Rosary School \ Marj El Hamam

Name: ………………………………

Subject: Worksheet (1) / Unit (1)

Number

Date: / 9 / 2025

Grade: 7 (A, B, C, D, E)

1.1 Calculating with negative numbers

Q1: Work out.

a) $5 + (-3) =$

b) $-8 + 12 =$

c) $-15 - (-7) =$

d) $-35 + (-30) =$

e) $16 \times (-9) =$

f) $-27 \times 4 =$

g) $-12 \times (-5) =$

h) $15 \times (-8) =$

i) $342 \div (-3) =$

j) $-154 \div 7$

k) $-45.18 \div (-9) =$

l) $72 \div (-12) =$

Q2: Substitute the values into each expression and work out its value.

$a)\ 3x\ -\ 4\ when\ x\ =\ -6$

$b)\ u + at\ \ when\ u = 3, a = -9\ and\ t = 6$

$c)\ m(p - t)when\ m = -3, p = 5\ and\ t = -7$

$d)\ a - (2ab\ +\ c)\ when\ a = 8, b = -4\ and\ c = 2$

Q3: Expand the brackets to work these out.

Check your answers using the order of operations.

a. $7 \times (-6 - 3)$	b. $-2\,(-5 + 8)$
c. $3 \times (-4 - 5) + 13$	d. $-4\,(12 - 2) - 9$

Q4: a) Work out these calculations.

     i. $(-2)^2 =$ _____

    ii. $(-5)^2 =$ _____

   iii. $(-10)^2 =$ _____

   iv. $(-12)^2 =$ _____

b) Write the positive and negative square roots of these numbers.

     i. $\sqrt{9} =$ _____ and _____

    ii. $\sqrt{16} =$ _____ and _____

   iii. $\sqrt{49} =$ _____ and _____

   iv. $\sqrt{196} =$ _____ and _____

1.2 Prime factor decomposition

Q5: Write each number as a product of its prime factors.

a) $84 =$

b) $180 =$

c) 126

d) 400

Q6: Use prime factor decomposition to find the HCF and the LCM of each pair
of numbers.

a) 45 and 60

HCF = _____

LCM = _____

b) 18 and 24

HCF = _____

LCM = _____

Q7: Use the following Venn diagram to find the HCF and the LCM of 63 and 84

HCF = _____

LCM = _____

Prime factors
of 63   Prime factors
               of 84

3   2

3   7   2
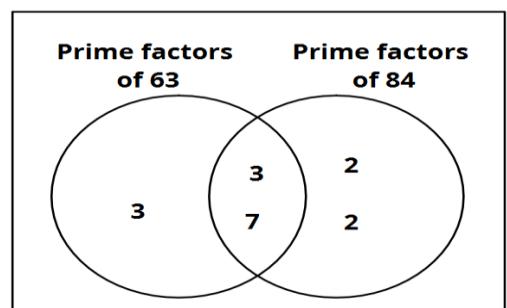
Q8: a) Write the prime factors of 27 and 36 in this Venn Diagram.

Prime factors of 27   Prime factors of 36
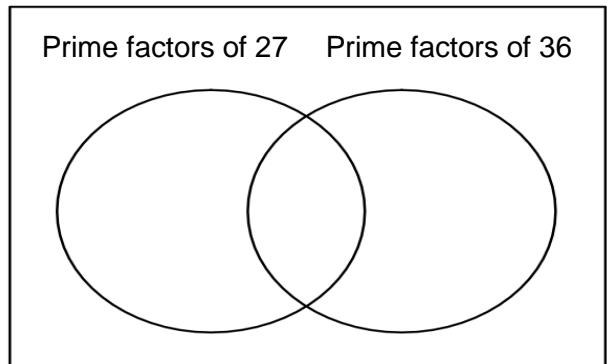
b) Find the HCF and the LCM of 27band 36.

