were you systematic?

4 Sort the expressions into three groups.

| | | |
|-------------------------|-------------------|-------------------------|
| $24g + 0g$ | $2g \times 12g$ | $g \times 4g \times 6g$ |
| $8g^3 + 8g \times 2g^2$ | $24g^2$ | $\frac{24g^2}{g}$ |
| $48g^3 \div 2g$ | $\frac{48g^3}{2}$ | $8g \times 3 \times g$ |
| $12g + 12g$ | $24g^3$ | $3g \times 8$ |

| Group 1 | Group 2 | Group 3 |
|---|---|--|
| $24g + 0g$ $12g + 12g$ $\frac{24g^2}{g}$ $3g \times 8$ | $48g^3 \div 2g$ $2g \times 12g$ $8g \times 3 \times g$ $24g^2$ | $8g^3 + 8g \times 2g^2$ $g \times 4g \times 6g$ $\frac{48g^3}{2}$ $24g^3$ |

5 The area of a triangle is $3p^2$
Find four possible combinations of bases and heights that would give this area.

E.g.

| Base | Perpendicular height |
|--------|----------------------|
| $3p$ | $2p$ |
| $6p$ | p |
| p^2 | 6 |
| $3p^2$ | 2 |

6 a) Here are four cards showing expressions.

| | | | |
|----------------|-----------|----------------|-------------|
| $\frac{3w}{r}$ | $3w(r-8)$ | $\frac{2}{5}r$ | $w^3 - r^2$ |
|----------------|-----------|----------------|-------------|

Put the cards in ascending order when $w = 5$ and $r = 11$

| | | | |
|----------------|-------------|----------------|-----------|
| $\frac{3w}{r}$ | $w^3 - r^2$ | $\frac{2}{5}r$ | $3w(r-8)$ |
|----------------|-------------|----------------|-----------|

b) Find values for w and r that will change the order of the expressions.
Show how you worked out your answer.

E.g.

$w = 100$

$r = 1$

7 Explain why it is possible to simplify $2b \times 5c$ but not $2b + 5c$

$$2b \times 5c = 2 \times b \times 5 \times c = 2 \times 5 \times b \times c = 10bc$$

$2b$ and $5c$ are not like terms so you can't add them.

