

****Question 1****

A. Write each ratio in its simplest form:

i) 35:15

ii) $\frac{1}{3} : \frac{3}{4}$

B. EUR 58.50 is divided between Ann and Barry in the ratio 8:5.
How much does each person receive?

C. Sam and Tina share a bag of sweets in the ratio 2:3.
If Sam receives 18 sweets, how many sweets will Tina receive?

****Question 2****

12 men can paint a school building in 10 days.

a) How long would it take one man to paint the same school by himself?

b) How many days would it take 15 men to paint the same school?

****Question 4****

A. Find the angles x and y in the diagram, giving reasons for each answer.

Diagram description: A–B–D is a straight line. Triangle A–B–C has angle at A of 55 degrees and angle at C of 80 degrees. The angle at B inside the triangle is labeled y . From B to the right, line B–D continues on the straight line, and a ray B–E goes upward. The angle between B–D and B–E is labeled x . The segment A–C and the ray B–E are marked with matching arrowheads (parallel lines).

$x = \underline{\hspace{2cm}}$ Reason:

$y = \underline{\hspace{2cm}}$ Reason:

B. Find the value of x and the value of y .

Diagram description: A triangle sits on a straight line. The left base interior angle is 72 degrees, the top interior angle is $2x$ degrees, and the right base interior angle is $4y$ degrees. The exterior angle on the straight line to the right of the triangle is labeled $5x$ degrees.

$x = \underline{\hspace{2cm}}$ $y = \underline{\hspace{2cm}}$

****Question 5****

A. Simplify $4(2x + 1) + 3(5x - 2)$

B. Simplify $-2a(a - 3y) - a(a + 4y)$

C. Simplify $(x + 4)(x - 3)$

****Question 6****

If $t = 4$ and $p = -3$ find the value of

$$2t - 3p^2$$

****Question 7****

A. Solve for x : $2x + 7 = 4x - 5$

B. Solve for y : $5(y - 2) + 12 = 2(y - 5)$

****Question 8****

Bart has x euro in his wallet. Lisa has 12 euro more than Bart.
Maggie has 4 times as much money as Bart.

If Bart and Lisa together have as much money as Maggie, write an equation to represent this information.

Solve your equation to find out how much money Bart has.

****Question 9****

The length of a rectangle is 3 cm longer than its width.
(Hint: it may help to sketch the rectangle)

If the width is x cm write in terms of x :

(a) the length of the rectangle

(b) the perimeter of the rectangle

(c) If the perimeter of the rectangle is 26 cm form an equation to represent this information.
And solve the equation to find the value of x .

****Question 10****

A. Solve the following inequality and show your answer on the number line.

$$5x - 7 > 3, x \in \mathbb{N}$$

B. Solve the following inequality and show your answer on the number line.

$$7x + 1 \leq 3x - 15, x \in \mathbb{R}$$

****Question 11****

A. Solve the following pair of simultaneous equations to find the value of x and y

$$x + y = 5$$

$$x - y = -7$$

B. Solve the following pair of simultaneous equations to find the value of x and y

$$3x + 4y = 5$$

$$5x - 6y = 2$$

****Question 12****

A. Use Pythagoras' Theorem to find the side lengths a and f.

Give your answer for b in surd form.

Diagram 1: Right triangle with a right angle at the lower-left corner, vertical side 10, base 12, and hypotenuse labeled a.

Diagram 2: Right triangle with the right angle at the upper-right corner. The top horizontal side is labeled f, the right vertical side is 2, and the left slanted side is 5.

****Question 13****

If the total area of this parallelogram is equal to 88 cm^2 , find the perpendicular height h.

Diagram description: A parallelogram with base labeled 11 cm and a perpendicular height labeled h cm (right angle shown).

****Question 14****

Find the circumference of a circle with a diameter of 18 cm.

Give your answer correct to 1 decimal place.

****Question 15****

The diagram shows the dimensions of a shed.

The shed is in the shape of a prism.

Its front face is in the shape of an isosceles triangle on top of a rectangle.

a) Work out the area of the front face of the shed.

Diagram description: The front face shows a rectangle with base 8 m and a total height of 10 m. The rectangle height is labeled 7 m, and the top is an isosceles triangle. The sloping roof side is labeled d. The shed length (depth) is labeled 9 m.

b) Hence work out the capacity of the shed in litres where $1 \text{ m}^3 = 1,000 \text{ litres}$.

****Question 16****

A full tin of paint in the shape of a cylinder has radius length 15 cm and height 24 cm. It has a lid and a base.

Work out the volume of paint in the tin.

****Question 17****

A solid sphere of chocolate fits exactly into a cube shaped box.
The radius of the sphere is 7 cm.

- A. Find the volume of the sphere. Give your answer in terms of π .
- B. Find the volume of the box.
- C. Find the volume of the box not occupied by the sphere.
Give your answer to the nearest cm^3 .
- D. What percentage of the box is not occupied by the chocolate sphere?