HCF = _____

LCM = _____

1.3 Using indices

Q9. Write each of these as a single power.

a) $2^3 \times 2^2 =$ _____

b) $5^4 \times 5^8 =$ _____

c) $7^2 \times 7^5 \times 7^9 =$ _____

d) $3^5 \div 3^2 =$ _____

e) $6^7 \div 6^3 =$ _____

f) $\dfrac{8^9}{8^5} =$ _____

g) $(2^2)^3 =$ _____

h) $(3^3)^2 =$ _____

i) $(7^4)^2 =$ _____

j) $\dfrac{2^3 \times 2^5}{2^4} =$ _____

k) $\dfrac{5^4}{5 \times 5^2} =$ _____

l) $\dfrac{10^6 \times 10^5}{10^4 \times 10^7} =$ _____

Q10: Write each calculation as a single power.

a) $25 \times 125 \times 625$

b) $\dfrac{7^9}{343}$

c) $\dfrac{36 \times 1296}{6^3}$

1.4 Priority of operations

Q11: Make the calculation correct by putting in a set of brackets.

a) $8 - 3 \times 2 + 5 = 15$

b) $20 - 2^3 \div 4 = 3$

c) $120 - 1 + 3^2 \times 5 = 40$

d) $32 - 2 \times 3 + 4 = 18$

Q12. Work out.

a) $2 + 3^2 =$

b) $\sqrt{16} + 5^2 =$

c) $(6 + 2^2) \div 2 =$

d) $\sqrt{81} + (4^2 - 6) \div 2 =$

❖ **2.1 Solving One-Step Equations**

Q1: Solve each equation. Show your working.

a) $x + 7 = 12$ b) $y - 9 = 4$

c) $5z = 25$ d) $\dfrac{m}{6} = 3$

e) $a + 13 = 20$ f) $-x = -9$

❖ **2.2 Solving Two-Step Equations**

Q2: Solve each equation step by step.

a) $2x + 3 = 11$ b) $4(x - 2) = 12$

1

c) $\dfrac{n}{5} + 2 = 6$

d) $7p - 5 = 23$

e) $3q + 4 = 19$

❖ 2.3 More Complex Equations
Q3: Solve the following.

a) $y - 4 = 3y + 2$

b) $2y + 3 = 5y - 6$

c) $3(m + 4) = 2m + 18$ d) $6a - 2 = 3a + 7$

e) $\dfrac{(2x + 5)}{3} = 7$

❖ **2.4 Working with Formulae**

Q4: Substitute the values given into each formula.

    Solve the equation to find the value of the unknown.

a) $t = k - 6$ Find k when $t = 16$

b) $s = 8 + n$ Find n when $s = 22$

c) $y = kx$ Find k when $y = 64$ and $x = 8$

d) $T = \dfrac{P}{4}$ Find P when $T = 32$

Q5:

a) The area of a rectangle is given by $A = lw$.
   If the area is 60 cm² and the length is 12 cm, find the width.

b) The formula for speed is $S = \dfrac{d}{t}$.
   A car travels 180 km in 3 hours. What is its average speed?

c) The perimeter of a rectangle is given by $P = 2l + 2w$.
   If the perimeter is 50 m and the length is 15 m, find the width.

Q6: Write a formula for converting.

   a) m to km   b) weeks to years

   c) minutes to hours   d) days to hours

   e) days to weeks

   ✚ Challenge Question:

Solve: $5(x - 2) + 3 = 2x + 10$.
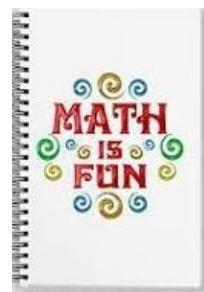
Teachers: Rand Haddadin, Zein Abbasi

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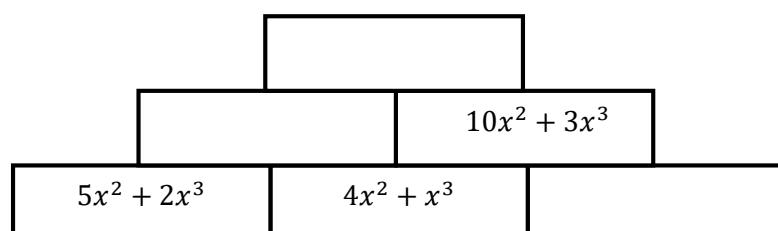
Q3: Write an expression for the perimeter of each shape. Write your answers in their simplest form.

a.

$3x^2 + 4y^2$ $2x^2 + y^2$ $5x^2 + 3y^2$

b.

