Online Teaching Suite Chapter 1 Reviewing algebra: **Chapter test 1**

Name _____

Multiple-choice questions

1 If $x + y = m$ and $x - y = n$, then $(x^2 - y^2) - 2x$ is equal to:

A $mn + m - n$

B $mn - m - n$

C $mn - m + n$

D $n^2 - m - n$

E $n^2 - m + n$

2 For the two equations $2ax + 2by = 3$ and $3ax - 2by = 7$, the solution for x and y in terms of a and b is:

A $x = 2a, y = \dfrac{3 - 4a^2}{2b}$

B $x = 2, y = \dfrac{3 - 4a}{2b}$

C $x = \dfrac{2}{a}, y = \dfrac{-1}{2b}$

D $x = 0, y = 0$

E $x = 3a, y = 7b$

3 The straight lines with equations $y = mx$ and $y = ax + b$ with $a \neq m$ intersect at the point with coordinates:

A $(a, am + b)$

B $\left(\frac{b}{m}, \text{b}\right)$

C $\left(\frac{b}{m-a}, \frac{bm}{m-a}\right)$

D $\left(\frac{a}{m}, \text{a}\right)$

E $\left(\frac{b}{a-m}, \frac{bm}{a-m}\right)$

4 The average of two numbers is $3y + 4$. One of the numbers is y. The other number is:

A $4y + 4$

B $5y + 8$

C $2y + 4$

D $8y + 8$

E $2y$

5 $\dfrac{x + y^{-1}}{x^{-1} + (xy)^{-1}}$ is equal to:

A $x^2y + x$

B $\dfrac{xy + 1}{y + 1}$

C x

D $\dfrac{x^2y + x}{y + 1}$

E $xy + x$

6 If $x - y = xy$, then y cannot be:

A 2

B 1

C 0

D -1

E -2

7 James has three lengths of string. One length is x cm, the second y mm and the third z m. The total length of string in centimetres is:

A $x + y + z$

B $x + 10y + 100z$

C $x + \frac{y}{10} + \frac{z}{100}$

D $x + 10y + \frac{z}{100}$

E $x + \frac{y}{10} + 100z$

8 If a square has side length s and diagonal length d, then $\frac{s^2}{d^2}$ is equal to:

A $\frac{1}{4}$

B $\frac{1}{2}$

C 1

D 2

E $\sqrt{2}$

9 If the height of an equilateral triangle is 9, then the length of the side of the triangle is:

A $9\sqrt{3}$

B $6\sqrt{3}$

C $3\sqrt{3}$

D $2\sqrt{3}$

E 3

10 When Robyn heard that the price of a certain fruit was about to increase by \$3 for each kilogram, she decided to buy \$30 worth of the fruit before the price increase. Had she bought at the new price she would have had to buy 5 kg less. The amount of fruit she bought was:

A 9 kg

B 6 kg

C 3 kg

D 10 kg

E 5 kg

11 For non-zero values of x and y, if $7x + 2y = 0$, then the ratio $\frac{y}{x}$ is equal to:

A $\frac{-7}{2}$

B $\frac{-2}{7}$

C $\frac{2}{7}$

D 1

E $\frac{7}{4}$

12 $\dfrac{5k^2-5k}{k^2-1} \times \dfrac{k+1}{k-1}$ is equal to:

A $\dfrac{5(k+1)}{k-1}$

B $\dfrac{5k}{k-1}$

C $\dfrac{-5k}{k-1}$

D $\dfrac{-5k}{k+1}$

E $5k$

13 If $x = \dfrac{a-bw}{z-cw}$,then w is equal to:

A $\dfrac{zx-a}{cx-b}$

B $\dfrac{zx+a}{cx-b}$

C $\dfrac{cx-b}{zx-a}$

D $\dfrac{zx-cx}{b-a}$

E $\dfrac{zx-b}{c-bx}$

14 If x text books cost $\$y$ and v fiction books cost $\$z$, then the average price in dollars of a single book is:

A $\dfrac{y}{x}+\dfrac{z}{v}$

B $\dfrac{y+z}{x+v}$

C $\dfrac{x+v}{y+v}$

D $\dfrac{yz}{xv}$

E $\dfrac{x+v}{yz}$

15 Two angles of a seven-sided polygon are 70° each, and the other five angles are all equal. The size of each of the five equal angles is:

A 151°

B 152°

C 161°

D 162°

E 172°

Short-answer questions (technology-free)

1 Solve each of the following literal equations for x.

a $ax + b = \dfrac{x + b}{a}$

b $\dfrac{a}{bx} - \dfrac{b}{ax} = a^2 - b^2$

c $(x - a)^2 = x^2 + b^2$

2 If 5 is subtracted from the numerator of a fraction and 6 from its denominator, the value of the fraction becomes $\dfrac{1}{2}$. If 3 is added to the numerator and 2 to the denominator, the value becomes $\dfrac{5}{6}$. What is the fraction?

3 Solve the simultaneous equations for x and y.

$x + 3by = a$

$3ax – y = b$

4 Simplify each of the following, expressing your answer with positive indices.

a $2x^{-3} \times 3x$

b $(2x^{-2})^3 \times 2x^2$

c $2x^2y^{-3} \times (3xy^3)^2$

5 Given that $a + b = 2$ and $a^2 + b^2 = 6$, find the value of $(a - b)^2$.

6 Simplify $\dfrac{x+2}{x^2+7x+12} \div \dfrac{x+3}{x^2+6x+8} \div \dfrac{x+2}{x^2+6x+9}$.

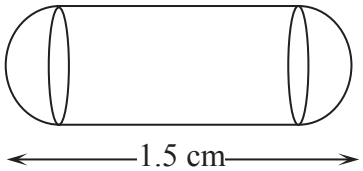
7 Simplify $\dfrac{4}{x+2} - \dfrac{7}{(x+2)^2}$.

8 If $v^2 = u^2 + 2as$ and $u = 6, a = 1.6$ and $s = 12$, find the value(s) of v.

9 Simplify $\dfrac{6ab}{4bc} \div \dfrac{2ab^2}{8bc^2} \times \dfrac{bc^2}{b^2c}$.

Extended-response questions

A capsule consists of a cylinder with a hemisphere at each end. Let r cm be the radius of the cylinder.



1 Express the height, h, of the cylinder in terms of r.

2 a Express the volume of the container in terms of r.

b Find r and h, correct to two decimal places, if the volume of the capsule is $0.24\,\text{cm}^3$.