

## Unit 2: Expressions

### The book.

## Chapter 2

### Check in

- 1 a i  $4p$       ii  $3t$       iii  $hk$       iv  $abc$   
v  $8m$       vi  $35y$       vii  $2ab$       viii  $12nu$   
ix  $24tr$
- b i  $5p$       ii  $2G$       iii  $2b$       iv  $0$   
v  $p^2$       vi  $m^3$       vii  $\frac{t}{p}$
- c i  $m + m + m + m$       ii  $y + y + y + y + y$
- 2 a  $2$       b  $-8$       c  $-6$       d  $-7$   
e  $-2$       f  $-9$
- 3  $96 \text{ cm}^2$
- 4  $14 \text{ cm}$

### Exercise 2A

- 1 a  $s - 4$       b  $2h + 3$       c  $\frac{n}{2}$
- 2 The total cost of 4 pens and 4 pencils  $\rightarrow 4n + 4m$   
How much more 4 pens costs than 4 pencils  $\rightarrow 4n - 4m$   
The change from \$4 in cents when you buy 4 pens  $\rightarrow 400 - 4n$

### Exercise 2B

- 1 a  $18 \text{ cm}^2$     b  $10a$     c  $12z$     d  $2xy$   
e  $9mn$     f  $20pq$
- 2 a  $4a$     b  $2a + 2b$     c  $a + 2b$     d  $a + b + c$   
e  $a + 2b + 12$     f  $2a + 2b$     g  $2n + 2tn$

### Exercise 2C

- 1 a 10    b 60    c  $10x$
- 2 a 60    b 300    c  $60x$
- 3 a 2    b 14    c  $2x$
- 4 a 400    b 1500    c  $100x$     d  $300x$
- 5 a 22    b 55    c  $11y$     d  $44y$
- 6 a 600    b 1600    c  $100x$     d  $800x$
- 7 a 730    b 3650    c  $365y$     d  $1825y$
- 8 a  $7x + 4$     b  $7y - 5$     c  $14y$     d  $12x - 3$   
e  $24x + 5$     f  $36x - 11$     g  $100z - 30$     h  $100z + 40$
- 9 a 10 years old;  $7 + 3$     b  $y + 3$     c  $p + 5$   
d  $m + n$
- 10 a \$13;  $5 + 8$     b  $\$10 + d$
- 11 a  $30$ ;  $5 \times 6$     b  $5y$     c  $48z$
- 12 a \$2;  $10 \div 5$     b  $\$ \frac{d}{3}$
- 13 a \$8;  $14 - 6$     b  $\$22$ ;  $14 + 8$   
c  $\$x - 10$     d  $\$2x - 10$
- 14 a The total of Amir's and Debbie's sweets  
b Triple the number of Debbie's sweets  
c How many more sweets Amir has than Debbie  
d Amir has 2 more sweets than Debbie

15

Expression	Meaning
$n + 3$	Three more than the number
$5n$	Five times the number
$n - 4$	Four less than the number
$2n$	Double the number
$\frac{n}{2}$	Half the number
$5n - 8$	Start with the number, multiply it by five, then subtract eight
$2n + 5$	Start with the number, double it, then add five

### Exercise 2D

- 1 a  $5y, 2y, -y$       b  $t, -t, \frac{3}{4}t, 400t$   
c  $40xy, -yx, 5xy$       d  $7, 8, -1, 0.2$
- 2 odd one out is  $ac$
- 3  $2R$  is the odd one out as it has a capital  $R$
- 4 The like terms are:  $4x^2p, 0.4x^2p; 4x^2p, 3px^2$

### Exercise 2E

- 1 a  $10p$       b  $9s$       c  $20t$       d  $11l$       e  $-3m$   
f  $4a^2$       g  $\frac{7x}{2}$       h  $\frac{7x}{10}$       i  $\frac{9x}{8}$       j  $2c - 12$   
k  $12c^2d$       l  $2c^2 + 7c$
- 2 a  $3a - 2b$       b  $3x - y$       c  $2g - f + 3$
- 3 a  $7a + 6b$       b  $3a$       c  $5d - c$       d  $p + q$   
e  $2x + 2y$       f  $6f + g + h$       g  $s - t$       h  $6n - m - 3p$   
i  $3x + y + 1$       j  $12 + 2x + y$       k  $17 + \frac{9}{2}x - 2y$   
l  $7c^2 - 5d$
- 4  $2P - x = P; 7t = 4$
- 5  $4 + 2x + 3x; 6 - 2x + 8x - 2 - x; 2 - x + 6x + 2$   
are all equal  $4 + 5x$
- 6  $3mpt$
- 7 a  $12a$       b  $4a + 8b$       c  $21t$       d  $12x + 10$   
e  $6x + 22$       f  $2h + 2k + 8$
- 9 a  $3s$       b  $4p$       c  $6m, 3w$       d  $3x, 14y$
- 10 a  $12 + 2x$  is wrong as it cannot be simplified