$2a^3 - 2b^2$ $4a^3 + 2b^2$
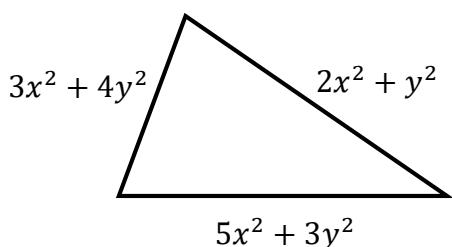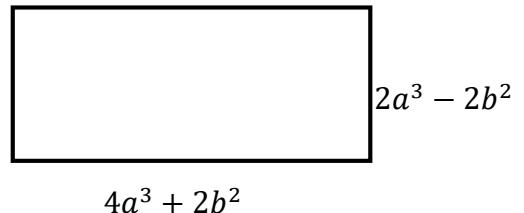
Q4: Expand and Simplify

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.

$2x + 1$

3

$x - 4$

6
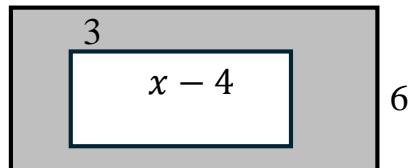
b. Write an expression for the area of the smaller rectangle.

c. Write an expression for the shaded area.

3.2 More simplifying

Q1: Simplify.

a. $3y \times 3y$

b. $6m \times 2n$

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

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

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

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

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

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

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

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.
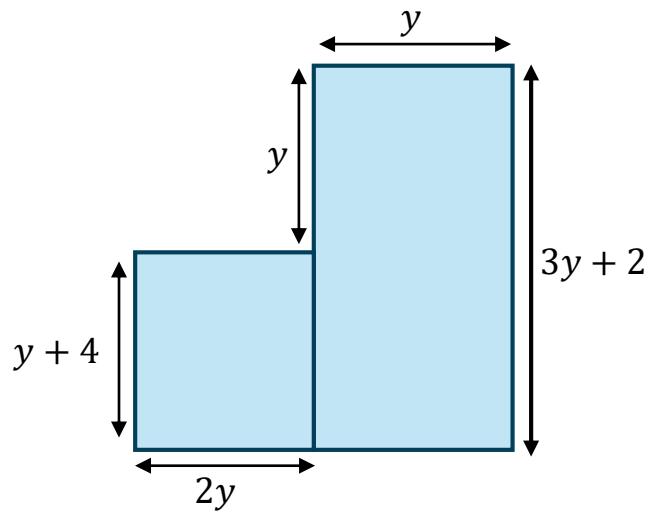
Q7: Show that both of these statements are identities.

    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.

$2x + y$

ii.

$3x - 2y$

$4x + 3y$
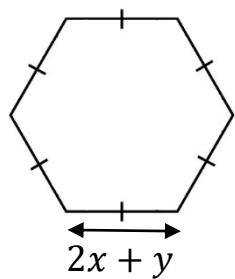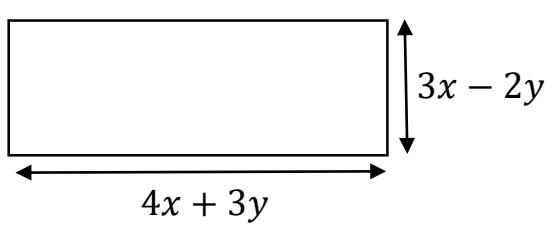
Q4: These two shapes have the same area. Work out the value of x.
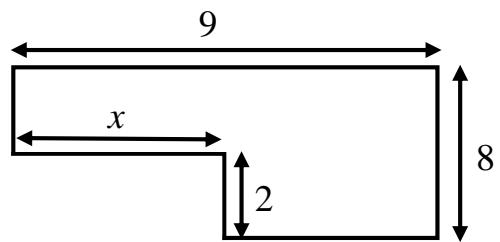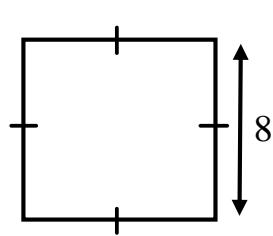
Q5: Substitute $a = 4$, $b = 5$ and $c = -3$.

   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 $3y$ is cut out of a rectangle with sides $5y + 4$ and $6y$.

