Question 1 **20 Marks**

The songs on Gavin's phone are shown in the table below.

Singer	Number of songs
Usher	
Pharrell	15
Ed Sheeran	4
Hozier	3

Gavin has **30 songs** on his phone, in total.

(a) Find how many songs by Usher are on Gavin's phone.

$$30 - (15 + 4 + 3) = 30 - 22$$
$$= 8.$$

Gavin plays a song at random on his phone.

(b) Find the **probability** that this song is by Hozier.

$$\frac{3}{30} \quad \textbf{or} \quad \frac{1}{10}.$$

(c) Find the **probability** that this song is by Ed Sheeran **or** Pharrell.

$$\frac{15+4}{30} = \frac{19}{30}.$$

Gavin plays a song by Ed Sheeran, and then plays a song by Hozier.

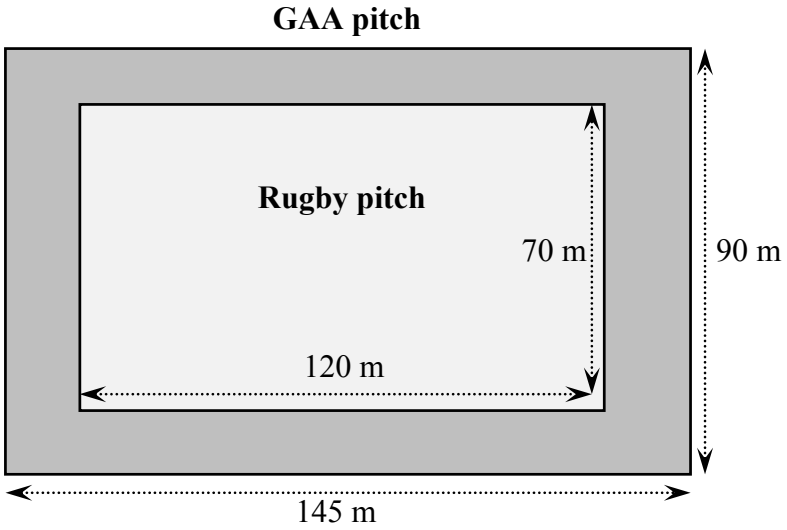
(d) In **how many different ways** can he do this?
Remember that he has 4 songs by Ed Sheeran and 3 songs by Hozier.

$$3 \times 4 = 12.$$

Question 2 **20 Marks**

When the Irish rugby team played in Croke Park, a rugby pitch was made inside the GAA pitch.

The GAA pitch was 145 m long and 90 m wide.
The rugby pitch was 120 m long and 70 m wide.



(a) Find the **area** of each pitch.

Area of GAA pitch:	Area of rugby pitch:
Area = length × width = 145 × 90 = 13,050 m^2.	Area = length × width = 120 × 70 = 8,400 m^2.

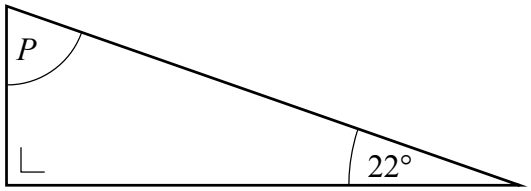
(b) What area of the GAA pitch was **not** used for rugby?

13,050 – 8,400 = 4,650 m^2.

