

Activity 6 Equivalent expressions

1. The block of 6 columns of height 4 readily shows that $24 \div 6$ is 4
 24×4 is the 100 square with 4 missing in the middle so it is 96

2.

a)

(i) 13

(ii) 31

(iii) $3n + 1$

b) Other ways could be:

horizontal matches $2n$ plus vertical matches $(n+1)$;

n squares are $4n$ matches with $n - 1$ double ups, i.e. $4n - (n - 1)$.

3.

a) 32

b) & c)

Some possibilities (there are many others as well):

2 rows of 10 plus 2 vertical lines of 6

2 10's plus 2 8's less the 4 corners that are counted twice

The total number of tiles less the inside ones: $10 \times 8 - 8 \times 6$

4 corners plus 2 8's for the horizontal and 2 6's for the vertical.

d) Generalising the above expressions

$$2 \times m + 2(n - 2)$$

$$2m + 2n - 4$$

$$mn - (m - 2)(n - 2)$$

$$4 + 2(m - 2) + 2(n - 2)$$

e) $2(m + n - 2)$

simplify ($2 \times m + 2(n - 2)$)	$2 \cdot (m + n - 2)$
simplify ($2m - 2n - 4$)	$2 \cdot (m - n - 2)$
simplify ($mn - (m - 2)(n - 2)$)	$-n \cdot (m - 2) + mn + 2 \cdot m - 4$
$4 + 2(m - 2) + 2(n - 2)$	$2 \cdot (m - 2) + 2 \cdot (n - 2) + 4$
simplify (ans)	$2 \cdot (m + n - 2)$

4. Many possibilities, e.g.

$$2x + 21 - (x + 5) = x + 16$$

$$= x + 21 - 5$$

a)
$$= \frac{2x + 32}{2}$$

$$= 5x + 20 - (x + 5) - 4x + 1$$

b)
$$2x + x + y + y - 5 = 3x + (2y - 5) = 2(x + y) + (x - 5)$$

c)
$$(x - 2)(y - 2) = xy - 4(x + y) + 16$$

5.

a)

(i) $-2a^3 + 4a^2 + a$

(ii) $x^2 + y^2 + 2xy$

(iii) $4xy$

b)

(i) $b(4b - 3a)$ or $-b(3a - 4b)$

(ii) $8(4a - b + 5c)$

(iii) $2b(2ac + a - 5c)$

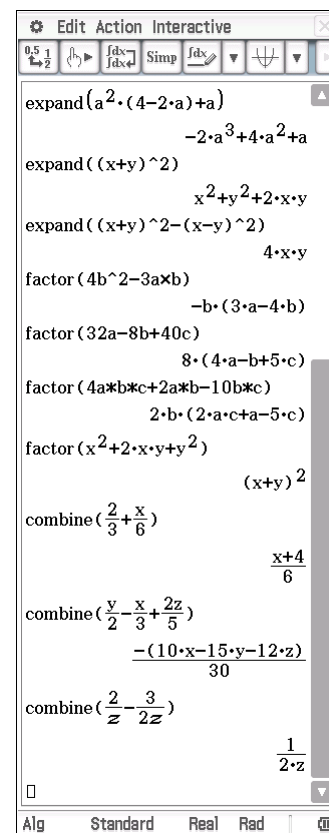
(iv) $(x + y)^2$

c)

(i) $\frac{x + 4}{6}$

(ii) $\frac{-(10x - 15y - 12z)}{30} = \frac{-10x + 15y + 12z}{30}$

(iii) $\frac{1}{2z}$



6.

a) Expand: remove brackets

b) Factorise: express as a product (write with brackets)

c) Simplify: collect like terms, write in as short a way as possible.