Expressions and Equations: Follow-up Sheet

If you got question 1 wrong, read and complete Section 1
If you got question 2 wrong, read and complete Section 2

etc.

Section 1

2x + 3y + 4x + 2y is an expression with four terms. This expression can be simplified by combining the "**x**" terms and the "**y**" terms. **2x + 4x = 6x** and **3y + 2y = 5y** so:-

2x + 3y + 4x + 2y = 6x + 5y

More examples:-

4a + 5b + 2a + 4b = 6a + 9b

4e + 3f + 2e + 3f + 5e + 2f = 11e + 8f

2p + 3q + 4r + 2p + 3q + 4r = 4p + 6q + 8r

2c + 3d + 4e + 5f cannot be simplified because all the letters are different

Now try these examples:-

1) 2p + 3q + 4p + 5q =

2) 4s + 3t + 5s + 3t =

3) 6a + 5b + 4a + 3b =

4) 3a + 4b + 2a + 2b + 3a =

5) 2x + 4y + 3x + 5y + 2x =

6) 2m + 3n + 4m +5n + 7n + 2m =

7) 2a + 2b + 2c + 2a =

8) 3p + 3q + 3r + 4p + 2q =

9) 2x + 3y + 4z + 2y + 2x =

10) 2a + 3b + 4c + 4a + 3b + 4c =

11) 5e + 6f + 7g =

12) 2d + 3e + 2d + 3e + 4f =

Section 2

a + 3a + a = 5a

This is because when we write "**a**" we mean "one **a**"

More examples:-

a + a + a = 3a

2m + m + 3m + m = 7m

x + y + x + y + x + y = 3x + 3y

2a + b + 3a + b + 4a + b = 9a + 3b

Now try these examples:-

1) p + p + p + p =

2) 2t + t + 3t + t =

3) b + b + b + 5b =

4) m + n + m + n =

5) x + x + y + x + y =

6) 3m + n + 4m + n =

7) a + 3b + a + 4b =

8) p + 2q + 3p + q =

9) x + 2y + x + 2y + x =

10) a + b + a + b + 3a + 4b =

11) e + f + g + e + f + g=

12) 2c + d + 2e + d + 2c =

Section 3

6m + 7n – 2m – n = 4m + 6n

This is because **6m – 2m = 4m** and **7n – n = 6n**.

More examples: -

4x + 5y – 2x – 2y = 2x + 3y

4f + 5g – f + g = 3f + 6g

8m + 9n – 8m + 9n = 18n <—— *8m – 8m = 0 but we write nothing because there is no m term in the answer*

6a + 3b – 3a + 3b – 3a = 6b <—— *6a – 3a – 3a = 0 but we write nothing because there is no a term in the answer*

7f + 8 g – 3f – 8g – 4f = 0 <—— *Here we do write a zero to show we have actually simplified the expression*

Now try these examples:-

1) 7a + 8b – a + b

2) 5c + 6d – 4c + d

3) 3f + 2g – 2f – g

4) 6p + 7q – 5p + 5q

5) r + s + 4r + s – 3r

6) 8m + 6n – 6m – 5n

7) p + q + r – p + q – r

8) 8t + 6u – 8t + 6u

9) 9v + 10w – 6v + 3w – 3v

10) f + g + f + g – f + g

11) 4x + 5y – 4x + 3y

12) 6p + 7q – 3p – 5q – 3p – 2q

Section 4

If **p + 56 = 134**, **p = 134 – 56**

We know this because, if adding 56 to **p** *makes 134*, **p** *can be found by reversing this operation i.e. subtracting 56 from both sides.*

More examples: -

If **x – 183 = 896**, **x = 896 + 180**

We know this because, if taking away 183 from **x** *makes 896*, **x** *can be found by reversing this operation i.e. adding 183 to both sides*

If **r + 523 = 987**, **p = 987 – 523**

We know this because, if adding 523 to **r** *makes 987,* **r** *can be found by reversing this operation i.e. subtracting 523 from both sides*

If **z – 357 = 159**, **z = 159 + 357**

We know this because, if taking 357 away from **z** *makes 159,* **z** *can be found by reversing this operation i.e. adding 357 to both sides*

Copy and complete:-

1) If x + 345 = 789
x =……

2) If a – 159 = 456
x =……

3) If b – 222 = 356
b =……

4) If y + 753 = 987
y =……

5) If r + 223 = 789,
r =……

6) If m – 357 = 426
m =……

7) If s – 753 = 111,
s =……

8) If p – 435 = 294
p =……

9) If t + 357 = 789
t =……

10) If u + 702 = 999
u =……

Section 5

5x = 35

x = 7

5x means five times **x** so, to find out what a single **x** stands for, we must divide both sides by five.

Another example:-

9m = 45

m = 5

9m means nine times **m** so, to find out what a single **m** stands for, we must divide both sides by nine.

