Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1. Write down the value of the 5 in 7.052

5 hundredths

.....

(Total 1 mark)

---

2. Simplify $4y - y + 2y$

5y

.....

(Total 1 mark)

---

3. Write 678 980 correct to the nearest ten thousand.

680,000

.....

(Total 1 mark)

---

4. Find all the factors of 40

1 x 40
2 x 20
4 x 10
5 x 8

1, 2, 4, 5, 8, 10, 20, 40

.....

(Total 2 marks)

---

5. Lynn is planning a Christmas party for her badminton club.
Here are her costs.

Food	£176
Drink	£103
Hire of room	£36 per hour

$36 \times 4 = 144$

Lynn wants to hire the room for 4 hours.

There will be 28 people at the party.
Lynn will charge these people £15 each. $28 \times 15 = 420$

Will Lynn get enough money to pay all her costs?

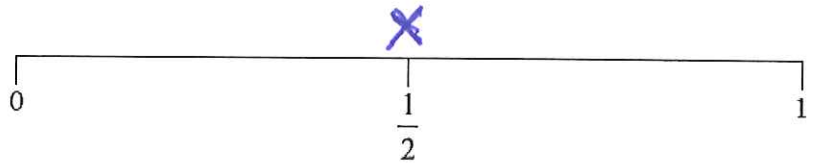
You must show your working.

Cost of Party = 176 + 103 + 144
= £423

Lynn will earn £420 from people attending the party, however it will cost £423. No, she won't get enough money to pay all her costs.

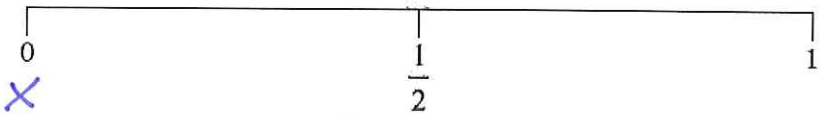
(Total 4 marks)

6. (a) Sabrina throws a fair coin.
On the probability scale, mark with a cross (×) the probability that the coin will land on tails.



(1)

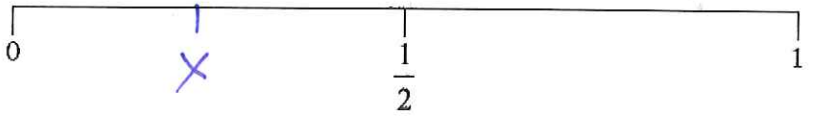
(b) Suresh throws an ordinary 6-sided dice.
On the probability scale, mark with a cross (×) the probability that he will throw a 7



(1)

(c) There are three yellow sweets and one blue sweet in a bag.
Graham takes at random a sweet from the bag.

On the probability scale, mark with a cross (×) the probability that he will take a blue sweet.

