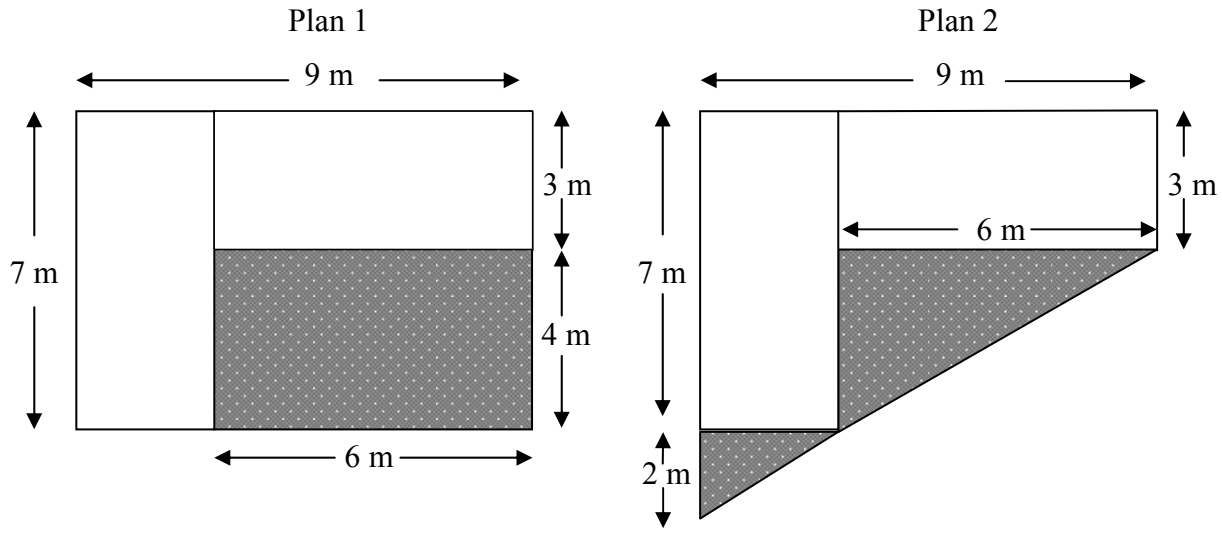
Question 1 **(suggested maximum time: 5 minutes)**

Niamh wants to extend her kitchen. She has two plans.
The extension is the shaded area in each plan.



(a) Find the area of the extension for each plan.

Plan 1

Plan 2

(b) Which plan adds the biggest area to the kitchen? Tick the correct box.

Plan 1 ☐ Plan 2 ☐

(c) How many extra square metres would Niamh have if she uses this plan rather than the other plan?

Question 2 **(suggested maximum time: 10 minutes)**

The data in the table below is taken from *CensusAtSchool*.
The data gives information about how students recycle soft drink cans.

Student	Gender	Age	Year	Location	Cans Bought	Cans Recycled
A	Female	12	1st Year	Dublin	6	2
B	Male	13	1st Year	Tipperary	0	0
C	Male	14	2nd Year	Cork	1	1
D	Female	15	5th Year	Cavan	0	0
E	Male	15	4th Year	Cork	2	1
F	Male	13	1st Year	Offaly	5	2
G	Female	17	5th Year	Westmeath	1	1
H	Male	17	5th Year	Westmeath	2	0
I	Male	13	1st Year	Mayo	1	1
J	Male	13	2nd Year	Galway	2	2
K	Male	17	5th Year	Kilkenny	5	5
L	Female	12	1st Year	Dublin	3	1
M	Female	17	6th Year	Kerry	2	1
N	Female	17	5th Year	Dublin	3	1

(a) How many students are in the sample?

(b) Complete the table below to show the **junior** students (1st to 3rd year) in the sample and to show how many cans they each bought and recycled.

Student	**A**						**L**
Cans Bought	**6**						**3**
Cans Recycled	**2**						**1**

(c) How many soft drink cans were bought by the junior students?

(d) How many soft drink cans were recycled by the junior students?

