

**Cardinal Newman
Catholic School**
Holy Cross Catholic Multi Academy Company

**Year 10 into Year 11
SUMMER HOMEWORK**

Topic	RAG
Linear equations & inequalities	
Algebra skills – Factorise, expand & simplify	
Area & perimeter – Quadrilaterals and circles	
Volume & Surface Area	
Factorise Quadratic expressions	
Solve quadratic equations	
Direct & Inverse proportion	
Simultaneous Equations	
Percentages	
Trigonometry and Pythagoras theorem	

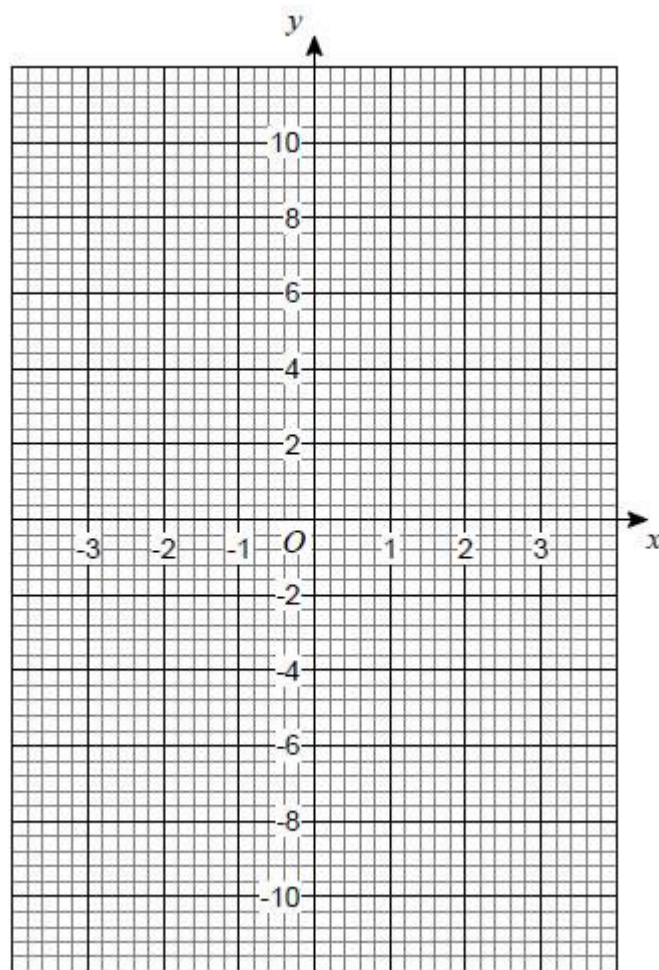
Q1.

(a) Complete the table for $y = 3x + 1$

x	-3	-2	-1	0	1	2	3
y	-8		-2		4		

(2)

(b) On the grid draw the graph of $y = 3x + 1$ for values of x from -3 to 3



(2)

(c) Solve $x = 3x + 1$

$x =$ _____

(2)

(Total 6 marks)

Q2.

A line has the equation $y = 4x - 5$

- (a) What is the gradient of the line?
Circle your answer.

-5 -4 4 5

(1)

- (b) What is the y-intercept of the line?
Circle your answer.

-5 -4 4 5

(1)

(Total 2 marks)

Q3.

A straight line

has gradient 4

and

passes through the point (5, 23)

Work out the equation of the line.

Give your answer in the form $y = mx + c$

Answer _____

(Total 3 marks)

Q4.

Multiply out $x(x - 4)$

Circle your answer.

$x^2 - 4$

$2x - 4$

$x^2 - 4x$

$-3x^2$

(Total 1 mark)

Q5.

Circle the expression equivalent to $x^2 - 4x - 12$

$(x - 4)(x - 8)$

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

$(x - 12)(x + 1)$

$(x + 2)(x - 6)$

(Total 1 mark)

Q6.

Simplify $7x + 5 - 8 - 3x$

Circle your answer.

x

$4x + 3$

$4x - 3$

$10x - 3$

(Total 1 mark)

Q7.

(a) Multiply out $3(2x - 7)$

Answer _____

(1)

(b) Factorise $x^2 + 8x$

Answer _____

(1)

(Total 2 marks)

Q8.

- (a) Factorise $x^2 - 9x + 20$

Answer _____

(2)

- (b) Solve $x^2 - 9x + 20 = 0$

Answer _____

(1)

(Total 3 marks)

Q9.