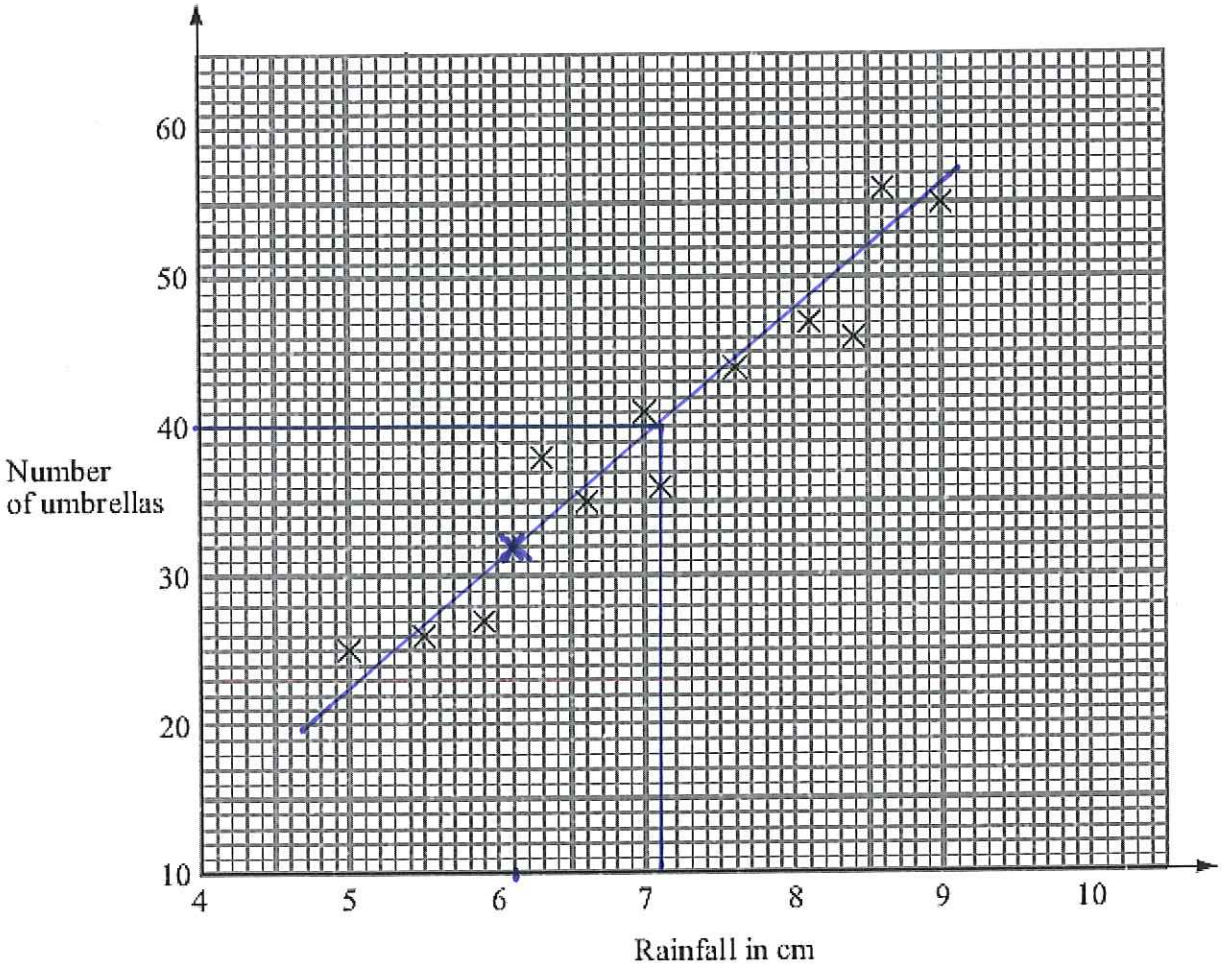


(1)

(Total 3 marks)

7. Mr Wither sells umbrellas.

The scatter graph shows some information about the number of umbrellas he sold and the rainfall, in cm, each month last year.



In January of this year, the rainfall was 6.1 cm.
During January, Mr Wither sold 32 umbrellas.

(a) Show this information on the scatter graph.

(1)

(b) What type of correlation does this scatter graph show?

Positive Correlation

.....

(1)

In February of this year, Mr Wither sold 40 umbrellas.

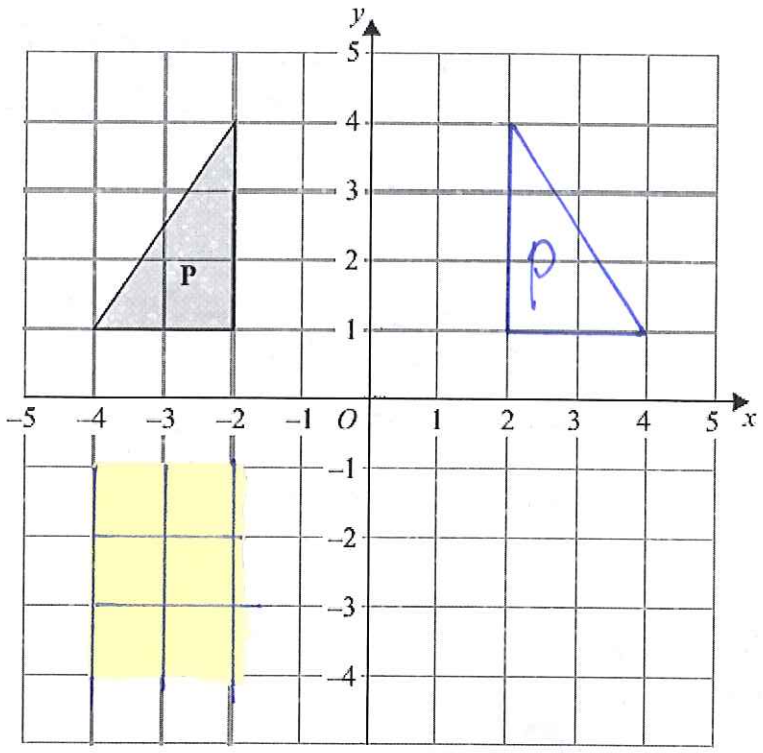
(c) Estimate the rainfall for February.