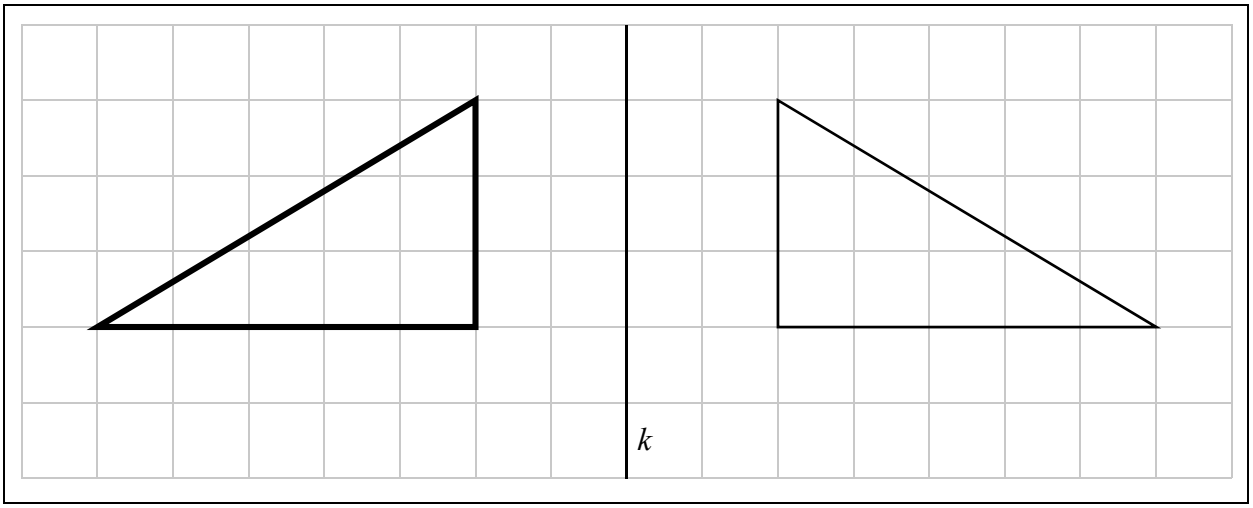
Question 3 **30 Marks**

(a) **Calculate** the size of the angle marked P in the right-angled triangle below.

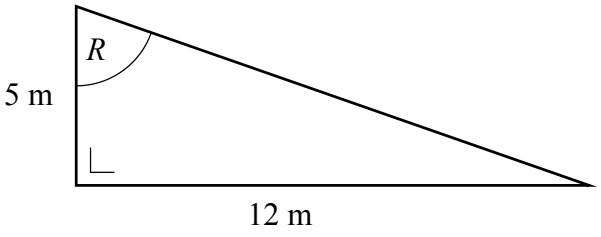
$180 - 90 - 22 = 68°.$



(b) Draw the image of the triangle below under **axial symmetry** in the line k.



(c) **(i)** Write down the length of the side **opposite** the angle R in the triangle shown.



Opposite = 12 m.

(ii) Use the Theorem of **Pythagoras** to find the length of the **hypotenuse** of this triangle.

