Question **(25 marks)**

(a) Use your calculator to answer the following.

(i) Write $0.\dot{2}\dot{3}$ as a fraction

(ii) Find 12.47% of $€25{,}000$, correct to the nearest euro.

(iii) Evaluate $\frac{3\pi}{\sqrt{7}} \times \cos 87°$, correct to 2 decimal places.

(b) The Search Engine Google takes its name from the word *googol.* A googol is the number 1 followed by one hundred zeros. Write this number in scientific notation.

Googol

10, 000, 000, 000, 000,
000, 000, 000, 000, 000,
000, 000, 000, 000, 000,
000, 000, 000, 000, 000,
000, 000, 000, 000, 000,
000, 000, 000, 000, 000,
000, 000, 000, 000

Question **(25 marks)**

(a) A hostel website gives the cost of staying for three nights in a hotel in Copenhagen as 3112.5 Danish kroner.

(i) Find the cost of the trip, in euro, if €1 is 7.5 Danish Kroner.

(ii) The cost of the trip includes a 3.5% service charge for the hostel website. Find, in euro, how much the hotel will get for the transaction, correct to three decimal places.

(b) (i) The average speed that the plane was travelling was approximately 850 kilometres per hour. If Copenhagen is 1,862 kilometres from Dublin, calculate how long the flight lasted, correct to the nearest minute.

(ii) State two reasons why the answer above is not 100% accurate for the time taken to get from Dublin to Copenhagen.

Question **(25 marks)**

(a) For each of the following sequences of numbers, use the pattern to continue the sequence for two more terms:

(i) 7, 35, 175, 875, _____, _____.

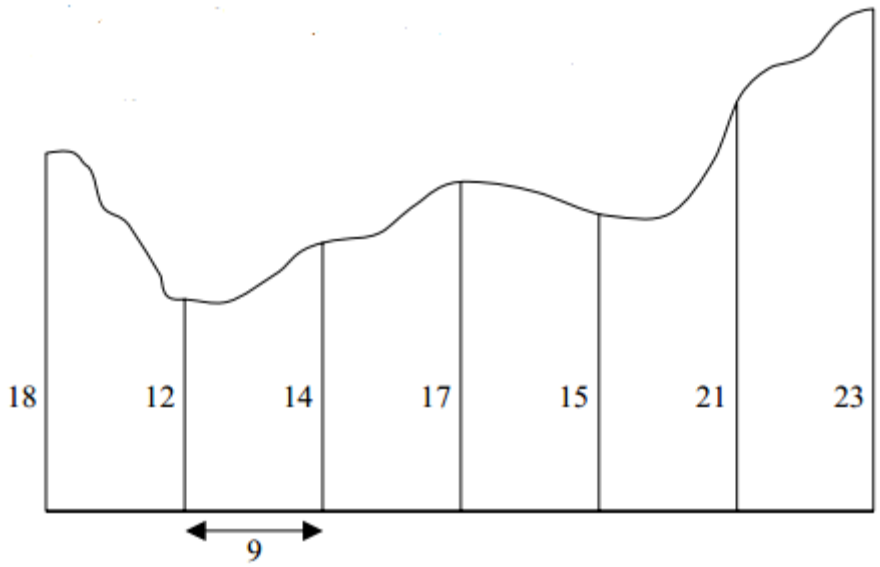
(ii) 100, 92, 84, 76, _____, _____.

(a) (i) Write 256 as 4^n, where $n \in \mathbb{N}$.

(ii) Find $81^{\frac{1}{2}}$.

Question **(25 marks)**

(a) A garden has one irregular side. Offsets of lengths 18, 12, 14, 17, 15, 21, and 23 metres are measured from the irregular side to the opposite side, as shown. The offsets are 9 metres apart.



(i) Calculate the area of the garden using the Trapezoidal Rule.

(b) Solve the quadratic equation$2x^2 + 5x - 1 = 0$.

Give your answers correct to two decimal places.