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

Name : _____

Date : / 11 / 2025

Subject: Worksheet (4) / Unit (4)

Grade : 7 (   )

2D shapes and 3D solids

4.1 Area of Shapes Triangle, Parallelogram and Trapezium.

Q1. Find the area of these triangles.

a.

8 cm

4 cm

5 cm

b.

8 cm

6 cm
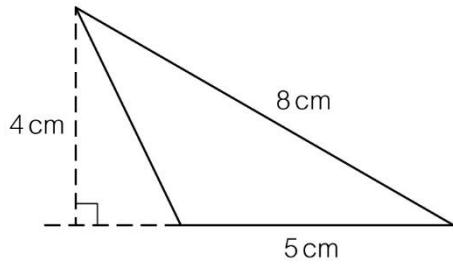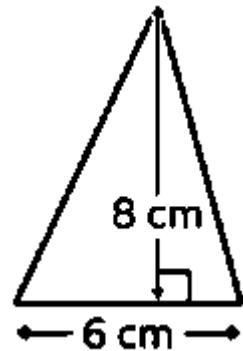
_____cm^2

_____cm^2

Q2. Find the area of these trapeziums.

a.

6 cm

8 cm

4 cm

_____cm²

b.

6m

4m

10m

_____cm²

c.

15 cm

5 cm

7 cm

12 cm
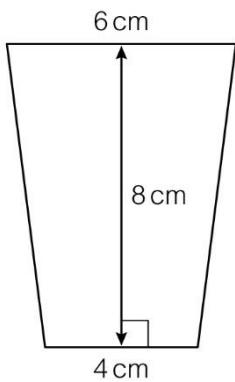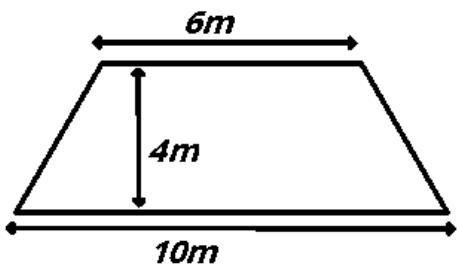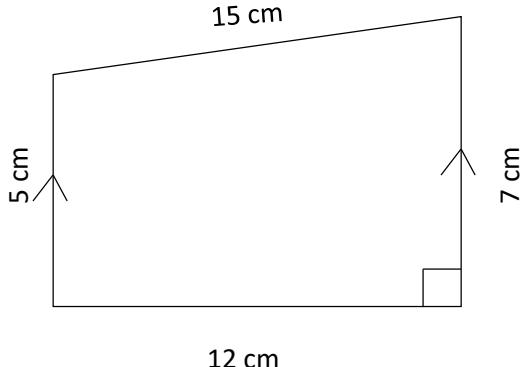
_____cm²

**Q3.** Find the area of these parallelograms.

a.
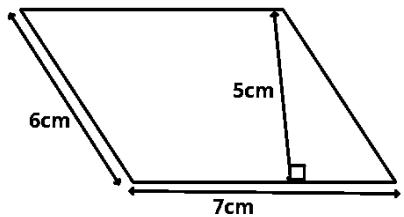
b.
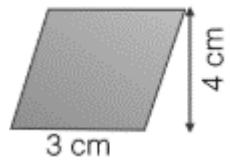
**Q4.** The diagram shows a parallelogram and a triangle.
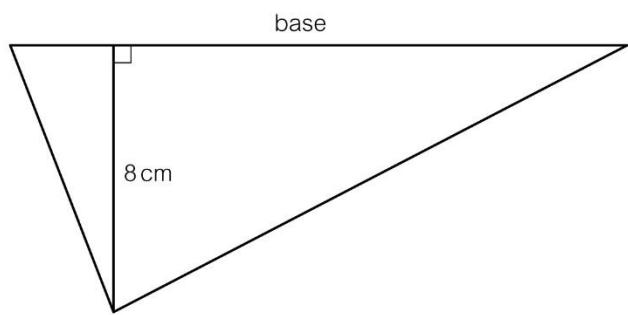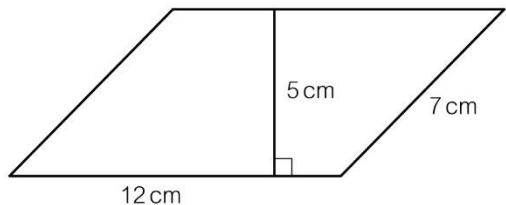
The parallelogram and the triangle have the same area.

