Expressions (2)

- Simplifying expressions by collecting like terms
- Expanding expressions involving brackets

Keywords

You should know

explanation 1

1 Simplify these expressions.

a $x + x + x$	**b** $x + x + x + 1$	**c** $x + 1 + x + 2$
d $x + 1 + 1 + x + 1$	**e** $x + 3 + 2x + x$	**f** $5x + 3 + 2x$
g $2x + 3x + 5x$	**h** $2x + 3x + 5$	**i** $2x + 1 + x$
j $x + 2 + 3x + 5$	**k** $5x + 2 + 3x + 1$	**l** $9x + 4 + 2x + 3$

2 Simplify these expressions.

a $x + 2y + y$	**b** $2x + 5y + 3x$	**c** $x + 2y + 3x + 4y$
d $x + 3 + y + 5$	**e** $x + 3y + 2y + 4x + 3$	**f** $2x + 3y + 5 + x + 4y$
g $8x + 3y + 6x + 2$	**h** $5x + 2y + 1 + x + 6y$	**i** $2y + 5 + 2x + 8y + 1$
j $5x + 3 + x + 5y + 6$	**k** $12 + 2y + x + 6y + 5$	**l** $8y + 5x + 2 + y + 7x$

3 Sort the cards into matching pairs. Which card is the odd one out?

A $x + x$	**B** $4x$	**C** $x \times x$
D $x + 2$	**E** $x + 1 + 1$	**F** $2x + 2$
G x^2	**H** $3x$	**I** x^3
J $2x$	**K** $x + x + 1$	**L** $x + 1 + x + 1$
M $x + x + x$	**N** $2x + 2x$	**O** $2x + 1$

explanation 2a | explanation 2b | online

4 Work these out.

a $7 - 5$	**b** $4 - 7$	**c** $-6 + 8$
d $5 - 8$	**e** $-3 + 4$	**f** $-1 - 7$
g $-6 + 3$	**h** $-2 + 6$	**i** $-5 - 4$
j $-8 + 6$	**k** $-3 + 8$	**l** $-3 + 3$
m $4 - 9$	**n** $-7 - 3$	**o** $-6 + 7$

5 Work these out.

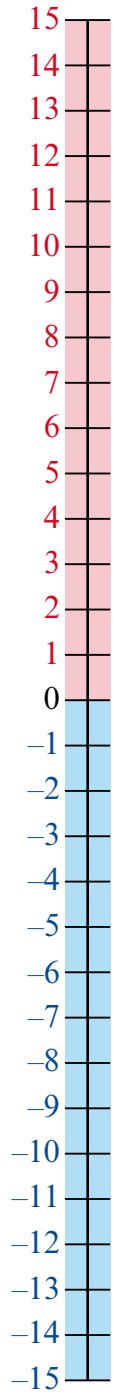
a $8 - 5 + 7$	**b** $-4 + 6 - 2$	**c** $-6 - 5 - 3$
d $-5 + 8 - 1$	**e** $3 - 12 + 4$	**f** $-1 - 7 + 4$
g $-6 + 3 + 2$	**h** $-7 - 6 + 5$	**i** $-5 + 4 - 2$
j $-8 + 6 - 5$	**k** $-3 + 8 - 2$	**l** $5 - 3 - 4$
m $8 - 9 + 4$	**n** $6 - 7 + 2$	**o** $2 - 6 + 5$

6 Simplify these expressions.

a $3x + x - x$	**b** $x + x + 1$	**c** $x + 3 - x$
d $3x + x - 2x$	**e** $5x + 3x - 7x$	**f** $6 + 5x - 1$
g $6x - x + 3$	**h** $5x + 1 - 2x$	**i** $2x - 3 + 8$
j $8 + x - 5$	**k** $10 + 2x - 4$	**l** $6x - 4x + 3x$

7 Simplify these expressions.

a $x + 5 - 2$	**b** $x + x - 1$	**c** $2x + 1 - x$
d $2x + 8 - 5$	**e** $5x + 13 - 7$	**f** $4 + 7x - 4$
g $6x - 2x + 3$	**h** $3x + 5 - 2x$	**i** $4x - 3 - 2$
j $3 + x - 4$	**k** $1 + 2x - 4$	**l** $3x - 4 + 9$