(c) €3500 is invested for four years at a fixed rate of compound interest. During the first year it earns €140.

What is the annual rate of interest?

Question **(25 marks)**

(a) (i) Write down the whole number factors of 20.

(ii) Write down the factors of 20 that are prime.

(b) Write down all the natural numbers which satisfy the inequality $5x \leq 2x + 9$

(c) Solve the equation $4p - 3 = 2p - 18$

Question **(25 marks)**

(a) A car which costs €16 900 will depreciate at the rate of 15% per year. How much will it be worth at the end of four years? Give your answer correct to the nearest €.

(b) (i) Solve the simultaneous equations

$$3x - 4y = 18$$

$$x + 2y = -4$$

(ii) Find the value of $8t^3 + 3t - 12$ when $t = 2$.

Question **(25 marks)**

(a) Simplify $4(2y - 7) - 3(2y - 6)$

(b) Write down expressions for the following sentences, by letting *x* represent the unknown number in each case:

(i) *Five times a certain number*

(ii) *Five times a certain number added to 12*

(c) Use your answers to part (b) to write an equation in *x* of the following information and solve it to find the unknown number.

Five times a certain number added to 12 is the same as three times the same number added to 20.

Question **(25 marks)**

Liz earns €550 per week. Her rate of tax is 20% and she has tax credits of €75 per week.

(i) How much tax does Liz pay each week?

(ii) Liz also pays other deductions of €91.50 per week. Find her weekly take home pay.

(iii) What percentage of her total pay does Liz take home each week?

Question 1 **(25 marks)**

(a) A newspaper states: 'It will most probably rain tomorrow.'

Which of the following best represents the probability of an event that will most probably occur? Circle the most appropriate answer and explain your answer.

33 % 50% 80% 100%

(b) Some men and women were surveyed at a football game. They were asked which team they supported. The results are shown in the two-way table.

	Team A	***Team B***	***Total***
Men	125	100	225
Women			165
Total	200		

(i) Complete the table above

(ii) What percentage of women surveyed supported Team B, correct to the nearest percent?

(iii) What fraction of people, in its simplest form, support Team A?

Question 2 **(25 marks)**

(a) A personal identification number (PIN) is made up of four digits. An example of a PIN is

0	2	2	9

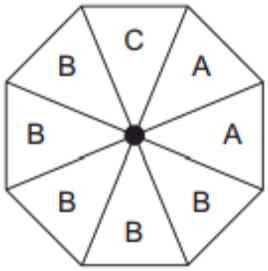
(i) When all ten digits are available for use, how many different PINs are possible?

(ii) What is the probability that one such PIN number is 1234 in that order?

(b) The diagram below shows a stem-and-leaf plot for 22 scores.

2	3	5	9		
3	1	4	7	9	
4	2	2	2	5	7
5	1	2	4		
6	2	3	7		
7	5	8	8	8	

(i) What is the mode for this data?



(ii) What is the median for this data?

Question 3 **(25 marks)**

(a) A fair spinner has eight equal sections.

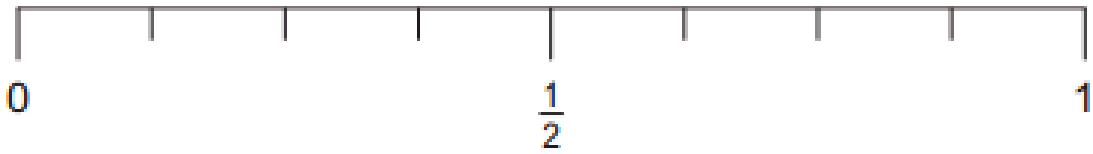
(i) What is the probability of landing on the letter A?

(ii) What is the probability of landing on the letter B?

(iii) What is the probability of landing on the letter C?