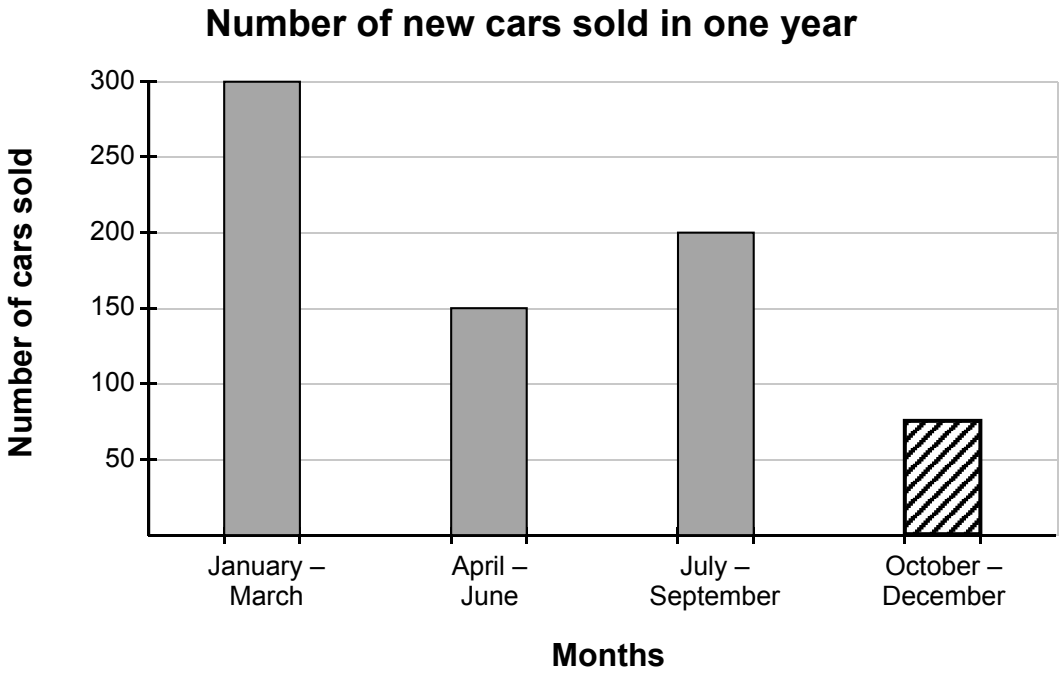
$\sqrt{5^2 + 12^2} = \sqrt{25 + 144}$

$= \sqrt{169}$

$= 13$ m.

Question 4 **25 Marks**

The diagram shows the number of new cars sold in a garage in one year.



(a) How many new cars were sold in the months **April – June**?

150.

In the months **October – December**, there were exactly **half** as many new cars sold as in April – June.

(b) How many new cars were sold in **October – December**?

$150 \div 2 = 75.$

(c) **Draw** the bar for **October – December** on the diagram above.

[See diagram above.]

(d) When were the **most** new cars sold? Put a tick (✓) in the correct box.

January – March	April – June	July – September	October – December
☑	❒	❒	❒

(e) Calculate the **total** number of new cars sold in the year.

300 + 150 + 200 + 75 = 725.

(f) Calculate the **average** (mean) number of new cars sold **per month** in the year.
Give your answer correct to one decimal place.

725 ÷ 12 = 60·416666...

= 60·4 (1 decimal place).

Question 5 **15 Marks**

(a) One of the following is a description of the **mode** of a list.
Put a tick (✓) in the correct box to show which one.

Description	Put a tick (✓) in **one** box
The **middle** value in an ordered list	
The **biggest** value in a list	
The **most common** value in a list	✓

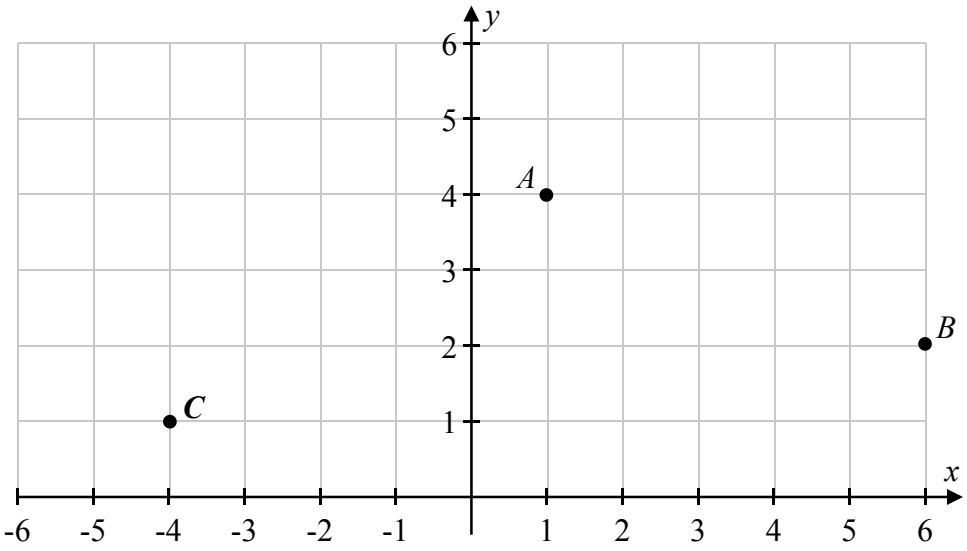
(b) Write out a list that has a mode, and write down the mode of your list.

List: Bob, Bob, Hugo.

Mode: Bob.

Question 6 **40 Marks**

The points A and B are shown on the co-ordinate grid below.



(a) Write down the co-ordinates of the point A.

$A = (1, 4)$.

B is the point $(6, 2)$.

(b) Find the **length** of $[AB]$. Give your answer in the form $\sqrt{x}$, where $x \in \mathbb{N}$.

$\sqrt{(6-1)^2+(2-4)^2} = \sqrt{(5)^2+(-2)^2}$ $= \sqrt{25+4}$ $= \sqrt{29}$.