- (a) Factorise fully $9y^3 - 6y$

Answer _____

(2)

- (b) Factorise $3x^2 - 22x + 7$

Answer _____

(2)

(Total 4 marks)

Q10.

(a) Factorise $3x^2 - 13x - 10$

Answer _____

(2)

(b) Simplify $\frac{3x^2 - 15x}{3x^2 - 13x - 10}$

Answer _____

(2)

(Total 4 marks)

Q11. Solve $x^2 - x - 12 = 0$

Answer _____

(Total 3 marks)

Q12.

Use the quadratic formula to solve $5x^2 + 11x - 2 = 0$
Give your solutions to 2 decimal places.

Answer _____

(Total 3 marks)

Q13. Solve $5x^2 = 10x + 4$.

Give your answers to 2 decimal places.

Answer _____

(Total 4 marks)

Q14.

(a) Expand and simplify $(6x - 1)(2x + 3)$

Answer _____

(2)

(b) Solve $4x^2 + x - 3 = 0$

Answer _____

(3)

(Total 5 marks)

Q15. y is directly proportional to x .
Complete the table.

x	-8	0	7
y			63

(Total 2 marks)

Q16. The mass of an ornament is m grams.

The height of the ornament is h centimetres.

m is directly proportional to the cube of h .

$m = 1600$ when $h = 8$

(a) Work out an equation connecting m and h .

Answer _____

(3)

(b) Work out the mass of an ornament of height 12 centimetres.

Answer = _____ grams

(2)

(Total 5 marks)

Q17.

y is inversely proportional to x .

Complete the table.

x	12	6	
y		4	8

(Total 2 marks)

Q18.

y is inversely proportional to \sqrt{x}

$$y = 4 \text{ when } x = 9$$

(a) Work out an equation connecting y and x .

Answer _____

(3)

(b) Work out the value of y when $x = 25$

Answer _____

(2)

(Total 5 marks)

Q19.

y is inversely proportional to x and k is a constant.

Circle the correct equation.

$$y = \frac{k}{x}$$

$$y = kx$$

$$y = \frac{x}{k}$$

$$y = x - k$$

(Total 1 mark)

Q20.

y is inversely proportional to x^2 where $x > 0$

When $x = 2$, $y = 20$

- (a) Form an equation for y in terms of x .

Answer _____

(3)

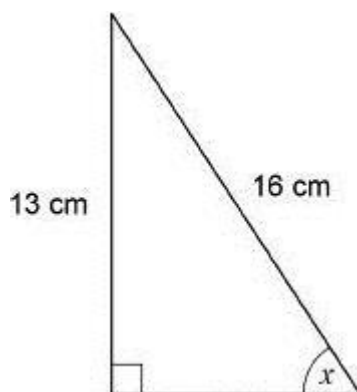
- (b) Work out the value of x when $y = 5$

Answer _____

(2)

(Total 5 marks)

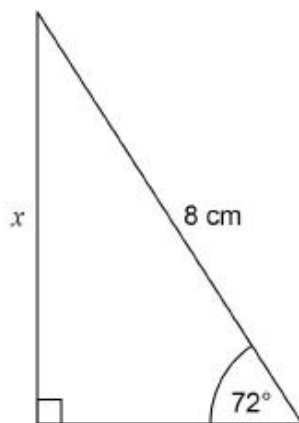
Q21. Here is a right-angled triangle.



Use trigonometry to work out the size of angle x .

Answer _____ degrees
(Total 2 marks)

Q22. Use trigonometry to work out the length x .

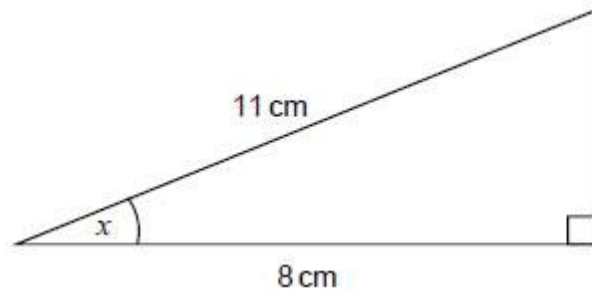


Not drawn accurately

Answer _____ cm
(Total 2 marks)

Q23.

- (a) Work out the size of angle x .