(e) Based on the data, would you conclude that the junior students from this sample are better at recycling than the senior students (4^{th} to 6^{th} year)?
Use calculations to justify your answer.

Question 3 **(suggested maximum time: 10 minutes)**

A hurling match is played between Team A and Team B.
A player on Team A, Fiachra, has the ball and attempts to score.
The probability of Fiachra scoring a point is 0·6 and the probability of him scoring a goal is 0·1.

(a) Is Fiachra more likely to score a point or a goal?

(b) What is the probability that Fiachra will not score a point in this attempt?

A player on Team B, Peadar, has the ball and attempts to score. The probability of Peadar scoring a point is 0·7 and the probability of him scoring a goal is 0·2.

(c) Peadar is more likely to score than Fiachra.
Give a reason why this is true.

(d) A spectator says "Peadar will always score more than Fiachra in a game between the two teams".

Do you agree with the spectator?

Yes ☐ No ☐

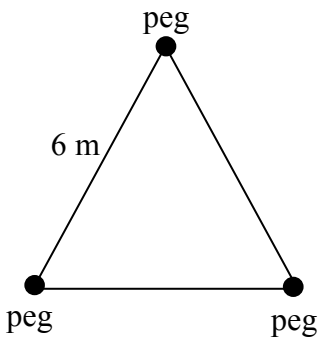
Give a reason for your answer.

(e) A penalty is awarded to Team B.
The goalkeeper for Team A has saved 12 penalties out of 20 this season.

What is the probability that the goalkeeper will save the penalty based on his previous record?

Question 4 **(suggested maximum time: 5 minutes)**

Amy is a scout. The scoutmaster has made an equilateral triangle with pegs and a rope as shown in the diagram. Amy measures one side of the triangle.
It is 6 m in length.



(a) Find the perimeter of the triangle.

(b) Construct an accurate scale diagram of the equilateral triangle in the space below.
Use a scale of 1 cm to represent 1 m.

Question 5 **(suggested maximum time: 5 minutes)**

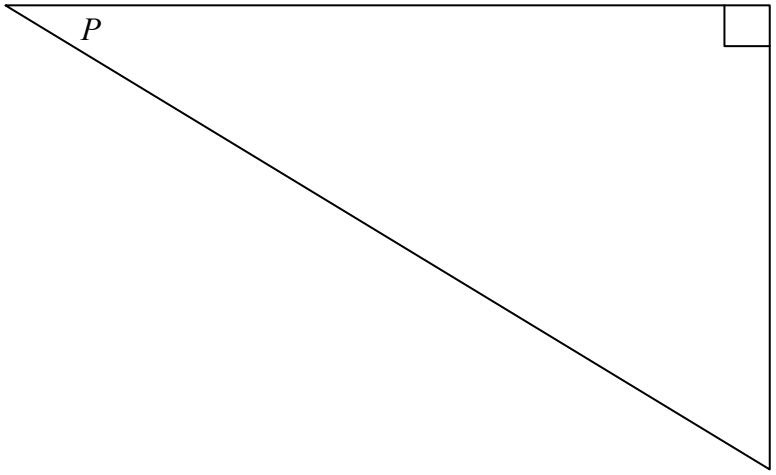
(a) Use your calculator to find the following trigonometric ratios.
Write each answer correct to four decimal places.

sin 25° = _____

cos 39° = _____

tan 40° = _____

(b) The angle P is shown in the triangle below.

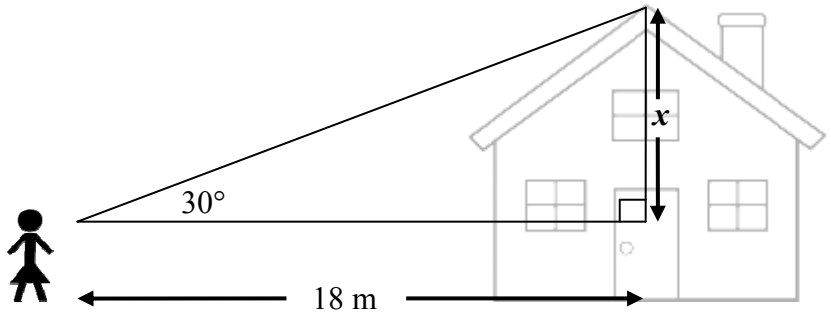


(i) On the diagram, clearly label the side opposite the angle P.