C is the point $(-4, 1)$.

(c) **Plot** the point C on the co-ordinate grid above.
Label the point C clearly.

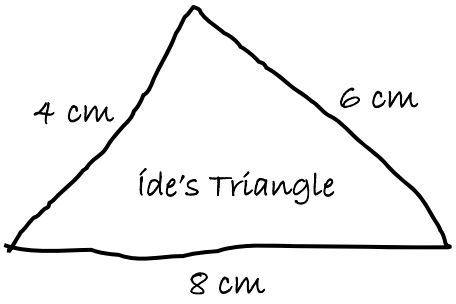
See diagram above.

(d) Find the **slope** of the line CA.

$\frac{\text{rise}}{\text{run}} = \frac{3}{5}$
OR
$m = \frac{4-1}{1-(-4)} = \frac{3}{5}$

Question 7 **25 Marks**

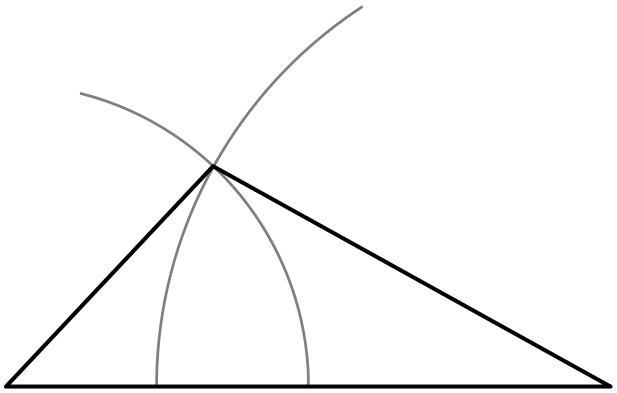
Íde draws the sketch of the triangle shown. The lengths of the sides are 4 cm, 6 cm, and 8 cm.



(a) What type of triangle has Íde sketched? Put a tick (✓) in the correct box.

Type of Triangle	Put a tick (✓) in **one** box
Isosceles	
Scalene	✓
Equilateral	

(b) **Construct** Íde's triangle in the box below. Show your construction lines clearly.



(c) Measure the biggest angle in your triangle from part **(b)**.
Write the size of this angle into the box below, correct to the nearest degree.

Size of biggest angle = 104° **or** 105°

Question 8 **30 Marks**

The marks that 9 students got on a test are:

23	16	13	30	26	15	18	23	20

(a) Write out all 9 marks **in order**, from the smallest to the biggest.

Answer =

13	15	16	18	20	23	23	26	30

(b) Write down the **median** mark.

Median mark = 20

(c) Find the **range** of the marks.

Maximum – Minimum = 30 – 13

= 17.

The teacher **adds 2 marks** onto each student's mark.

(d) Find the **new range** of the marks.

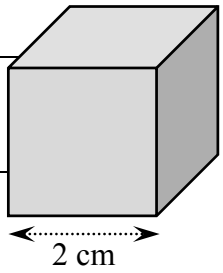
New Max – New Min = 32 – 15

= 17.

Question 9 **25 Marks**

A cube has sides of length 2 cm.

(a) Find the **volume** of the cube.

