

## WorkSHEET 3.1 Introductory algebra

Name: \_\_\_\_\_

1 For each of the following expressions, write the coefficient of  $x$ .

- (a)  $7x$   
 (b)  $6x^2 - 7x$   
 (c)  $\frac{x}{4}$   
 (d)  $\frac{-2x}{3} + 7$

2 For each expression:

- (i) state the number of terms  
 (ii) state the coefficient of the first term  
 (iii) state the constant.

(a)  $-7y^2 + 9y + 5$

(b)  $12pq^2 - 4q^2 + 3p + 7$

(c)  $3a^2b^2 + 4b^2 + 2 - 5ab^2 - 3c$

(d)  $5c^2d - 3c + 7d - 2 + 8cd^2 - 7cd$

3 Write expressions for the following, where  $x$  and  $y$  represent numbers:

- (a) 10 less than  $y$   
 (b) 10 minus 6 times  $x$   
 (c) the sum of 3 times  $x$  and 5 times  $y$   
 (d) the sum of  $3x$  and 4 divided by 7 times  $x$ .

4 David has 10 vintage cars. Write the number of cars he will have left if he sells:

- (a) 2  
 (b)  $p$   
 (c)  $q$   
 (d)  $x$  on the first day and  $y$  on the following day.

5 A bus leaves its depot with  $p$  passengers. Write an expression for the number of passengers on the bus after its first stop if:

- (a) 3 passengers get on  
 (b)  $q$  passengers get off  
 (c)  $r$  passengers get on and  $s$  passengers get off  
 (d)  $t$  passengers get on,  $u$  passengers get off and then another  $v$  passengers get off.

6 Are the following statements true or false?

- (a) A packet of Minties contains  $p$  Minties and they are divided amongst 7 people. The number of Minties each person receives is  $\frac{7}{p}$ .  
 (b) Amanda wants to buy 4 pairs of shoes each costing  $q$  dollars. The total cost is  $4q$  dollars.

7 Kelly has a 60 cm-long string.

- (a) If she cuts off  $x$  cm, how much string is remaining?  
 (b) If she cuts off  $\frac{1}{5}$  of the remaining string, how much string has been cut off?  
 (c) How much string is now remaining?

- 8 Matthew divides  $x$  marbles among  $y$  friends.  
How many marbles does each person receive?

- A  $xy$   
B  $x+y$   
C  $y-x$   
D  $\frac{x}{y}$   
E  $\frac{y}{x}$

- 9 Shelley drives her car for  $p$  days over a 30-day period. Her sister Helen uses it for  $\frac{1}{6}$  of the remaining days.

(a) For how long does Helen use the car?

(b) For how long do Shelley and Helen use the car over a 30-day period?

- 10 Convert the following to algebraic expressions.

- (a) If one load of washing takes 25 minutes, how long will it take to complete  $w$  loads?
- (b) Nicky has \$200 more than Megan. How much money does Nicky have?
- (c) Jennifer buys a bag containing  $x$  jelly beans.
- (i) If she divides them equally amongst  $n$  people, how many does each person receive?
- (ii) If she keeps one-third of the jelly beans and divides the remaining jelly beans equally amongst  $n$  people, how many does each person receive?

**WorkSHEET 3.2 Simplifying algebraic expressions** Name: \_\_\_\_\_

1 For each of the following terms, find the like terms listed in brackets.

- (a)  $3ab$  ( $4a, 6b, -7ab, 3p, 2ab, ab$ )  
 (b)  $-7x^2$  ( $-7x, -7, x^2, -x^2, 6x^2$ )  
 (c)  $3x^2y$  ( $3x^2, 2x^2y, 3xy^2, 2x, 3y$ )  
 (d)  $-5a^2b$  ( $-5ab^2, 2a^2b, 3ba^2, \frac{a^2b}{7}, -3ab$ )

2 Which of the following is an example of a constant term?

- A 1  
 B  $x$   
 C  $x + y$   
 D  $-x$   
 E  $x^2$

3 Simplify the following expressions by collecting like terms.

- (a)  $3q - 2q$   
 (b)  $5x + 6x - 3x$   
 (c)  $18p - 20p$   
 (d)  $12x + 8y - 7x + 3y$

4 Simplify the following expressions by collecting like terms.

- (a)  $20y^2 - 15y^2$   
 (b)  $11x^2 + 7x - 5x + 3$   
 (c)  $-8g^2 - 10g + 6g + 7$   
 (d)  $12 - 7a^2b - 5 - 3ba^2$

5 Simplify the following expressions by collecting like terms.

- (a)  $7p^2q + 8qp^2 - 3pq^2$   
 (b)  $6x^2 - 10x^2 + 5x + 2x$   
 (c)  $-9a^2b^2 - 3 + 11a^2b^2 + 7 - ab^2$   
 (d)  $3m^2n + 5n - 5m^2n + 8n - 11$

6 Which of the following expressions cannot be simplified?

- A  $a + 3a$   
 B  $2x^2 + 8x^2$   
 C  $7 + 15$   
 D  $m + 6$   
 E  $y - y$

7 Simplify the following expressions.

- (a)  $4p \times 2p$   
 (b)  $-3q \times 6pq$   
 (c)  $-10xy \times -4xy$   
 (d)  $-6ab \times b \times 4a$

8 Simplify the following expressions.

- (a)  $3x \times 2x \times 5y$   
 (b)  $11p \times -3q^2 p \times p$   
 (c)  $-3a^2 \times -4ab^2 \times 6a^3b$   
 (d)  $5de \times 3d^2 \times -2e \times 10d^4e^3$

9 Simplify the following expressions.

- (a)  $\frac{10d}{2}$   
 (b)  $\frac{12}{24y}$   
 (c)  $-60q \div -30q$   
 (d)  $-8x^2y^2 \div 15xy$

10 Simplify the following expressions.

(a)  $\frac{3xy}{9y}$

(b)  $\frac{40pqr}{-12qr}$

(c)  $6abc \div -30abc$

(d)  $\frac{-30x^3y^2z^4}{24x^2yz^2}$