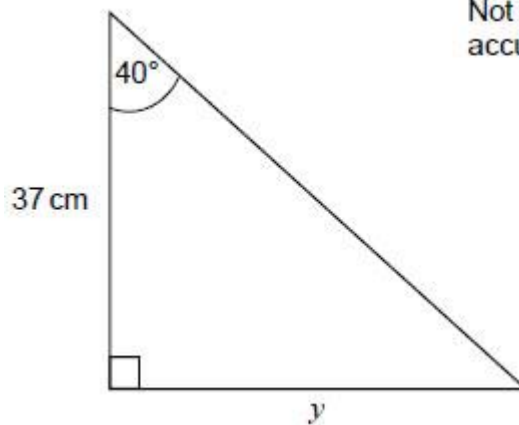


Not drawn accurately

Answer _____ degrees

(2)

- (b) Work out length y .



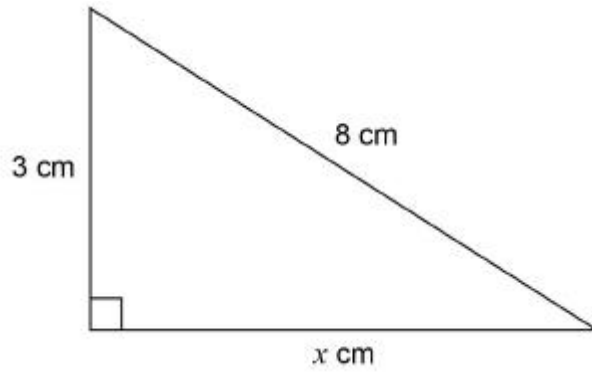
Not drawn accurately

Answer _____ cm

(2)

(Total 4 marks)

Q24.



Not drawn accurately

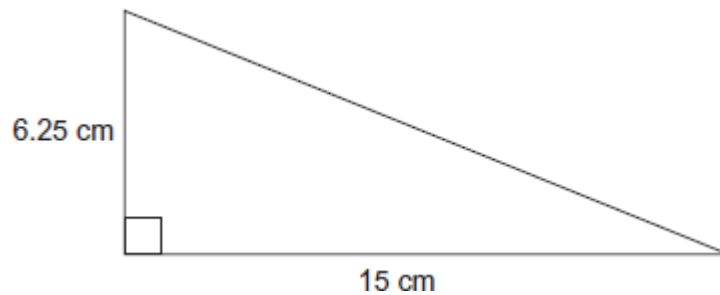
Work out the value of x as a decimal.

Answer _____

(Total 3 marks)

Q25.

Work out the length of the hypotenuse.



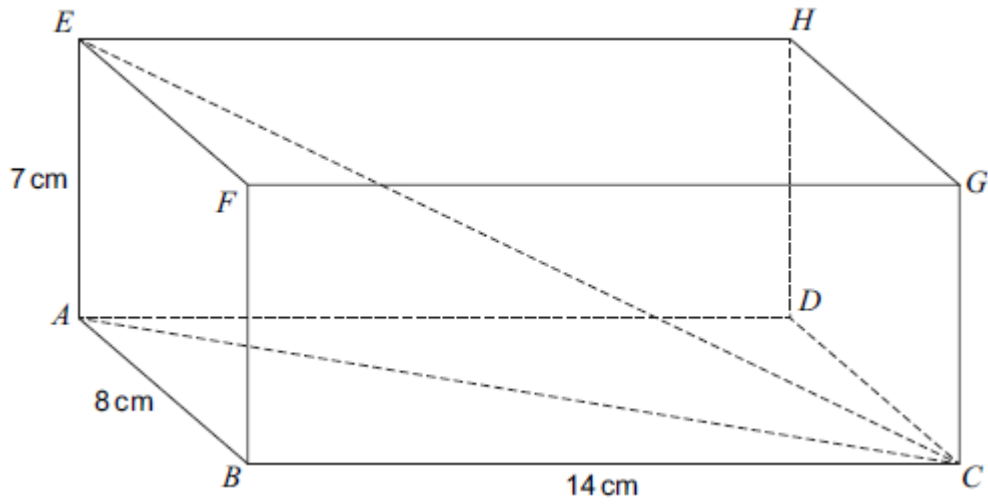
Not drawn accurately

Answer _____ cm

(Total 3 marks)

Q26.