(ii) On the diagram, clearly label the side adjacent to the angle P.

(iii) If the length of the opposite side is 9 and the length of the adjacent side is 12, find the length of the hypotenuse.

Question 6 **(suggested maximum time: 5 minutes)**



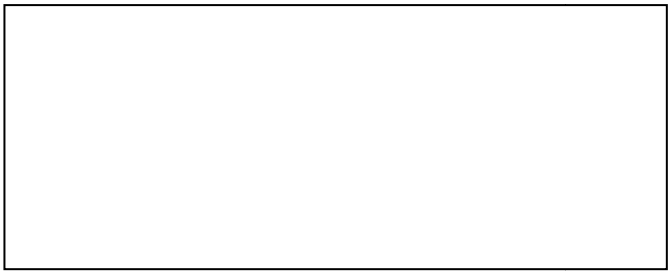
Jasmine wants to find the height of her house. She measures the angle of elevation of the top of the roof using a clinometer. The angle is 30°. She is standing 18 m from the point on the ground directly below the apex of the roof. Jasmine draws the diagram above to show this information.

(a) Use Jasmine's measurements to find x.
Write your answer in metres correct to one decimal place.

(b) What other information is needed to find the height of the house?

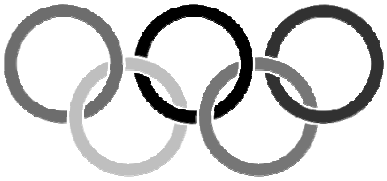
Question 7 **(suggested maximum time: 10 minutes)**

(a) The perimeter of a rectangle is 28 cm. The length of the rectangle is 9 cm.
Find the width of the rectangle.



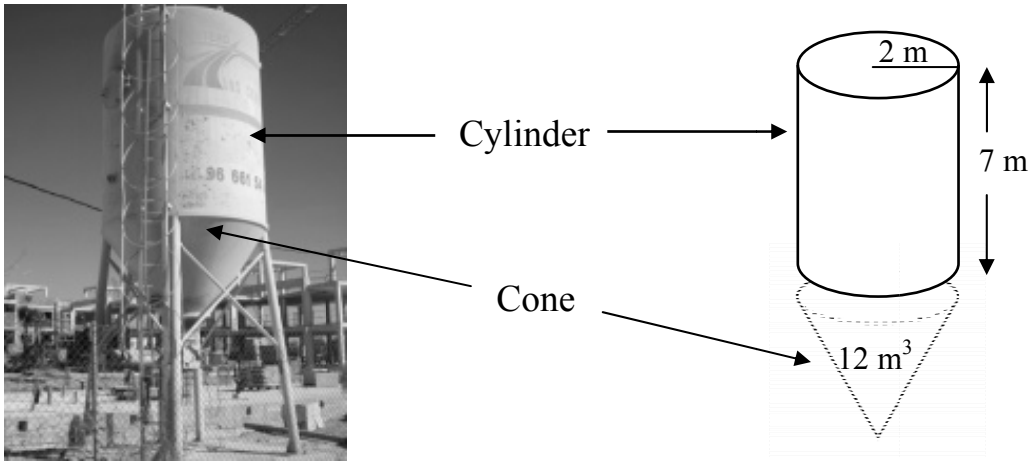
9 cm

(b) The symbol for the Olympic Games is five intersecting rings. The rings represent the five continents which compete in the games. The radius of each ring is 4 m.
Find the total circumference of the five rings. Use $\pi = 3{\cdot}142$.



Question 8 **(suggested maximum time: 10 minutes)**

Cement is stored in a silo in the shape of a cylinder on a cone as shown in the diagram.