4n

### Exercise 2F

- 1 a  $3p + 3q$     b  $5p - 5q$     c  $4l + 4m$     d  $3x - 3y$   
e  $6r + 6s$     f  $5l - 5m$     g  $8p + 40q$     h  $18x + 9y$   
i  $6x + 15$     j  $15y - 10$     k  $7p + 21q$     l  $8u - 20v$
- 2 a  $10x + 5y - 35$     b  $20m - 32t + 4$   
c  $11 - 11x + 44y$     d  $32m - 24 + 72n$
- 3 a  $6x + 12$     b  $-6x - 12$     c  $70t - 7$   
d  $-70t + 7$     e  $110p - 30$     f  $-110p + 30$   
g  $32 - 8x + 4y$     h  $-32 + 8x - 4y$
- 4 a 1    b 2    c 7    d 5
- 5 There are many possible answers (more in **a** and **b** if you include negative integers outside of the brackets)
- a  $2(5x + 15)$ ,  $5(2x + 6)$ ,  $10(x + 3)$   
b  $2(6x + 12)$ ,  $3(4x + 8)$ ,  $4(3x + 6)$ ,  $6(2x + 4)$ ,  $12(x + 2)$   
c  $2(8x^2 - 10)$ ,  $4(4x^2 - 5)$ ,  $-2(-8x^2 + 10)$ ,  $-4(-4x^2 + 5)$

### Exercise 2G

- 1 a  $10x + 10y$     b  $11p + 11q$     c  $8r + 13s$     d  $10r + 6s$   
e  $19q + 2p$     f  $6x + 10y$     g  $15 - 8z$     h  $26 + y$   
i  $17 - 5p$     j  $7x - 4y + 2$     k  $15x + 2$     l  $8x - 1$
- 2 a  $3x + 15$     b  $6b - 8$     c  $15x + 40$   
d  $5x + 6$     e  $26x + 20$
- 3 a  $-7x - 8y$     b  $27 - 6x$     c  $8w$     d  $-2x - 9y$   
e  $20p - 55t$     f  $-13m - 40p + 21q$     g  $17h - 2g$   
h  $3r + 15 + 8t + 2s$
- 4  $-8x - 7 = 3 - 2(4x + 5)$   
 $21x + 28 = 4 - 3(2 - 7x) + 30$   
 $7(3x + 4) - 2x + 1 = 5(4x - 1) - (x - 34)$   
The odd one out is  $-8x + 13$ .

### Exercise 2H – mixed questions

- 1 a  $15x$     b  $7x + 4y$     c  $2m + 7n + 7$   
d  $15xy$     e  $17m$     f  $18p - 4$
- 2 a  $4 + 12w$     b  $-10x + 15$   
c  $44t - 11s$     d  $-26$     e  $7x - 17$     f  $4 - 2x$

- 3 a  $100d + p$                       b  $21x + 5$       c  $1000k + s$   
 4 a  $5a + 2b$                       b  $5r + 20$   
 5  $3z + 11\text{ km}$   
 6 a  $x + 15$                       b  $x + y + 15$       c  $3x + y + 30$   
 7  $\$5x + 7y$   
 8  $22p$   
 9  $P = 10x + 36, A = 25x + 80$

### Exercise 2

- 1 a  $3b$                       b  $7a + 4b$       c  $72ab$   
 2 a 180                      b  $60x$       c 1440      d  $1440y$   
 e  $2880 + 60x$       f  $1440y + 840$   
 g  $1440y + 60x$   
 3 a  $\$30$                       b  $\$5x$                       c  $\$20y$                       d  $\$20y + 30$   
 e  $\$5x + 20y$   
 4 a  $14 + 2x$                       b  $4y + 2$                       c  $5p + 2w - 1$   
 5 a  $6a$                       b  $4r + 8$   
 6 a  $\$37$                       b  $\$9d + 5c$   
 8 a  $12p + 3$                       b  $-18T - 30$   
 c  $16x + 8y$                       d  $14m - 9y - 12$       e  $-4 - R$   
 f  $16 - 34n$                       g  $5d - 3c - 14b$   
 9  $10x + 18$

