

- 8 (a) Show that the lines $y = 3x + 7$ and $2y - 6x = 8$ are parallel.
Do **not** use a graphical method.

box

[3 marks]

- 8 (b) Is the point $(-5, -6)$ above, below or on the line $y = 3x + 7$?
Tick **one** box.

☐

Above

☐

Below

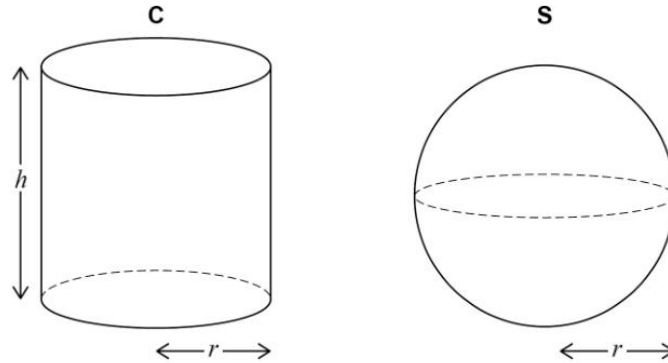
☐

On the line

You **must** show your working.
Do **not** use a graphical method.

[2 marks]

- 21 A cylinder, C, and a sphere, S, each have radius r
C has height h



Volume of a sphere = $\frac{4}{3}\pi r^3$
where r is the radius

- 21 (a) volume of C = volume of S
Work out the ratio $r : h$
You **must** show your working.

[3 marks]

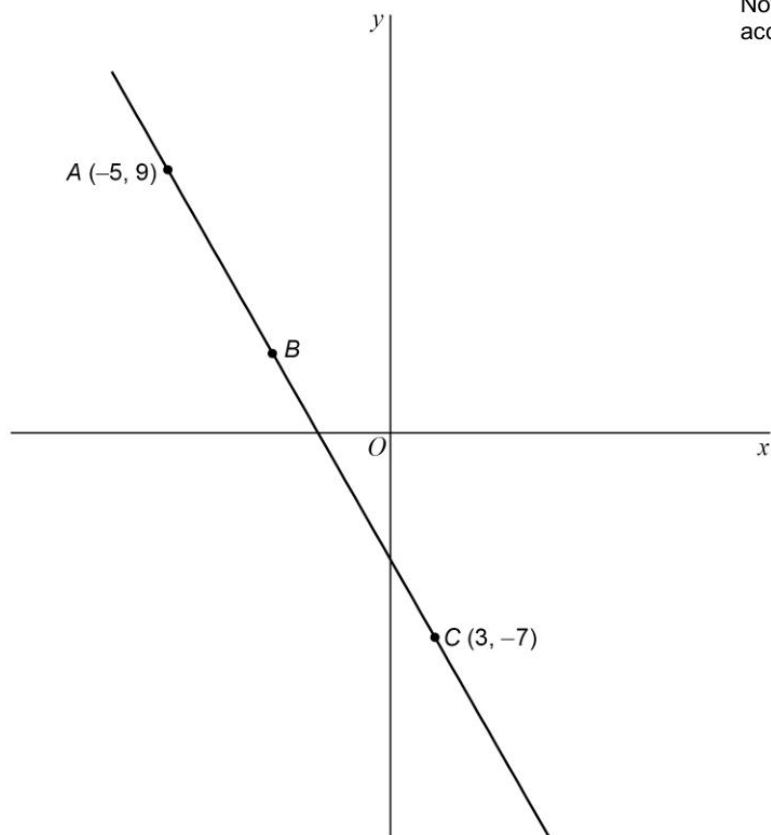
Answer _____ :

- 21 (b) A **different cylinder** has radius $3r$ and height $2h$.
How many times bigger is the volume of this cylinder than the volume of C?

[2 marks]

Answer _____

- 15 A straight line passes through points $A(-5, 9)$, B and $C(3, -7)$.



Not drawn
accurately

- 15 (a) $AB : BC = 1 : 3$

Work out the coordinates of point B .

