Rosary School \ Marj Elhamam

Name : _____ Date : / 11 / 2025

Subject: Worksheet (3) Unit (3) Grade : 7 ( )

Working With Powers

3.1 Simplifying expressions

Q1: Simplify

a. $4x + 7x$

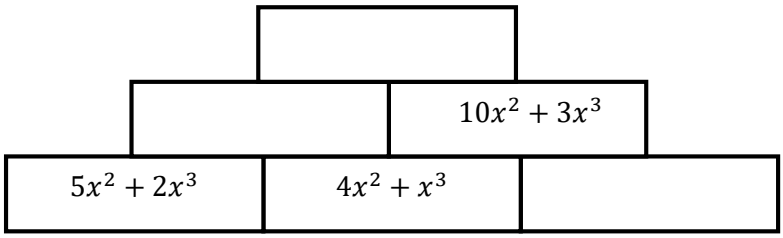
b. $5m + 3n + 9m + n$

c. $6p + 4q - 2p - q$

d. $10x + 8y - 12x$

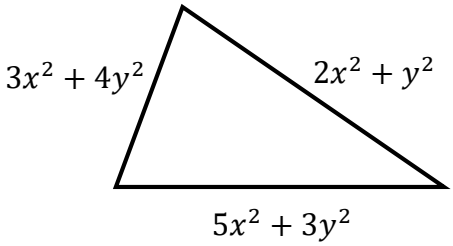
e. $2z^3 + 5z^2 - z^3$

Q2: Complete this addition pyramid**.**
Each brick is the sum of the two bricks below it.

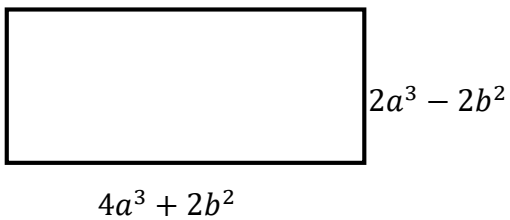


Q3: Write an expression for the perimeter of each shape. Write your answers in their simplest form.

a.



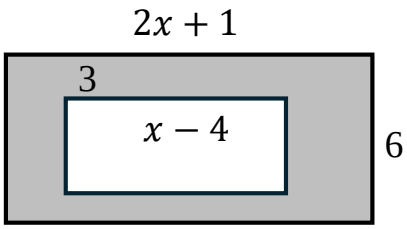
b.



Q4: Expand and Simplify

a. $4(y + 3) + 2(y - 5)$	d. $6(n - 2) - 4(n + 3)$
b. $5(a + 4) - 3(a - 1)$	e. $3(p + 7) - (5p - 4)$
c. $2(4b - 1) + 5(b - 2)$	f. $5(2k - 3) - 2(3k - 4)$

Q5: a. Write an expression for the area of the larger rectangle.



b. Write an expression for the area of the smaller rectangle.

c. Write an expression for the shaded area.

3.2 More simplifying

Q1: Simplify.

a. $3y \times 3y$

b. $6m \times 2n$

c. $\frac{10k}{5}$

d. $\frac{10x^6}{5x^2}$

e. $\frac{36m^{10}}{6m^3}$

f. $\frac{40k^5}{8k}$

g. $\frac{21y^8}{7y^5}$

h. $\frac{4r^2 \times 6r^2}{3r}$

i. $\frac{2a^4 \times 9a^2}{6a^3}$

j. $(3y^3)^2$ k. $(5a^4)^3$ l. $(2k^2)^4$

m. $(\frac{m^3}{5})^2$ n. $(\frac{b^5}{3})^3$ o. $(\frac{c^4}{6})^2$

3.3 Factorising expressions

Q1: Write the common factors of

a. 10 and $5m$ _____ b. $14k$ and 7 _____

c. $18y$ and 12 _____ d. 9 and $15p$ _____

Q2: Write the HCF of

a) $15m$ and 20 _____ b) 42 and $18y$ _____

Q3: Factorise completely.

a. $5y + 15$	b. $9k + 27$
c. $10a + 30$	d. $16x - 8$
e. $32 - 4b$	f. $14 + 7t$
g. $80m + 16$	h. $55 + 11p$
i. $6x + 9y + 12$	j. $28 + 14a + 7b$
k. $rst + 5r + 15r$	l. $12ab + 8ac - 4a$

Q4:

a) Sara pays a £45 deposit for a new phone. She then pays £15 a month.

Write a formula for the total amount (T) paid after *p* months.

b) Ben pays a £300 deposit for a car. He then pays £150 a month.

Write a formula for the total amount paid after *m* months.

c) A health club charges a $ 75 joining fee and $ 35per month.
Write a formula for the total cost (C) after *n* months.

d) A hiker is already 3 kilometers from the camp and walks at a steady pace of 5 kilometers per hour. Write a formula for the total distance (D) the hiker is from the camp after (*h*) hours.

e) A water tank holds 100 litres of water. Water is added to the tank at a rate of 12 Liters per minute. Write a formula for the total volume (*V*) of water in the tank after (*t*) minutes.