### Check out

- 1 a  $5a - 2b$                       b  $10xy$                       c  $2b \times 3c$   
 2 a  $\$2x + 7$                       b  $\frac{t}{4}$   
 3 a i 3                      ii 1  
 b i and iii are expressions, ii is an equation  
 c  $3t, -t, \frac{1}{2}t, 400t$                       d i 3      ii -2  
 4 a  $40r - 30$                       b  $-3 + 12x$   
 c  $18t + 4f$                       d  $14 - 19W$   
 5 a i  $16p$                       ii  $16p + 4$   
 b i  $40x - 10$                       ii  $8x + 18$   
 6 a  $\frac{17m}{5}$                       b  $\frac{11y}{20}$

## The homework book

### 2A

- 1  $x - 5$  cm
- 2  $15 - y$  m
- 3  $8m$  kg
- 4  $p - 4$
- 5  $5p + 7r$  cents
- 6  $8b + 2p$  cents
- 7  $20 - 2x$  dollars
- 8  $5b + 5$
- 9  $8c + 8g + 24$

### 2B-2C

- |                         |            |            |         |
|-------------------------|------------|------------|---------|
| 1 a $21x$               | b $10xy$   | c $12pq$   |         |
| 2 a $6x$                | b $3x + y$ | c $2x + y$ |         |
| 3 a $7$                 | b $28$     | c $7x$     | d $14x$ |
| 4 $ab - cd$             |            |            |         |
| 5 $x + y$ years         |            |            |         |
| 6 $36 - x$ dollars      |            |            |         |
| 7 $\frac{x}{5}$ dollars |            |            |         |
| 8 $12x + 19y$ dollars   |            |            |         |

## 2D-2E

- 1 a  $8x + 6y$                       b  $13f + 5g$   
c  $8y + 10$                         d  $4a + 2b$   
e  $8q + 5$                          f  $8x + 4y$   
g  $7x - 7y$                         h  $10c + 3d$   
i  $3x - 3y$                          j  $-4a - 3b$

2  $6x + 8y + 4z - 8$

3  $2a + 3b + 4b = 7b + 5a - 3b$

$$5 \times b \times a = 2ab + 3ba$$

$$-2a - 3a + 4b = 5b + a - b - 6a$$

$$2ab + 5 = 4ab + 7 - 2ab - 2$$

4 a  $5x + 6y - 3x + 2y = 2x + 8y$

b  $7n - 3m - 2n + m = 5n - 2m$

c  $7a - 3b - 9a - b = -2a - 4b$

5 a 4

b  $3 - 2x$

c  $8 + x$

6  $6x + 22$

## 2F

- 1 a  $3x + 6$                         b  $4y - 20$   
c  $40 + 5a$                         d  $18 - 6p$   
e  $2x + 2y$                         f  $3a - 3b$   
g  $8m - 8n$                         h  $7p + 7q$   
i  $12x + 6$                         j  $15y - 10$   
k  $24 - 20y$                         l  $6v - 8$   
m  $6x + 9y$                         n  $24x - 20y$   
o  $36a + 45b$                       p  $24p - 32q$   
q  $-2x - 4$                         r  $-4y + 4$   
s  $-12y - 21$                       t  $-12 + 10y$
- 2 a  $8a + 12b - 20$                 b  $15x - 6y + 3z$   
c  $6 + 12x + 18y$                 d  $10p - 6 + 4q$   
e  $21f + 14g - 35h$               f  $10x - 20y + 30z$   
g  $-6x - 3y + 12$                 h  $-2a + 6b - 14$   
i  $-21p + 7q - 28r$

3 a  $2x + 3$

c  $2x - 3$

e  $7x + 1$

b  $4y - 5$

d  $4x - 3$

f  $2 - 5x$

4 a  $3(2x + 5) = 6x + 15$

b  $4(3y - 2) = 12y - 8$

c  $8(6x - 7) = 48x - 56$

d  $5(5 - 2y) = 25 - 10y$

e  $6(2x + 3) = 12x + 18$

f  $4(7x + 2) = 28x + 8$

g  $-3(5y - 4) = -15y + 12$

h  $-8(2x + 5) = -16x - 40$

## 2G-2H

1 a  $5x + 21$

c  $10y + 61$

e  $5x + 2$

g  $30x + 28$

i  $14y - 19$

k  $11 + 2x$

m  $3x + 8$

o  $11x + 4$

q  $5x - 2$

b  $9x + 42$

d  $9x - 12$

f  $14y + 22$

h  $3x + 2$

j  $3x + 26$

l  $47x - 64$

n  $3x + 22$

p  $-2 - 5x$

r  $2x + 5$

2 a  $13x + 14$

c  $6x + 13$

b  $4x + 13$

d  $5x + 24$

3  $8x + 20$

4 area =  $38x - 94$ , perimeter =  $8x$

5 a  $7x + 10$

b  $11x + 2$

6  $5(x + 3) + 2(x + 3) = 7x + 21$