

## OCR GCSE Mathematics Calculator 2023 Higher Paper 3 Revision Worksheet

9. A large box of chocolates contains dark, milk and white chocolates.

When Riley opens the box, the ratio of dark to milk to white chocolates is 3:2:4.

Riley's family eat 6 of the dark chocolates, none of the milk chocolates and all of the white chocolates.

The ratio of dark to milk chocolates is now 9:8. **How many white chocolates did Riley's family eat?**

10. (a)  $x$  and  $y$  are related by the equation  $xy = 36$ .

Tick the correct statement.

☐

$y$  is directly proportional to  $x$

☐

$y$  is inversely proportional to  $x$

☐

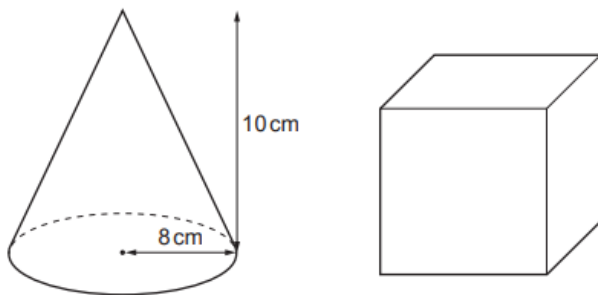
$y$  is not proportional to  $x$

(b)  $y$  is inversely proportional to  $x^4$ .  
 $y = 2.5$  when  $x = 2$ .

Find a formula linking  $x$  and  $y$ .

11. The diagram shows a cone and a cube.

The diagram shows a cone and a cube.  
The cone has radius 8 cm and height 10 cm.



The volume of the cone is equal to the volume of the cube.

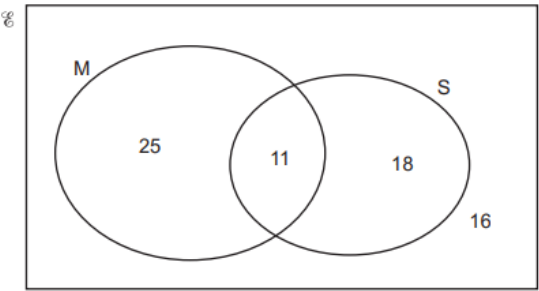
Work out the length of one side of the cube.

[The volume  $V$  of a cone with radius  $r$  and height  $h$  is  $V = \frac{1}{3}\pi r^2 h$ .]

12.

A cafe owner recorded information about customer orders for coffee. They recorded whether the customer asked for milk (M) and whether the customer asked for sugar (S).

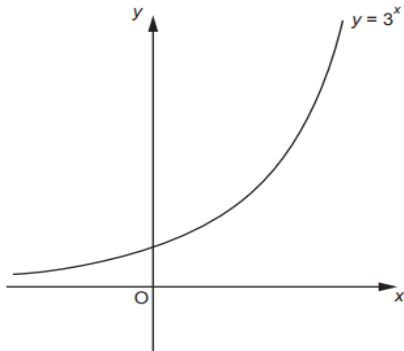
The results are shown in this Venn diagram.



- (a) One of the customers is chosen at random. Find the probability that the customer asked for sugar.
- (b) One of the customers is chosen at random. Find the probability that the customer asked for sugar given that they asked for milk.

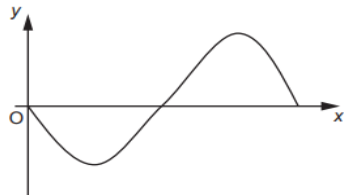
13. (a) The graph of  $y = 3^x$  is sketched below.

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On the same axes, sketch the graph of  $y = 2^x$ .

(b) Charlie sketches this graph.

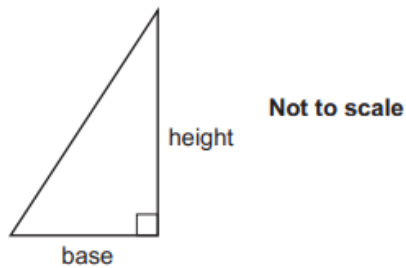


Charlie says  
The equation of my graph is  $y = \sin x$ .

- On the same axes, sketch the graph of  $y = 2^x$ . [3]
- (b) Charlie sketches this graph. Charlie says: "The equation of my graph is  $y = \sin x$ ."
- (i) Explain how you know that Charlie is not correct. [1]
- (ii) Write down a possible equation for Charlie's graph. (b)(ii) ..... [1]

14.

Here is a right-angled triangle.



The area of the triangle is  $100\text{cm}^2$ , correct to the nearest  $10\text{cm}^2$ .  
The length of the base of the triangle is  $8\text{cm}$ , correct to the nearest  $\text{cm}$ .

Calculate the largest possible height of the triangle.

15.

- (a) Sasha and Taylor are asked to find how many solutions the equation  $5(x+2)^2 = 45$  has.

Here is **Sasha's** answer.

$$\begin{aligned} 5(x+2)^2 &= 45 \\ (x+2)^2 &= 9 \\ x+2 &= 3 \\ x &= 1 \end{aligned}$$

There is one solution.

Here is **Taylor's** answer.

$$\begin{aligned} 5(x+2)^2 &= 45 \\ (x+2)^2 &= 9 \\ x+2 &= 3 \text{ or } x+2 = -3 \\ x &= 1 \text{ or } x = -5 \end{aligned}$$

There are two solutions.

Decide who is correct, Sasha or Taylor, and give the reason for your decision.

..... is correct because .....

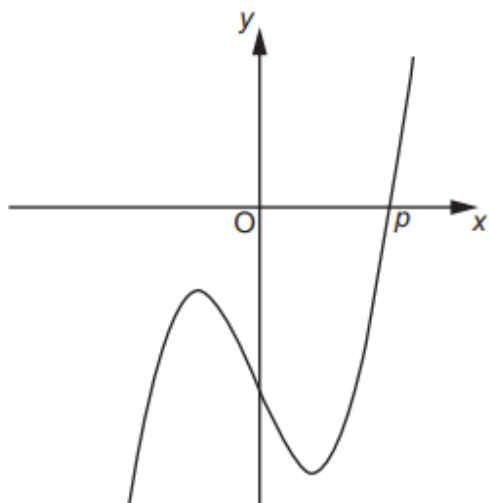
..... [1]

- (b) Solve this equation algebraically.  
Give your answers correct to **2** decimal places.  
You must show your working.

$$x^2 - 5x + 3 = 0$$

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The graph of  $y = x^5 - 70x - 150$  is sketched below.  
The root of the equation  $x^5 - 70x - 150 = 0$  is  $p$ .



(a) Show that  $3 < p < 4$ .

(b) Find a smaller interval that contains the value of  $p$ .  
You must show calculations to support your answer.