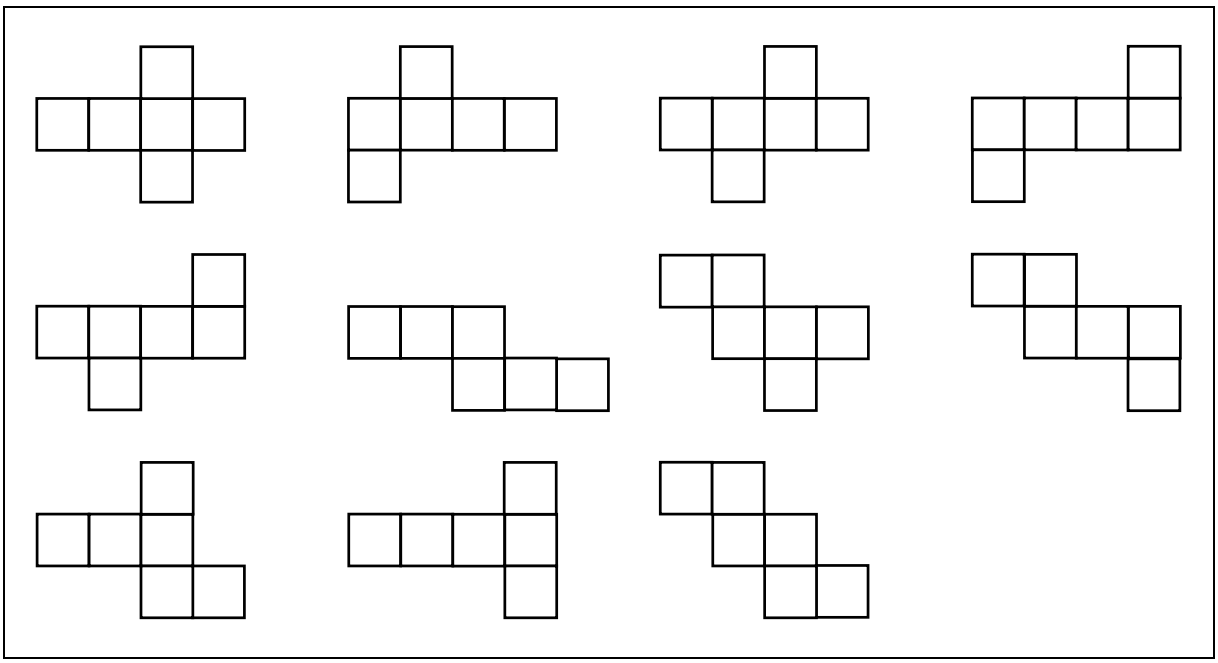


$2 \times 2 \times 2 \quad = 8 \text{ cm}^3$.

(b) How many **faces** does a cube have?

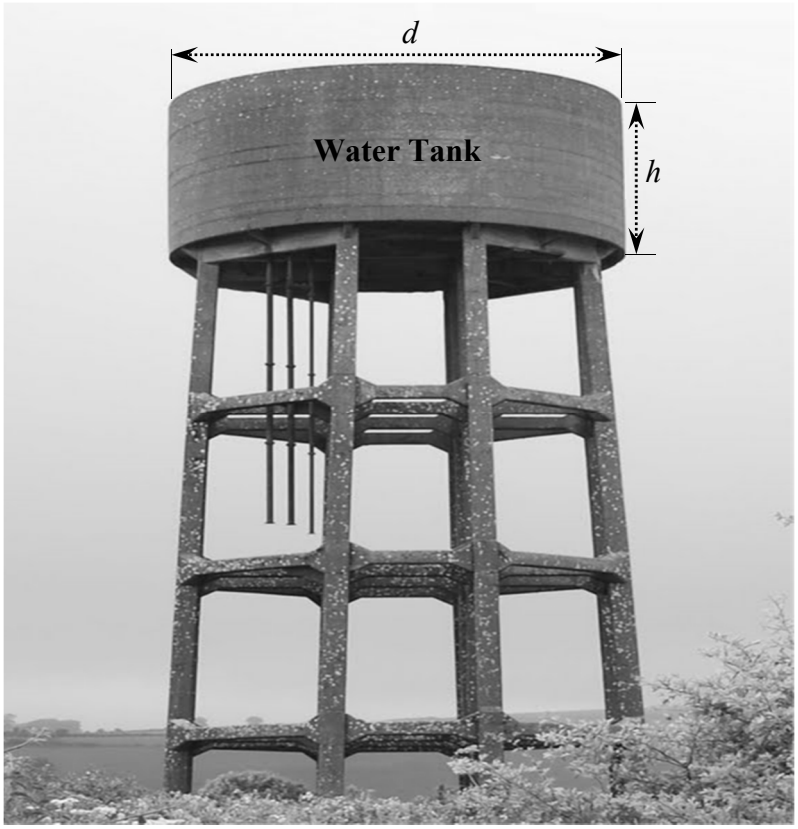
6.

(c) Draw a **net** of the cube, as accurately as you can.



