

EQAO PRACTICE BOOKLET #1 – Algebra

OPEN RESPONSE QUESTIONS

A Expand and simplify the following expression:

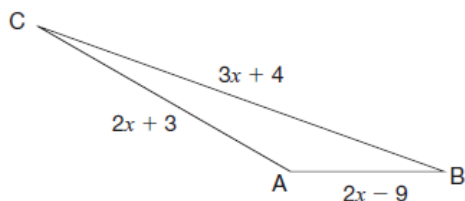
$$\begin{aligned} & 2(x^2 - 2x + 1) - x(x - 3) \\ &= \underline{2x^2} - \underline{4x} + \underline{2} - \underline{x^2} + \underline{3x} \\ &= 2x^2 - x^2 - 4x + 3x + 2 \\ &= x^2 - x + 2 \end{aligned}$$

B Expand and simplify.

$$\begin{aligned} & 2(3x^2 - 5x) + 4x(7 + x) \\ &= \underline{6x^2} - \underline{10x} + \underline{28x} + \underline{4x^2} \\ &= 6x^2 + 4x^2 - 10x + 28x \\ &= 10x^2 + 18x \end{aligned}$$

C What Side?

The perimeter of the triangle below is 75 m.



Determine the measure of each side of the triangle.

Show your work.

$$\begin{aligned} \underline{2x} + 3 + \underline{3x} + 4 + \underline{2x} - 9 &= 75 \\ 2x + 3x + 2x + 3 + 4 - 9 &= 75 \\ 7x - 2 + 2 &= 75 + 2 \\ \frac{7x}{7} &= \frac{77}{7} \\ \boxed{x = 11} \end{aligned}$$



∴ The sides are:
 $2(11) + 3 = 25\text{m}$
 $3(11) + 4 = 37\text{m}$
 $2(11) - 9 = 13\text{m}$

MULTIPLE CHOICE QUESTIONS:

1. Tim shows the steps he took in simplifying the following algebraic expression:

$$\frac{(a^2)^3}{a^2 \times a^3}$$

$$= \frac{a^5}{a^2 \times a^3} \quad \text{Step 1}$$

$$= \frac{a^5}{a^{2+3}} \quad \text{Step 2}$$

$$= \frac{a^5}{a^5} \quad \text{Step 3}$$

$$= 1 \quad \text{Step 4}$$

In which step did Tim make an error?

- F Step 1
 G Step 2
 H Step 3
 J Step 4

a⁶ b/c power of a power requires you to multiply the powers.

2. Juan shows the steps he took in rearranging a formula:

Given $P = 2(l + w)$

Step 1 $P = 2l + 2w$

Step 2 $P + 2l = 2w$

Step 3 $\frac{P + 2l}{2} = w$

Step 4 $\frac{P}{2} + l = w$

In which step did Juan make an error?

- A Step 1
 B Step 2
 C Step 3
 D Step 4

3. Simplify the following expression.

$$(x^2 + 4x + 3) + x(3 - x)$$

F $x + 3$

G $3x$

H $7x + 3$

J $-2x^2 + 4x + 3$

$$\begin{aligned} & \underline{x^2} + \underline{4x} + 3 + \underline{3x} - \underline{x^2} \\ &= x^2 - x^2 + 4x + 3x + 3 \\ &= 7x + 3 \end{aligned}$$

4. Simplify the following algebraic expression:

$$\frac{a^6 b^4}{a^2 b} = a^{6-2} \cdot b^{4-1} = a^4 b^3$$


F $\frac{a^3}{b^3}$

G $\frac{a^4}{b^3}$

H $a^3 b^3$

J $a^4 b^3$

5. Eric and Julie are each asked to solve an equation.



I solved
 $3x = x + 12.$ ✓
 My answer is $x = 6.$

$$3x - x = x + 12 - x$$

$$\frac{2x}{2} = \frac{12}{2}$$

$$\boxed{x = 6}$$

Eric



Julie

I solved
 $3x - 4 = x + 12.$ ✓
 My answer is $x = 8.$

$$3x - 4 - x = x + 12 - x$$

$$2x - 4 = 12 + 4$$

$$\frac{2x}{2} = \frac{16}{2}$$

$$\boxed{x = 8}$$

Who has correctly solved his or her equation?

- F Eric only
- G Julie only
- H Both Eric and Julie
- J Neither of them

6. In a soccer league, a win counts for 2 points, a tie counts for 1 point and a loss counts for 0 points. A soccer team has 5 wins, 2 ties and 3 losses.



If the team continues to win, tie and lose in the same ratio, which of the following values is the best prediction of their point total after 40 games?

- a 36 points
- b 48 points
- c 96 points
- d 480 points

In 10 games \Rightarrow $\frac{5}{10}$ wins
 $\frac{2}{10}$ ties
 $\frac{3}{10}$ losses.

It's a proportion; therefore,

Step 1

$$\text{In 40 games } \Rightarrow \left. \begin{array}{l} \frac{5}{10} = \frac{x}{40} \\ \frac{10x}{10} = \frac{200}{10} \\ x = 20 \text{ wins} \end{array} \right\} \text{wins}$$

Points: $20 \times 2 = 40$ points

Step 2

$$\left. \begin{array}{l} \frac{2}{10} = \frac{x}{40} \\ \frac{10x}{10} = \frac{80}{10} \\ \boxed{x = 8} \end{array} \right\} \text{TIES}$$

Points: $8 \times 1 = 8$ points

\therefore Total = $40 + 8$
 $= 48$ points.