Show that the base of the triangle is 15 cm.

4.2 Area of Compound Shape

**Q1.** Find the area of the following compound shapes.

a.
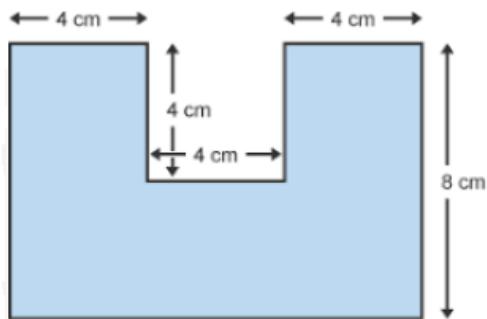
b.
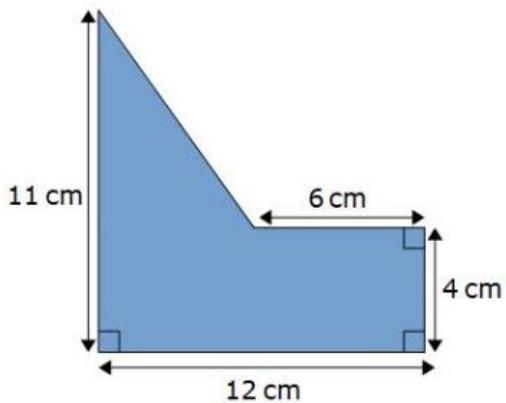
4.3 Properties of 3D solids

Q1. Sketch the net of the following cuboid.
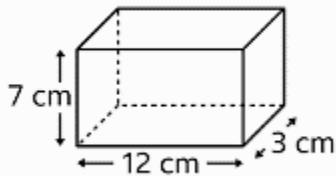
Q2. A cube has 2 opposite faces coloured red, 2 opposite faces coloured blue and the other faces coloured green.

Sketch the net of this cube, showing the colour of each face.

4.4 Surface area

**Q1.** A cuboid has edges of length 5 cm, 6 cm, 4 cm.

Work out the total surface area of the cuboid.

_____cm^2

Q2. Here is a net of a cube.

The length of each side is s cm.

a. Write an expression for the surface area

s cm
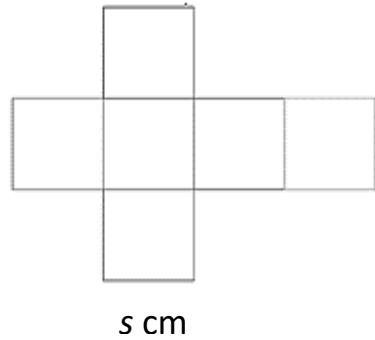
b. Work out the surface area when the edge is 6 m

4.5 Volume

Q1. Find the volume of:

a. A cube with side 7 cm.

_____ cm^3

b. A cuboid with width 4 cm, height 5 cm, and length 12 cm.

_____ cm^3

Q2. A fish tank is in the shape of a cuboid.

The base of the tank measures 45 cm by 20 cm.

Sam pours water into the tank up to a depth of 15 cm.

Work out the amount of water that he pours in.

Give your answer in litres.

_____*litres*

Q3. Copy and complete these conversions.

a. 0.26 litres = _____ cm^3

b. 2.3 cm^3 = _____ ml

c. _____ litres = 5241 cm^3

4.6 STEM: Measure of area and volume

Q1. Change 50 cm^3 to mm^3.

_____mm^3

Q2. Show that 5.4 m^3 = 5 400 litres.

Show your working clearly.

Q3. Copy and complete these conversions.

a. 3000 cm³ = _____ l

b. 0.8 l = _____ cm³

c. 0.5 m² = _____ cm²

d. 4 hectares = _____ m²

e. 89000 m² = _____ hectares
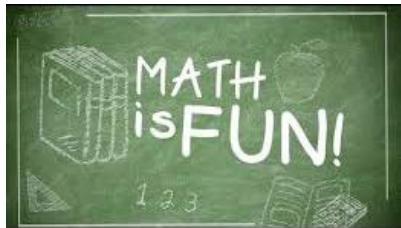
Teachers: Rand Haddadin, Zain Abbasi