Question 10 **30 Marks**

The photograph shows a water tank in the shape of a cylinder.
The height (h) and diameter (d) of the tank are marked.



Source: www.watertowersofireland.com. Altered.

(a) Using your **ruler**, find the height and the diameter of the tank in the photograph.
Give each answer correct to the nearest centimetre.

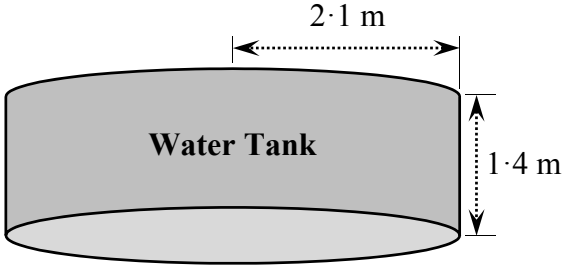
$h = 2$ cm.	$d = 6$ cm.

Jenny thinks that the **actual height** of the water tank is 1 m.

(b) Use Jenny's value to find the **actual diameter** and the **actual radius** of the tank.
Give each answer in metres.

Actual diameter $= 6 \div 2$ $= 3$ m.	Actual radius $= 3 \div 2$ $= 1{\cdot}5$ m.

Colm finds other values for the actual height and the actual radius of the tank.
They are shown in the diagram below.



(c) Use Colm's values to find the **volume** of the tank.
Give your answer in m^3, correct to one decimal place.

Volume = $\pi r^2 h$

= $\pi \times 2{\cdot}1 \times 2{\cdot}1 \times 1{\cdot}4$

= 19·38636...

= 19·4 m^3 (1 decimal place).

Question 11 **20 Marks**

(a) Use your calculator to find the value of each of the following.
Give each answer correct to two decimal places.

(i) sin 20° = 0·34 and cos 70° = 0·34

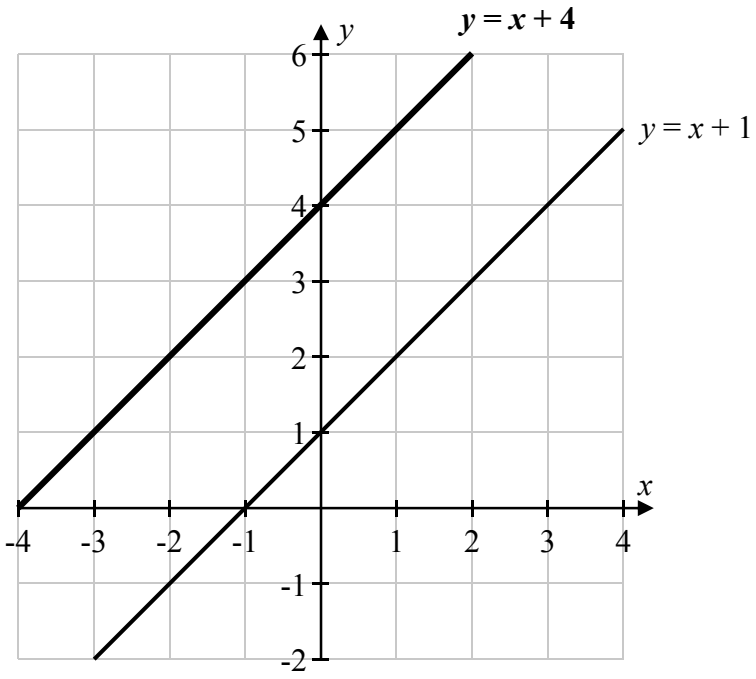
(ii) sin 50° = 0·77 and cos 40° = 0·77

(b) Hence, or otherwise, fill in the correct angle below.

sin 10° = cos 80 °

Question 12 **20 Marks**

The graph of the line $y = x + 1$ is shown on the co-ordinate grid below.



(a) Write down the co-ordinates of the point where this line crosses the ***y*-axis**.

(0 , 1)

(b) Write down the co-ordinates of the point where the line $\boldsymbol{y = x + 4}$ crosses the ***y*-axis**.

(0 , 4)

(c) Hence, or otherwise, **draw** the graph of the line $y = x + 4$ on the co-ordinate grid above.

[See diagram above.]