***8** Simplify these expressions.

a $x - 3 + x$

b $x + 4 + x - 6$

c $2x + 5 - x + 3$

d $2x + 3 - x + 3 - x$

e $5x + 3 - x - 7$

f $4 - 2x - 4 + 7x$

g $9x - 4 - 2x + 3$

h $6x + 5 + 2x - 3$

i $4x - 3 - 4x - 3$

j $3 - 2x + 4 + 5x$

k $1 + 7x - 4 - 5x$

l $3x + 4 - x - 2$

9 Simplify these expressions.

a $2x - 3 + y + 5$

b $5y + 4x - y + 6$

c $8x + 5y - x + 2y$

d $6x + 5y - x + 3 - 4y$

e $6x + 2y - 4x + 7y$

f $5 + 5y - 4 + 7x - 2y$

g $6x - 5x + 8y + 2 - 4y$

h $x + 5y + 2x - 3y$

i $7x + 5y + 6 - 2y + 4x - 3$

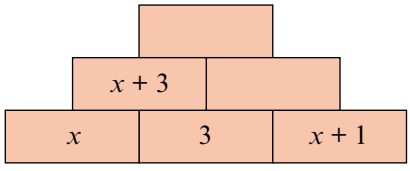
j $8 + 4y + 6x - 3y - 5x$

k $5y + 7x - 4y - 5x + 6$

l $3x + 4y + 5 - x - 2y - 3$

10 In these algebra pyramids, the expression in each brick is the sum of the expressions in the two bricks beneath it.
Copy and complete each algebra pyramid.

a



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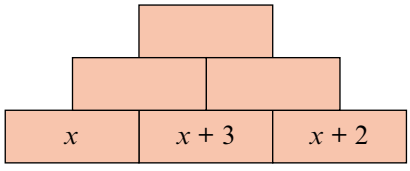
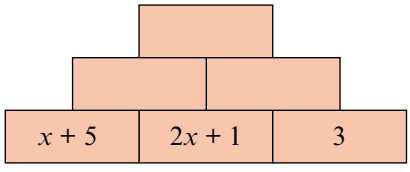


c



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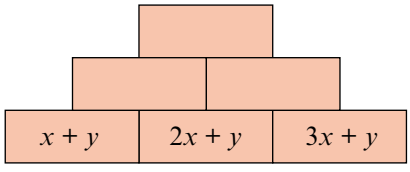

***11** Each card shows an algebraic expression.

A $x - 2$ **B** $x + 2y$ **C** $3x + 2$ **D** $2x + 3$ **E** $3 - 2y$

a Which two cards add to give $5x + 5$?

b Which two cards add to give $3x + 1$?

c Which two cards add to give $4x$?

d Which two cards add to give $x + 3$?

e What is the total of all of the expressions on the cards?

explanation 3a | explanation 3b | online

12 Use the method of expanding brackets to work out these calculations.

a $14 \times 12 = 14 \times (10 + 2)$

$= 14 \times \square + 14 \times \square$

$= \square + \square$

$= \square$

b $6 \times 19 = 6 \times (20 - 1)$

$= 6 \times \square - 6 \times \square$

$= \square - \square$

$= \square$

13 Use the method of expanding brackets to write each expression without brackets.

a $2(x + 5) = 2 \times (x + 5)$

$= 2 \times \square + 2 \times 5$

$= \square + \square$

b $3(y - 4) = 3 \times (y - 4)$

$= 3 \times \square - 3 \times \square$

$= \square - \square$

14 Sort the cards into matching pairs. Which card is the odd one out?

A $2(x + 1)$ **B** $2(x + 4)$ **C** $2x + 1$

D $2x + 6$ **E** $2x + 12$ **F** $2x + 2$

G $2x + 4$ **H** $2x + 8$ **I** $2(x + 3)$

J $2(x + 2)$ **K** $2(x + 6)$

15 Expand the brackets in these expressions.

a $4(x + 5)$ **b** $6(n + 4)$ **c** $3(t + 5)$

d $10(h + 6)$ **e** $8(p + 2)$ **f** $9(b + 1)$

g $3(x + 4)$ **h** $5(n + 1)$ **i** $2(5 + t)$

j $4(t + 6)$ **k** $2(8 + y)$ **l** $6(9 + r)$

***16** Copy and complete the calculations to write each expression without brackets.

a $4(3x + 5) = 4 \times (3x + 5)$

$= 4 \times \square + \square \times \square$

$= \square \times x + \square$

$= \square + \square$

b $5(1 - 2z) = 5 \times (1 - 2z)$

$= 5 \times \square - 5 \times \square$

$= \square - \square \times z$

$= \square - \square$

***17** Expand the brackets in these expressions.

a $3(2g + 5)$ **b** $5(2m + 1)$ **c** $6(2h + 7)$

d $10(4h + 1)$ **e** $8(3y + 5)$ **f** $9(j + 6)$

g $3(4t + 5)$ **h** $5(6n + 1)$ **i** $2(5 + 5t)$

j $5(2x + 1)$ **k** $5(3n + 4)$ **l** $4(2t + 3)$

***18** Copy and complete this calculation.

$2(x + 5) + 3(x + 4)$

$= 2x + \square + 3x + \square$ ← Expand the brackets

$= 5x + \square$ ← Simplify by collecting like terms

***19** Show that $3(x + 2) + 5(x + 6)$ simplifies to $8x + 36$.
Use the method of question **18**.

***20** Expand the brackets and then simplify.

a $3(x + 1) + 2(x + 5)$ **b** $7(d + 1) + 3(d + 5)$ **c** $5(k + 4) + 8(k + 2)$

d $9(b + 1) + 5(b + 2)$ **e** $2(x + 5) + 3(x + 5)$ **f** $4(n + 1) + 6(n + 2)$