3.4 Expanding and Factorising expressions

Q1: Simplify

a. $2x \times 2y$

b. $4k \times 5k$

c. $3m \times -6m$

d. $5b^4 \times 3b^2$

e. $8q^3 \times -2q^4$

f. $-9x^2y \times 4xy^4$

Q2: Expand

a. $3(4x + 2)$	b. $5(2 - 3y)$
c. $x(x + 5)$	d. $4(x - 2)$
e. $y(y^2 + 5y)$	f. $3a(4a^4 - 2a^3)$
g. $4k(k^3 + 3k^2 + 6)$	h. $b^3(b^2 - 4b + 5)$

Q3: Expand and simplify.

a. $3(x + 2y) + 4(x + y)$

b. $a(3a^2 + 4) + 2a(2a^2 + 6)$

c. $2(5 - 3z) + z^2(z - 5)$

e. $4k(k + 3) - 3k^2(k^2 - 1)$

$d. 2y(y^2 + 3) - 6y^2(y^2 - 2y)$

Q4: Write the highest common factor of each pair.

a. y^3 and y^5

b. k^4 and k

c. a^6 and $2a^3$

d. $12b^5$ and $6b$

e. $9n^4$ and $15n^2$

f. x^2y^2 and x^3y^3

Q5: Factorise completely.

a. $20y^4 - 4y$

b. $18a + 9a^3$

c. $20x^4 - 35x^3$

d. $5t^4 + 10t$

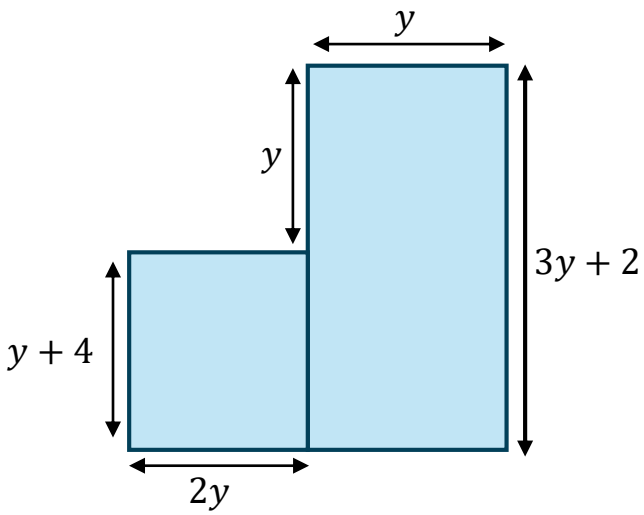
e. $d^3 - 9d^5$

f. $5p^4 - 25p^2$

g. $14m^5 - 7m^2$

h. $9b^6 - 3b^3$

Q6: Write an expression for the total area of this shape.



Q7: Show that both of these statements are identities.

i. $6y^3 + y(4y^2 + 5y) \equiv 5y^2(y + 1)$

ii. $4p(p^2 - 3p) - p(p^2 - 15p) \equiv 3p^2(p + 1)$

3.5 Substituting and Solving

Q1: Rectangle A has area y cm^2. Rectangle B has area $(y + 18)$ cm^2.

The area of rectangle B is three times the area of rectangle A.

a. Write an equation using the information given.

b. Solve the equation to find the value of y.

Q2: Find the value of these linear expressions when $a = 9$, $b = 4$ and $c = -2$.

a. $5a + 4c$

b. $3(a + 1) + b + c$

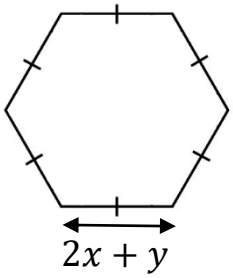
c. $4(b-c)-3a$

d. $2(a+b)-5(b+c)$

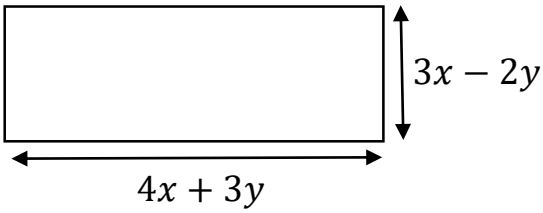
Q3: For each shape

a. Write and simplify an expression for the perimeter.
b. Work out the perimeter when $x=5$ and $y=-3$.

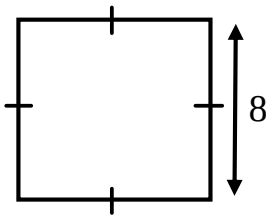
i.

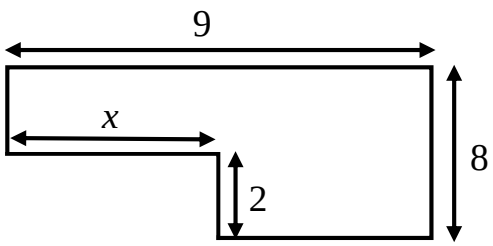


ii.



Q4: These two shapes have the same area. Work out the value of x.





Q5: Substitute $a = 4$, $b = 5$ and $c = -3$.

a. $2a(a + b)$

b. $c^2(c + b^2)$

c. $3a(10 + c) + b^2$

d. $2c(4a - b) + c^2$

Q6: A square with sides 3*y* is cut out of a rectangle with sides 5*y* + 4 and 6*y*.

a. Write an expression, in terms of *y*, for the area of the remaining shape.

b. Use your expression to find the area of the remaining shape when $y = 3$.

Teachers:- Zein Abbasi, Rand Haddadin