Now solve these equations:-

1) 4a = 20 **2)** 5c = 30 **3)** 3d = 21

4) 7m = 70 **5)** 8k = 56 **6)** 9t = 99

7) 6q = 6 **8)** 5m = 150 **9)** 8b = 0

10) 3w = 0 **11)** 4r = 4 **12)** 4m = 200

Section 6

3m – 6 = 18

3m = 24 <—— *first add six to each side to find out what* **3m** *alone stands for*

m = 8 <—— *divide by three on each side to find out what* **m** *stands for.*

Another example:-

4q + 7 = 15

4q = 8 <—— *first subtract seven from each side to find out what* **4q** *alone stands for*

q = 2 <—— *divide by four on each side to find out what* **q** *stands for.*

And yet another example:-

6a + 2 = 50

6a = 48 <—— *first subtract two from each side to find out what* **6a** *alone stands for*

a = 8 <—— *divide by six on each side to find out what* **a** *stands for.*

Notice that, if the equation contains and **+** we subtract and if it contains a **–** we add because we are reversing the operations which have been carried out.

Now solve these equations:-

1) 4x + 3 = 11

2) 5t – 10 = 35

3) 6y + 3 = 45

4) 3d – 1 = 20

5) 5d + 5 = 10

6) 6r + 8 = 20

7) 7d – 3 = 4

8) 8 j + 8 = 8

9) 4m + 3 = 63

10) 2f – 4 = 60

11) 5w + 3 = 3

12) 9w – 1 = 80

Section 7

4k + 1 = 2k + 7 <—— *There are letters on both sides of this equation*

2k + 1 = 7 <—— *Subtracting* **2k** *from both sides gets rid of the letters on the right hand side of this equation*

2k = 8 <—— *Subtracting one from both sides simplifies the equation further*

k = 4 <—— *Dividing both sides by 2 reveals the solution to this equation*

Another example:-

7f – 7 = 4f + 8 <—— *There are letters on both side of this equation*

3f – 7 = 8 <—— *Subtracting* **4f** *from both sides gets rid of the letters on the right hand side of this equation*

3f = 15 <—— *Adding seven to both sides simplifies the equation further*

f = 5 <—— *Dividing both sides by 3 reveals the solution to this equation*

Now solve these equations:-

1) 5m + 3 = 3m + 5

2) 10f – 1 = 7f + 8

3) 6y – 10 = 4y + 10

4) 7q + 6 = 5q + 10

5) 5t + 1 = t + 13

6) 5v – 6 = 4v + 6

7) 9u – 6 = 2u + 1

8) 9c – 4 = 5c + 12

9) 3m + 8 = m + 8

10) 7h + 1 = 6h + 9

Section 8

Emma takes a plank of wood **p** cm long and saws off 30cm. The plank is now 90cm long.

This situation is best described by the equation **p – 30 = 90**

More examples:-

There are **n** people on a bus and three more get on. There are now 15 people on the bus.

This situation is best described by the equation **n + 3 = 15.**

There are **s** sweets in a packet. In five packets of sweets there is a total of 65 sweets.

This situation is best described by the equation **5s = 65.**

A total of **m** marbles are shared equally among four children. Each child gets 14 marbles

This situation is best described by the equation **m ÷ 4 = 14** (***or*** $\frac{m}{4}$ ***= 14***)

Write an equation to describe each of the following situations.

You do not need to solve the equations but you can if you want to!

1) There were **h** houses in a street. A builder built six more houses and now there are there are fourteen houses on the street.

2) There were **s** scones on a plate. Three were eaten and there were six left.

3) Doughnuts are sold in bags of **d** doughnuts. Nine bags contain 54 doughnuts.

4) There were **g** grapes in a bunch. Five people share the grapes equally. Each person got eight grapes.

5) There are **t** people in a team for a new sport. Six teams contain a total of 42 people.

6) There were **c** cars in a car park. Nine cars left and there were only two remaining in the car park.

7) A packet of biscuits contained **b** biscuits. If nine people share the biscuits equally, each person gets two biscuits.

8) A collector owned **p** paintings by his favourite artist. He bought three more at a sale. Now he owns twelve paintings by this artist.

Section 9

A shop has three boxes of **b** tins of baked beans in their store room and 14 cans of baked beans on the shelves. Altogether they have 122 cans of beans.

The equation which best describes this situation is **3b + 14 = 122**

More examples:-

There are **s** sweets in a packet. Joanne has five packets of sweets but she has eaten sweets three out of one of the packets. Altogether she has 37 sweets.

The equation which best describes this situation is **5s – 14 = 37**

A primary teacher sorts his class into 6 groups of **g** pupils and there is one pupil left working on their own. There are 25 pupils in the class.

The equation which best describes this situation is **6g + 1 = 25**

Write an equation to describe each of the following situations.

You do not need to solve the equations but you can if you want to!

1) Three books at **x** pounds each and a record costing £14 make a total of £50.

2) Four teams of **t** pupils and two extra pupils makes a total of 30.

3) Joe has five bags of **d** doughnuts but he has eaten two doughnuts out of one of the bags. Altogether he has 28 doughnuts.

4) There were five families each with **c** children living on Pine Crescent but three of the children have gone to college. Now there are 12 children living on Pine Crescent

5) I think of a number which I will call **x**. If I double the number and add 17 the answer is 65.

6) A loaf of bread has **s** slices. In a hotel kitchen there are five loaves of bread but nine slices of one loaf have been used. Altogether there are 91 slices of bread.