Lesson 3 – Forming Expressions

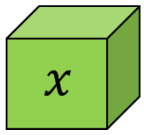
Starter

1) -5 - 2
2) 6 - - 7
3) -2 + 8
4) -6 - - 9
5) 2 + 4 x 5
6) -3 + 2 x 6
7) -2 + 10 ÷ 2 - -6
8) $\frac{18}{6} - -4 + 5 \times 6$

Starter Answers

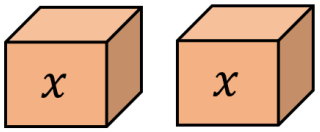
1) -7 2) 13 3) 6 4) 3 5) 22 6) 9 7) 9
8) 37

Imagine we have a box of pens but we don't know how many pens are in the box.
Since we don't know how many, we will say there are x **pens** in the box.



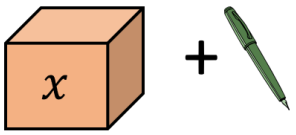
If we had two of these boxes with the same number in each, how many pens have we got in total?

We would have $x + x = 2x$ pens



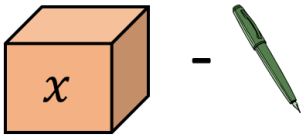
If I had the original box of pens and I just added 1 extra pen, how many pens do I have now?

We would have $x + 1$ pens



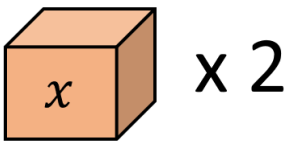
If I had the original box of pens and I took 1 pen out, how many pens would I have now?

We would have $x - 1$ pens



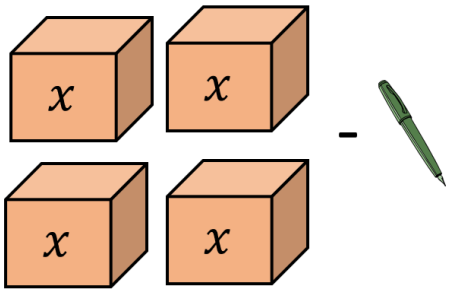
What about if I doubled the number of pens?

We would have $2 \times x = 2x$ pens



What about if I had 4 of these boxes, all with the same number of pens in and then I took out 1 pen from one of the boxes. How many pens would there be now?

We would have $4x - 1$ pens



We call x, $x + 1$, $x - 1$, $2x$ and $4x - 1$ **algebraic expressions**.

Example 1

Match up the description to the algebraic expression.

1	Times x by 3
2	Add 3 to x
3	Divide x by 3
4	Subtract 3 from x
5	Double x
6	Half x
7	Times x by 2 and then add 1
8	Add 1 to x and then times by 2

A	$\frac{x}{3}$
B	$2x$
C	$3x$
D	$2x + 1$
E	$x + 3$
F	$2(x + 1)$
G	$\frac{x}{2}$
H	$x - 3$

Answer

1 – C 2 – E 3 – A 4 – H 5 – B 6 – G 7 – D
8 – F

Example 2

Match the descriptions to the algebraic expressions

a)	"Multiply **b** by 2 then subtract from **a**."	**1)**	$a(b - c)$
b)	"Subtract **c** from **a** then multiply by **b**."	**2)**	$4a - c$
c)	"Add **b** to **a** then divide into **c**."	**3)**	$\frac{ab}{c}$
d)	"Multiply **a** by **b** then divide by **c**."	**4)**	$\frac{c}{a + b}$
e)	"Divide **c** by **b** then multiply by **a**."	**5)**	abc
f)	"Multiply **a** by **c** then divide into **b**."	**6)**	$b(a - c)$
g)	"Add **b** to **a** then divide by **c**."	**7)**	$a - 2b$
h)	"Multiply **ab** by **c**."	**8)**	$\frac{b}{ac}$
i)	"Multiply **a** by 4 then subtract **c**."	**9)**	$\frac{a + b}{c}$
j)	"Subtract **c** from **b** then multiply by **a**."	**10)**	$\frac{c}{b} \times a$

Answers

a – 7 b – 6 c – 4 d – 3 e – 10 f – 8 g – 9
h – 5 i – 2 j – 1

Example 3

1) I have x sweets.
John gives me 4 more sweets.
How many sweets do I now have?

I have $x + 4$ sweets

2) I have x sweets.
I double the amount I have.
How many do I have now?

I have $2x$ sweets

3) I have x sweets.
I give three to my friend.
How many do I have now?

I have $x - 3$ sweets

4) I have x sweets.
I split them into 3 equal piles.
How many are in each pile?

To split them into 3 equal piles we divide the total by 3
We could write this as $x \div 3$ sweets in each pile
Alternatively, we could write it as $\frac{x}{3}$ sweets in each pile

5) Jacob is x years old.
Hannah is three times as old as Jacob.
How old is Hannah?

Hannah is $3x$ years old

6) Jacob is x years old.
Ruby is 3 years older than Jacob.
Kyle is twice as old as Ruby
How old is Kyle?

Jacob = x
Ruby = $x + 3$ 3 years older means we add on 3
Kyle = $2x + 6$ or we could write this as $2(x + 3)$ which means we are multiplying $x + 3$ by 2

7) Mary is x years old.
Anna is twice as old as Mary.
Kara is 5 years younger than Anna.
How old is Kara?

Mary = x
Anna = $2x$
Kara = $2x - 5$