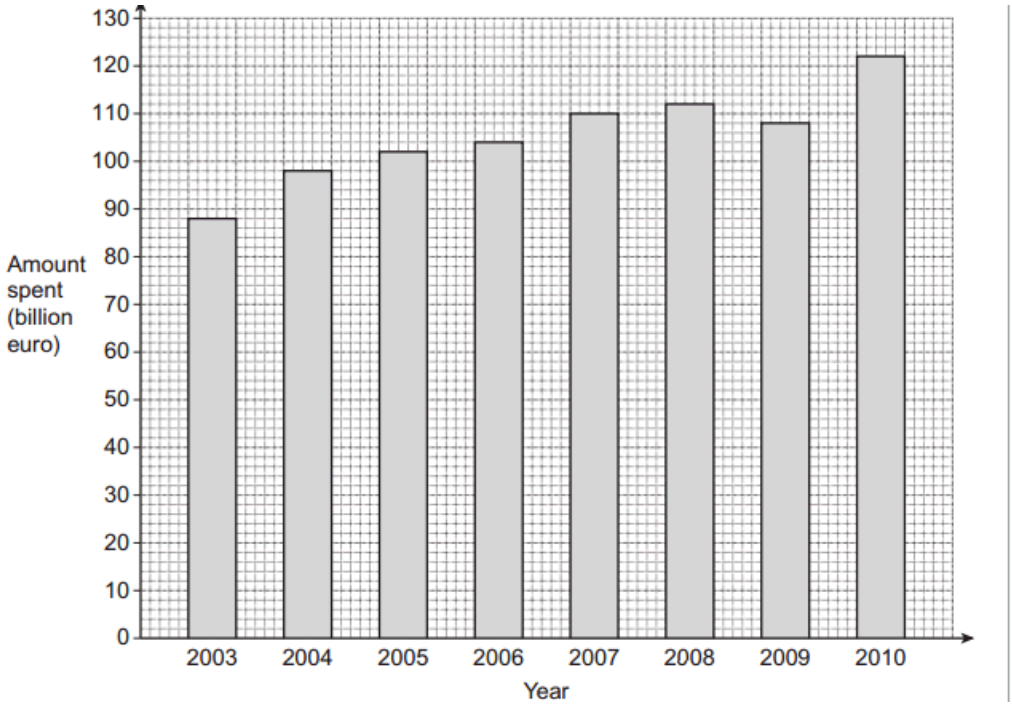
(iv) Put arrows on the scale to show the probability of landing on each letter.

Label each arrow with the correct letter.



Question 4 **(25 marks)**

(a) The graph shows the amount of money spent by the European Union in each of eight years.



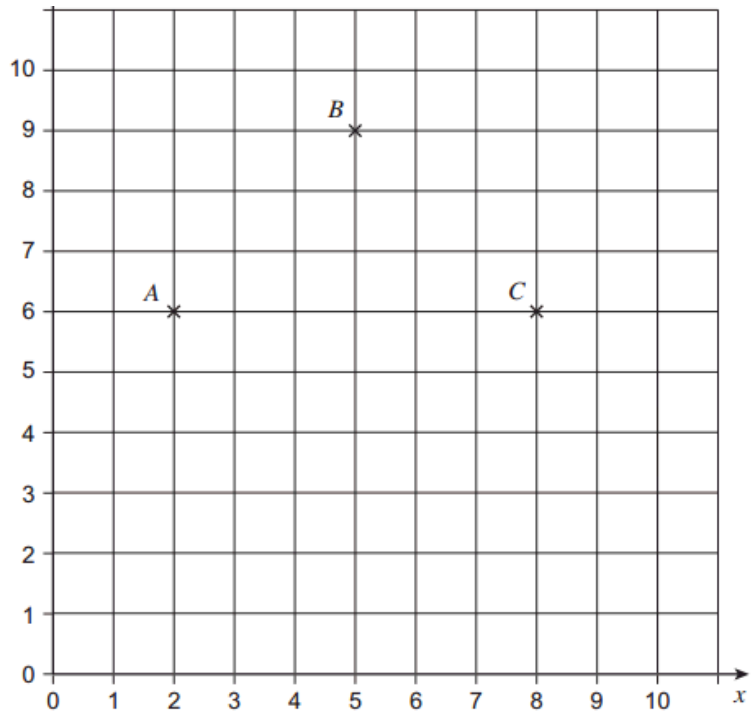
(i) Which of these years was the first that over 100 billion euro was spent?