ABCDEFGH is a cuboid.



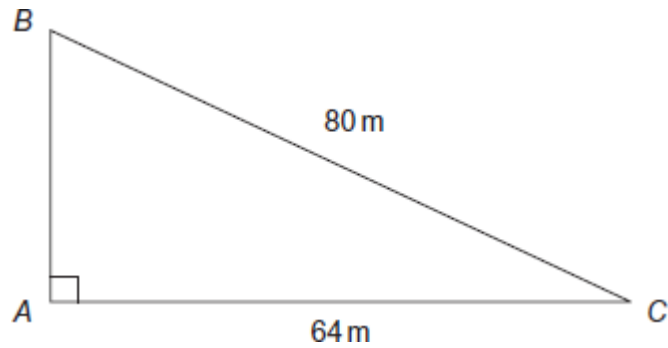
Work out the angle between *EC* and *ABCD*.

Answer _____ degrees
(Total 3 marks)

Q27.

This triangular plot of land is for sale.

Not drawn accurately



The land is sold for £ 6400 per acre.
1 acre = 4047 m²

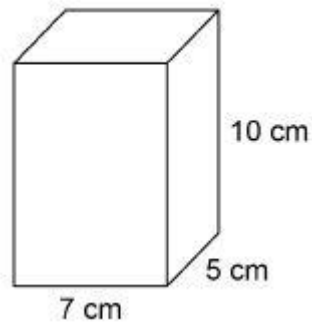
Work out the cost of the land.
Give your answer to 2 significant figures.

£ _____

(Total 6 marks)

Q28.

Here is a cuboid.



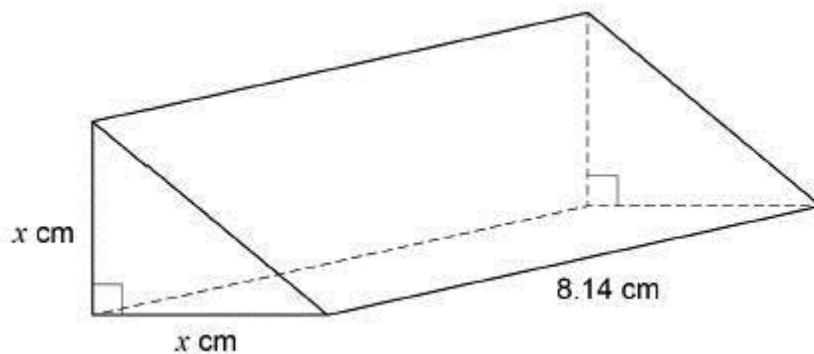
Work out the volume.

Answer _____ cm³

(Total 2 marks)

Q29.

The triangular cross section of a prism is an isosceles right-angled triangle.



The volume of the prism is 102 cm^3

Use approximations to estimate the value of x .

You **must** show your working.

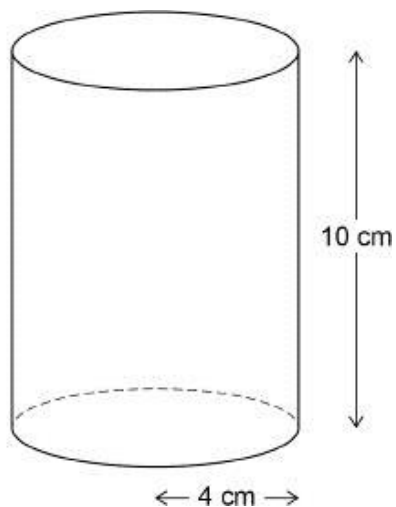
Answer _____

(Total 3 marks)

Q30. Here are two solids.

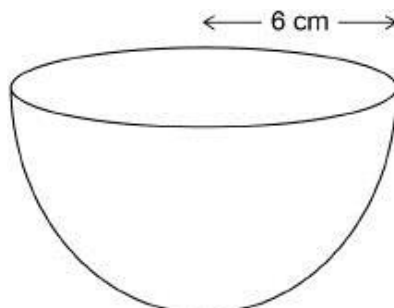
Cylinder

radius 4 cm height 10 cm



Hemisphere

radius 6 cm



$\text{volume of a hemisphere} = \frac{2}{3} \pi r^3 \text{ where } r \text{ is the radius}$
--

Which solid has the greater volume?

You **must** show your working.

Answer _____

(Total 4 marks)