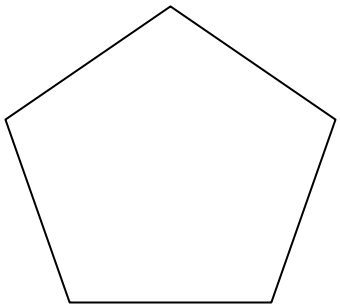
(a) The height of the cylinder is 7 m and the radius is 2 m.
Find the volume of the cylinder. Use $\pi = 3{\cdot}142$.
Give your answer correct to the nearest m^3.

(b) The volume of the cone is 12 m^3.
Find the total volume of cement in the silo when it is full. Give your answer correct to the nearest m^3.

(c) If 1 m^3 of cement weighs 2·5 tonnes, what is the total weight of the cement in the silo?

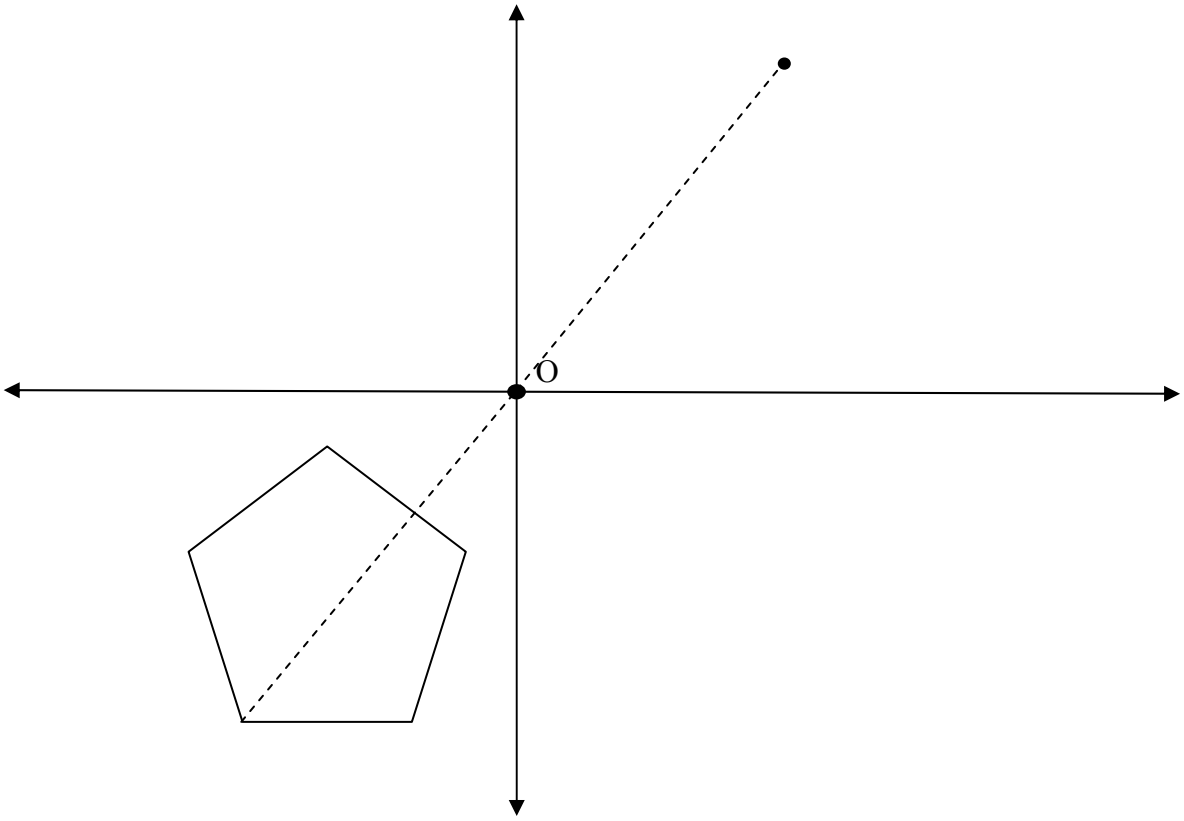
Question 9 **(suggested maximum time: 5 minutes)**

(a) Draw two axes of symmetry of the regular pentagon shown in the diagram below.