[3 marks]

Answer (_____ , _____)

- 15 (b) Work out the equation of the line perpendicular to AC that passes through C .

[4 marks]

Answer _____

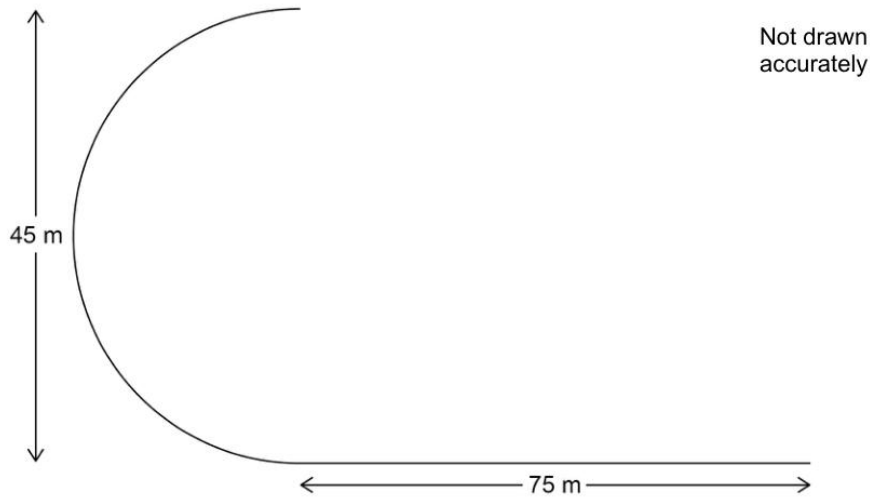
11

Part of a running track is the arc of a semicircle joined to a straight line.

The semicircle has diameter 45 metres.

The straight line has length 75 metres.

box



Abby runs once along this part of the track in 18 seconds.

Work out her average speed.

Give your answer to 2 significant figures.

[4 marks]

Answer _____ m/s

5

Laura works in a shop.

The table shows the number of hours she works on two weekends.

	Saturday	Sunday
Weekend 1	3	2
Weekend 2	$5\frac{1}{2}$	$3\frac{1}{2}$

Work out the percentage increase in her **total** hours from Weekend 1 to Weekend 2

[3 marks]

Answer _____ %

box

box

Volume of a cone = $\frac{1}{3}\pi r^2 h$ where r is the radius and h is the perpendicular height

perpendicular height h cm

Give your answer in the form $a : b$ where a and b are integers.

[4 marks]

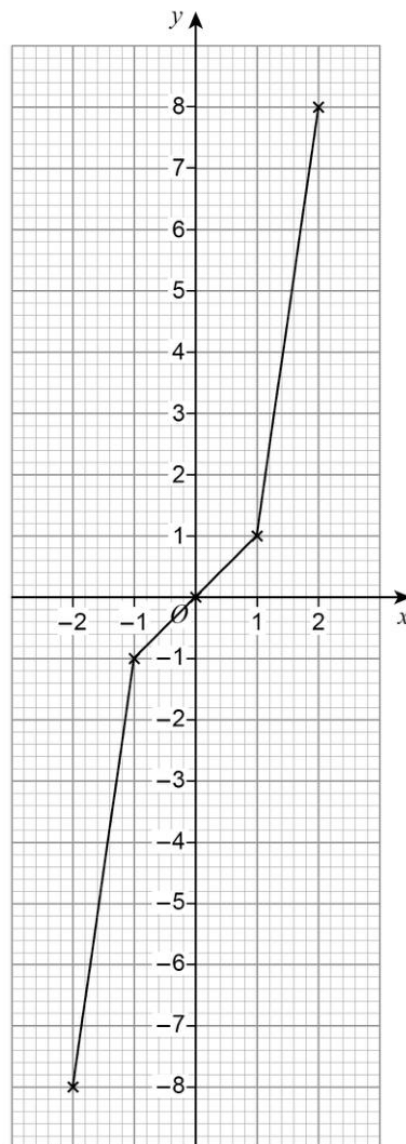
[illegible]

Answer _____ :

12

Lewis wants to draw the graph $y = x^3$ for values of x from -2 to 2 . Here is his graph.

box



Make **one** criticism of his graph.