7. While experimenting with a toy rocket, Dan determines that he can model the rocket's height, h , in metres, with respect to time, t , in seconds, using the equation

$$h = \frac{1}{2}t^2$$



$$h = \frac{1}{2}(10)^2$$

Which calculation correctly finds the value of h when $t = 10$?

a $h = \frac{1}{2} \times 10^2$
 $= 5^2$
 $= 25$

b $h = \frac{1}{2} \times 10^2$
 $= \frac{1}{2} \times 20$
 $= 10$

c $h = \frac{1}{2} \times 10^2$
 $= \frac{1}{2} \times 100$
 $= 50$

d $h = \frac{1}{2} \times 10^2$
 $= \frac{1}{4} \times 100$
 $= 25$

B
 E step 1
 D step 2
 M
 A
 S

8. Asha receives \$10 000.

Asha keeps **half** his money and gives **the rest** to Bertha.



Bertha keeps **half** her money and gives **the rest** to Calvin.

Calvin keeps **half** his money and gives **the rest** to Dane.

Dane keeps **half** his money and gives **the rest** to Evanna.

Which expression shows the dollar amount of money that **Evanna** receives from Dane?

a $10\,000 \div 2^4 = 625$

b $5000 \times \frac{1}{2} \times \frac{1}{2} = 1250$

c $10\,000 \div \frac{1}{2} \div \frac{1}{2} \div \frac{1}{2} \div \frac{1}{2}$

d $2500 \div 2 = 1250$

$10,000 \div 2 \div 2 \div 2 \div 2 = 625$
 (Bertha)
 (Calvin)
 (Dane)
 (Evanna)
 $10,000 \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}$
 $10,000 \times (\frac{1}{2})^4$ OR $10,000 \div 2^4$

9. Simplify fully:

$$-5x(4 - 3x) + 2x^2$$

a $2x^2 - 17x$

b $2x^2 - 23x$

c $17x^2 - 5x$

d $17x^2 - 20x$

$$= -20x + 15x^2 + 2x^2$$

$$= 17x^2 - 20x$$

10. Simplify the following expression:

$$3x(2x + 3) - 5x$$

a $6x^2 - 5x + 3$

b $6x^2 - 6x$

c $15x^2 - 5x$

d $6x^2 + 4x$

$$6x^2 + 9x - 5x$$

$$= 6x^2 + 4x$$

11. Sabeeta expands and simplifies the expression below.

$$2(3x^2 - 5x) + 4x(7 + x)$$



Which expression is equivalent to the one above?

a $6x^2 + 22x = 10x^2 + 18x$

b $10x^2 + 18x$ *

c $10x^2 - 38x$

d $28x^2$

13. Meg has been asked to determine the value of the numerical expression below.

$$\frac{2^{400}}{2^{396}} - 2^3$$

Which of the following is the value of Meg's expression?

A 1

B 2

C 4

D 8

$$= 2^{400-396} - 2^3$$

$$= 2^4 - 2^3$$

$$= 16 - 8$$

$$= 8$$

12. If $x = 3$, what is the value of $2x^2 + 5x$?

a 21 $2(3)^2 + 5(3)$

b 27 $= 2 \cdot 9 + 15$

c 33 * $= 18 + 15$
 $= 33$

d 51

14. A rectangular field has a perimeter of $(10a - 6)$ metres and a width of $2a$ metres.



Which expression represents the length of this field?

A $8a - 6$

B $12a - 6$

C $3a - 3$

D $3a^2 - 3$

Let L be the length

$$2(L + 2a) = 10a - 6$$

$$2L + 4a = 10a - 6 - 4a$$

$$\frac{2L}{2} = \frac{6a - 6}{2}$$

$$L = \frac{6a}{2} - \frac{6}{2}$$

$$L = 3a - 3$$

15. Which of the following represents the expression $2(3x + 4) + 3(x - 1)$ in a simplified form?

- a $9x + 3 = 6x + 8 + 3x - 3$
- b $9x + 5 = 9x + 5$
- c $8x + 8$
- d $8x + 11$

17. Alfredo and his wife, Jody, work in a restaurant. Last week Alfredo received an average of \$15 in tips for each of the 55 tables he served. Jody received an average of \$20 in tips for each of the 60 tables she served. They are planning a weekend trip. Alfredo will pay a total of \$220 for their hotel room and Jody will pay a total of \$160 for their rental car. How much of their combined tips will be left over after they have paid for their hotel room and rental car?

	Alfredo	Jody
Tips	$15 \times 55 = \$825$	$20 \times 60 = \$1200$
Spent	\$220	\$160
Left	$825 - 220 = \$605$	$1200 - 160 = \$1040$

$$\begin{aligned} \text{Total \$ left} &= 605 + 1040 \\ &= \$1645 \end{aligned}$$

16. The expression below can be simplified.

$$\frac{(x^2y)^3}{(xy)^2}$$

Which of the following shows the expression in its simplest form?

- a x^4y
- b x^4
- c xy
- d x^3y

$$\begin{aligned} \frac{(x^2y)^3}{(xy)^2} &= \frac{x^6 \cdot y^3}{x^2 \cdot y^2} = x^{6-2} \cdot y^{3-2} \\ &= x^4 \cdot y \end{aligned}$$

$$\begin{array}{r} 55 \\ \underline{15} \\ 275 \\ \underline{55} \\ 325 \end{array}$$