(b) What is the total number of lines of symmetry of a regular pentagon?

(c) Complete the image of the pentagon under a central symmetry in the origin.



Question 10 **(suggested maximum time: 10 minutes)**

(a) Convert the following times to the 24 hour clock.

(i) 1.30 pm = _____

(ii) 7.15 am = _____

(iii) 9.50 pm = _____

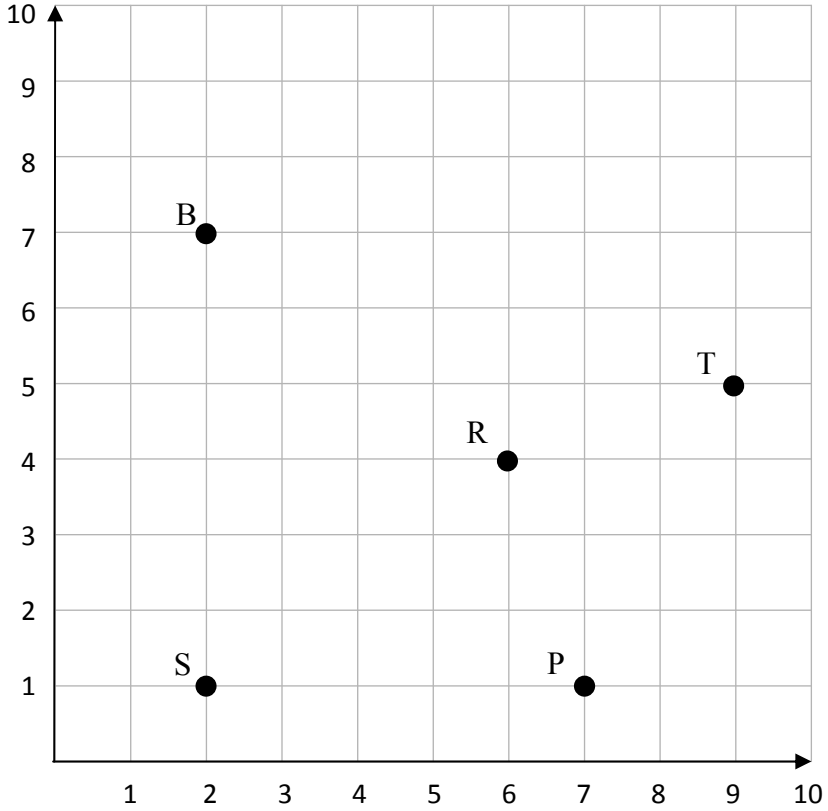
(b) An aeroplane leaves Shannon airport. It flies west for six and a half hours and lands at JFK airport in New York. The distance between the two airports is 4 596 km.
Find the average speed of the aeroplane in km/h.

(c) During the flight, the aeroplane uses 240 litres of fuel per minute.
How many litres of fuel were used in the flight?

(d) For emergencies the aeroplane must carry 20% more fuel than it requires.
Find the total amount of fuel carried by the aeroplane.

Question 11 **(suggested maximum time: 10 minutes)**

An archaeologist has discovered various items at a site. The site is laid out in a grid and the position of each item is shown on the grid. The items found are a brooch (B), a plate (P), a ring (R), a statue (S) and a tile (T).



(a) Write down the co-ordinates of the position of each item.

B = (2 , 7)

P = (,)

R = (,)

S = (,)

T = (,)

(b) Each square of the grid represents 1 m^2.
Find the total area of the grid.

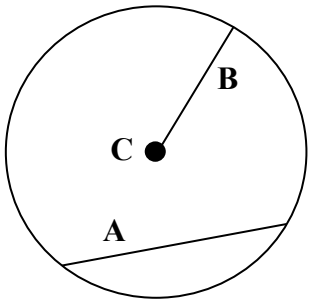
(c) Which of the items is nearest to the tile (T)?

(d) Find the distance between the brooch (B) and the statue (S).

(e) What is the slope of the line from the plate (P) to the brooch (B)?