[1 mark]

7

$$k = n^2 + 9n + 1$$

box

Mo says,

" k will be a prime number for all integer values of n from 1 to 9"

Show that Mo is wrong.

You **must** show that your value of k is **not** prime.

[3 marks]

- 4** Work out the lowest common multiple (LCM) of 20, 30 and 40
Circle your answer.

box

[1 mark]

10

120

240

24 000

[3 marks]

[illegible]

Answer

14

Phil sells ties.

He increases the original price of each tie by 10% to £13.20

A month later he announces a sale.



Phil says,

"The ties will be back to their original price, because each change was by 10%"

Is he correct?

Tick a box.

☐

Yes

☐

No

Show working to support your answer.

box

27

A bag contains 30 discs.
10 are red and 20 are blue.

One disc is taken out at random and replaced by **two** of the other colour.

Another disc is then taken out at random and replaced by **two** of the other colour.

Another disc is then taken out at random.

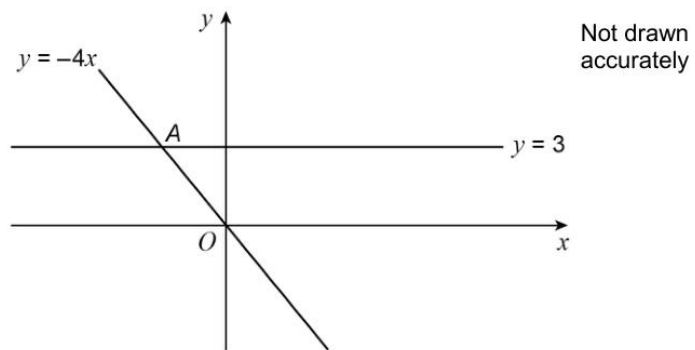
Work out the probability that all three discs taken out are **red**.

[3 marks]

Answer _____

box

- 16 Two straight lines intersect at point A.



Circle the coordinates of A.

[1 mark]

$(-\frac{3}{4}, 3)$

$(-4, 3)$

$(-12, 3)$

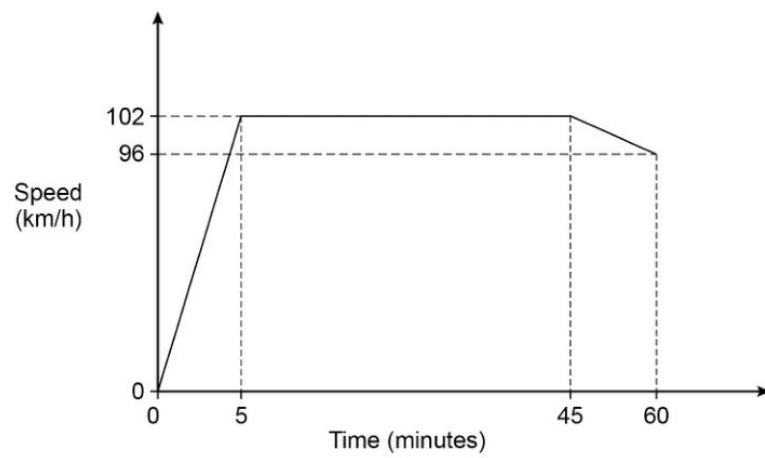
$(-\frac{4}{3}, 3)$

- 11 Millie is estimating the value of $\frac{1}{(\sqrt[3]{8.34})^2 \times 10.21}$
- She rounds each decimal number to 1 significant figure.
- 11 (a) Work out Millie's estimate.
You **must** show your working. [2 marks]
- _____
- _____
- _____
- _____
- _____
- _____
- Answer _____
- 11 (b) Millie says,
"My estimate must be more than the exact value."
Without working out the exact value, give a reason how she can know this. [1 mark]

25

Here is a sketch of a speed-time graph for the first part of a journey.

DOX



The total distance for the journey is 130 kilometres.