(ii) In which year did the amount spent fall?

(iii) $\frac{9}{20}$ of the amount spent in 2007 was on farming. How much was spent in 2007 on farming?

Question 5 **(25 marks)**

(a) Here is a centimetre–square grid with points A, B and C plotted.



(i) Write down the coordinates of point A.

A = (,)

(ii) Plot the point D so that ABCD is a square.

(iii) Write down the coordinates of point D

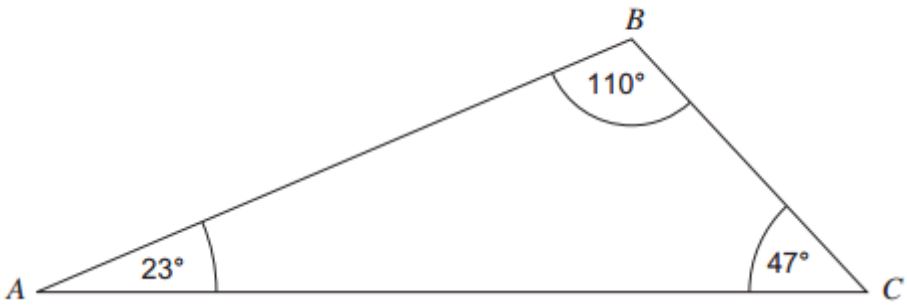
D = (,)

(iv) Use a ruler to measure all four sides of your square. Write down the length of the sides.

(v) If each cm of your ruler represents a distance of 10 km on a map, find the total area of the square on the map.

Question 6 **(25 marks)**

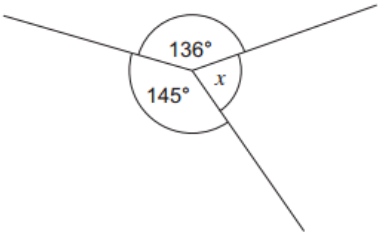
The diagram shows a triangle ABC.



(a) (i) Circle the correct word to describe triangle ABC.

Scalene Isosceles Equilateral

(ii) Explain why you chose this word.



(b) (i) From the diagram above, write down $\angle ABC$ $\angle ABC =$

(ii) Circle the correct word to describe angle $\angle ABC$

Acute Obtuse Reflex

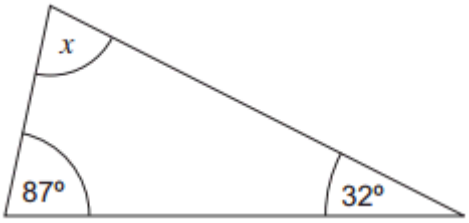
(iii) Explain your answer.

Question 7 **(25 marks)**

(a) The diagram on the right shows three angles at a point.

(i) Calculate the value of x.

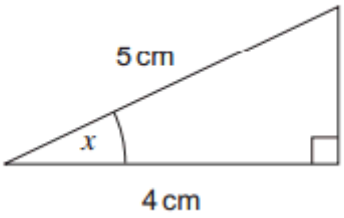
(ii) Work out the value of *x* in the diagram below.



(b) In the space below draw a circle of radius 3 *cm*.

Question 8 **(25 marks)**

(a) The diagram shows a right-angled triangle.



(i) Calculate the value of the unknown side using the Theorem of Pythagoras

(ii) Write down the value of sin *x* as a fraction

(iii) Use this answer to find the angle *x* in the diagram above.

(b) Brian knows that $\sin 30°$ is $\frac{1}{2}$. He thinks that $\sin 60°$ should be 1. Show that Brian is incorrect.