Question 12 **(suggested maximum time: 15 minutes)**

(a) Choose the correct terms for A, B and C from the following list:



radius

diameter

circumference

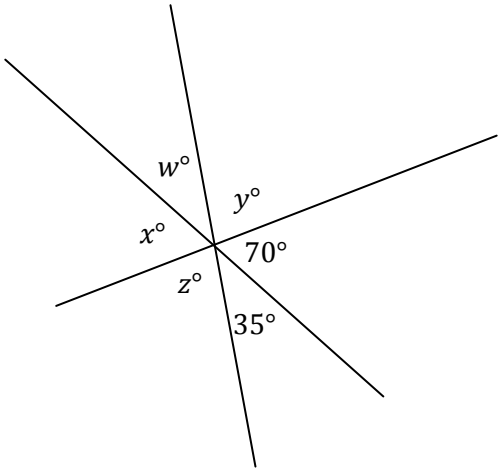
centre

chord

Write the answers into the grid.

A	
B	
C	

(b) Find the missing angles in the diagram. Write the answers into the grid.



x	
w	
y	
z	

(c) The measurements of the sides of four triangles are as follows:

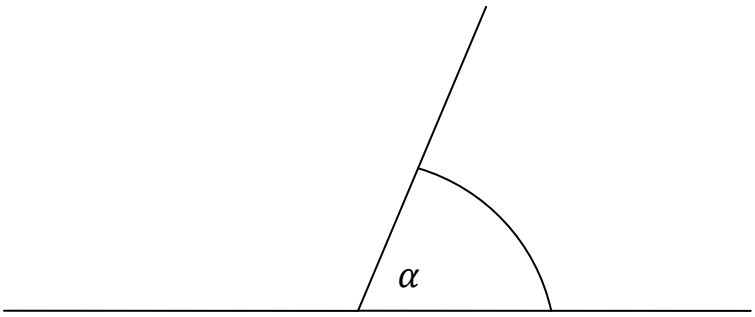
Triangle	Sides
A	5, 3, 4
B	5, 6, 5
C	5, 6, 7
D	5, 6, 8

Which triangle is isosceles? Give a reason for your answer.

Answer

Reason

(d) Cian used a protractor to measure the angle α in the diagram below.
His answer was 100°.

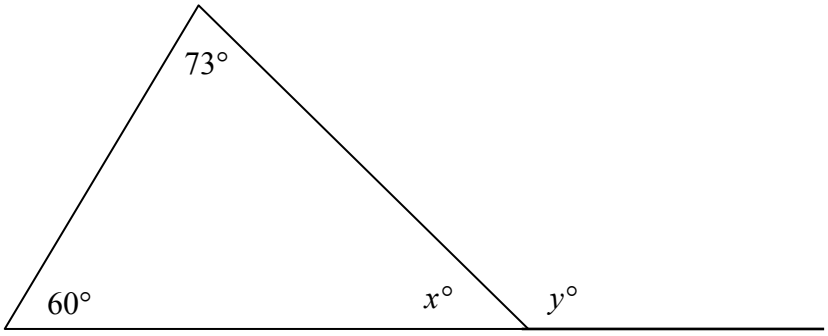


Do you agree or disagree with Cian's measurement? Give a reason for your answer.

Agree ☐ Disagree ☐

Reason

(e) Theorems on your course can be used to find the measure of the angles in the diagram below.
Write down, in your own words, any theorem that you could use to find one of the missing angles.



Theorem

(f) Find the measure of each of the missing angles in the diagram in part **(e)** above. Show your calculations.

$x°$ =

$y°$ =

Question 13 **(suggested maximum time: 10 minutes)**

A group of students was asked how many text messages each had sent the previous day.
The results were:

14	32	6	17	19	15	3	35	42	25
9	28	34	18	40	11	16	28	31	7

(a) How many students were in the group?

(b) Represent the data on a stem-and-leaf diagram.

0	
1	
2	
3	
4	

Key:

(c) Find the mode of the data.

(d) Find the mean of the data.

(e) What percentage of students sent more than 30 texts?