How far is left to travel?

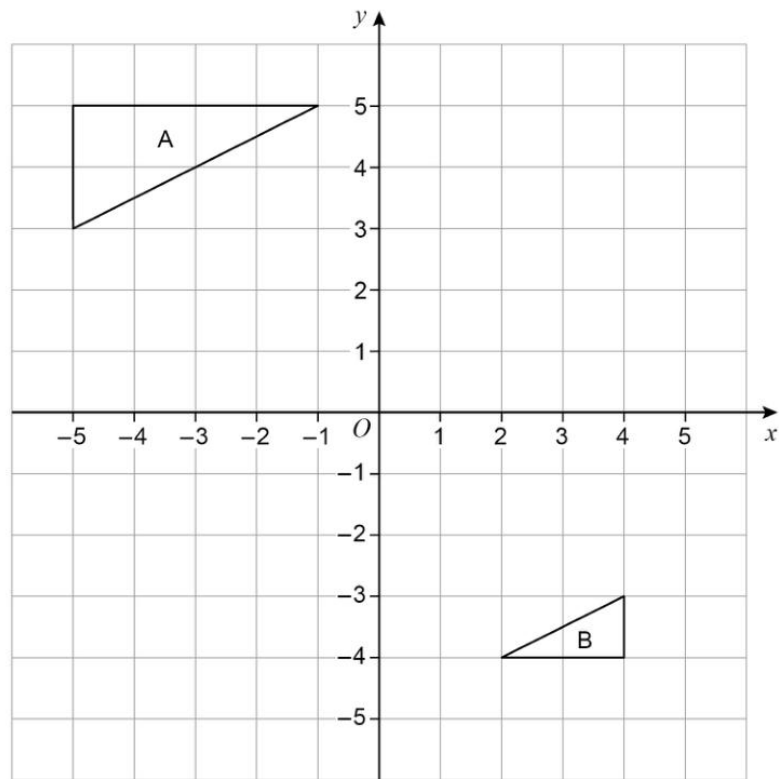
[4 marks]

Answer

km

- 24 Shape A and shape B are shown on the grid.

box



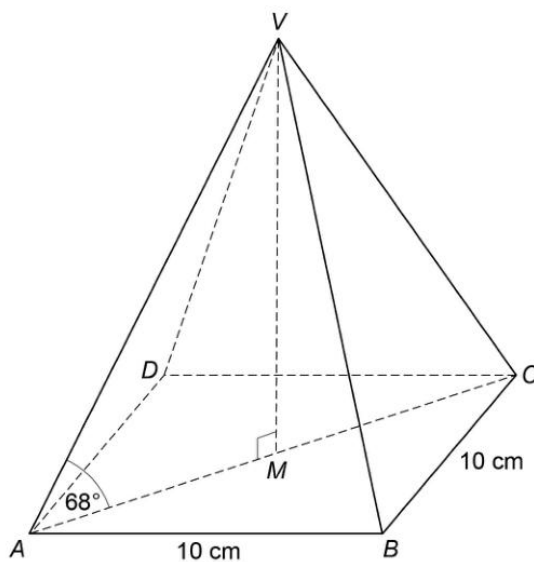
Describe the **single** transformation that maps shape A to shape B.

[3 marks]

$VABCD$ is a square-based pyramid.

Angle VMA is 90°

Angle VAM is 68°



$$\text{Volume of pyramid} = \frac{1}{3} \times \text{area of base} \times \text{perpendicular height}$$

[6 marks]

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Answer _____ cm^3

21

 N is a number.As a product of prime factors in index form $N = 2 \times 3^4 \times y^3$ Work out $3N^2$ as a product of prime factors in index form.Give your answer in terms of y .**[3 marks]**

Answer

20

w is a positive number.

x is 10% more than w .

y is 10% less than x .

Which statement is true?

Tick **one** box.

[1 mark]

$w < x$ and $w < y$

☐

$w < x$ and $w = y$

☐

$x > y$ and $w > y$

☐

$x > y$ and $w = y$

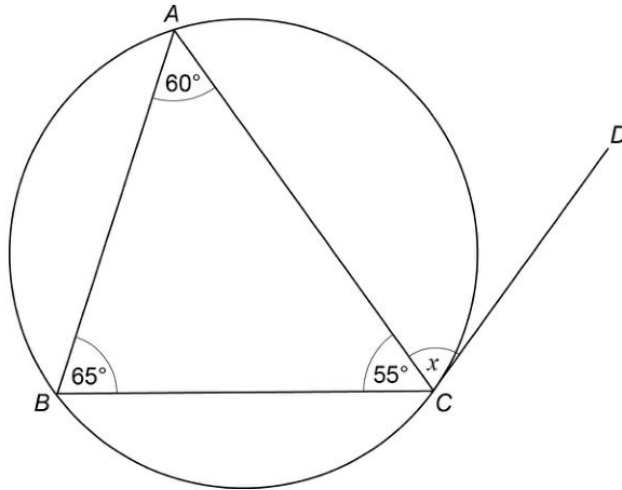
☐

19

A , B and C are points on a circle.

CD is a tangent to the circle.

Not drawn
accurately



Write down the size of angle x .

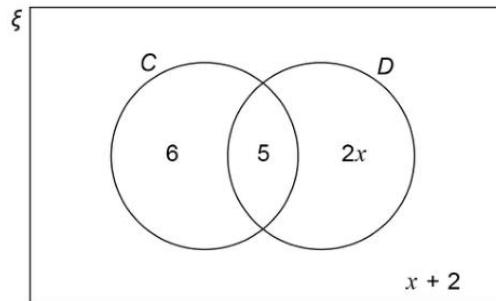
Give a reason for your answer.

[2 marks]

Answer _____ degrees

Reason _____

- 14** In the Venn diagram
 ξ represents 31 students in a class
 C is students who have a cat
 D is students who have a dog



- 14 (a)** One student from the class is picked at random.
Work out the probability that the student has a dog.

[3 marks]

Answer _____

- 14 (b)** One of the students who has a cat is picked at random.
Work out the probability that this student has a dog.

[1 mark]

Answer _____

27 Prove that $x^2 + x + 1$ is always positive.

[3 marks]

- 14 $xy = c$ where c is a constant.
Circle the correct statement.

[1 mark]

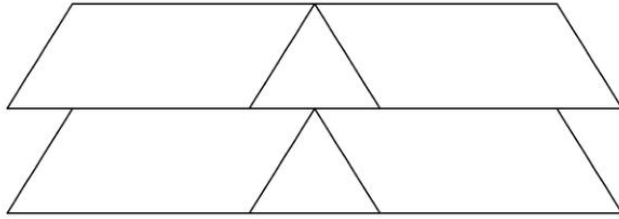
y is directly proportional to x

y is directly proportional to $\frac{1}{x}$

y is inversely proportional to $\frac{1}{x}$

x is directly proportional to y

- 8 This shape is made from two triangles and four congruent parallelograms.



Not drawn
accurately

For each statement, tick the correct box.

- 8 (a) The triangles are equilateral.

[1 mark]

☐

Must be true

☐

Could be true

☐

Must be false

- 8 (b) The triangles are congruent.

[1 mark]

☐

Must be true

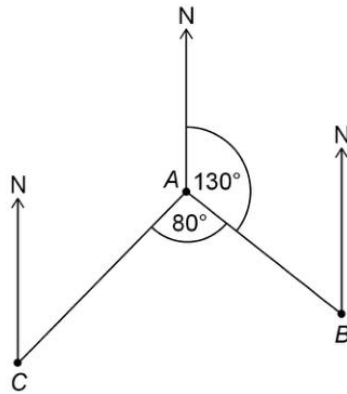
☐

Could be true

☐

Must be false

4



Not drawn
accurately

Work out the bearing of *C* from *A*.
Circle your answer.

[1 mark]

030°

130°

150°

210°

17

Solve $\frac{x+8}{2} + \frac{9-x}{5} = 4$

box

[4 marks]

 $x =$ _____