7.1 ..... cm

(2)

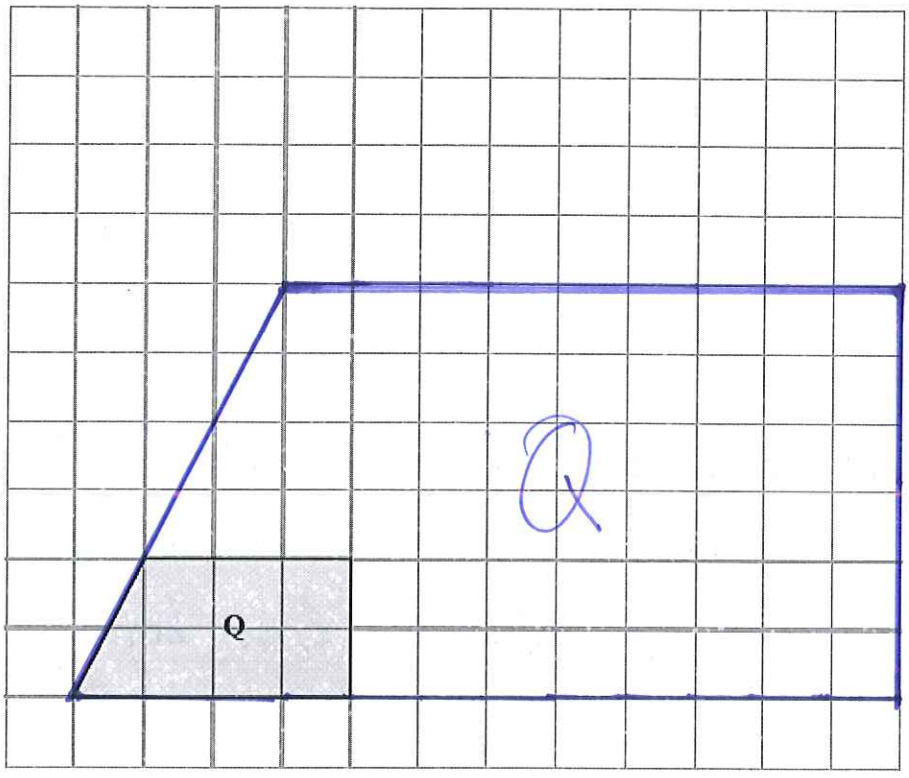
(Total 4 marks)

8.



(a) Reflect triangle **P** in the y-axis.

(2)



(b) Draw an enlargement of shape **Q** scale factor 3

(2)

(Total 4 marks)

9. A pile of sand has a weight of 65 kg.

Some of the sand is put into a small sack.
The rest of the sand is put into a large sack.

← 2 sacks must add up to 65 kg.

The sand in the large sack weighs 15 kg more than the sand in the small sack.

What is the weight of the sand in the small sack?

Small sack = (65 − 15) ÷ 2
= 50 ÷ 2
= 25 kg

Check
∴ Large sack = 65 − 25
= 40 kg
Large weighs 15 kg more ✓

25 kg

(Total 2 marks)

10. Laura is asked to solve the equation $6x + 4 = 10$

Here is her working.

$$6x + 3 = 9$$
$$6x = 12$$
$$x = 2$$

Laura's answer is wrong.
What mistake did she make?

Laura minuses 3 from the left side of the equation, but adds it to the other side instead of minusing from both sides.

(Total 1 mark)

11. In August 2008, Eddie hired a car in Italy.

The cost of hiring the car was £620
The exchange rate was £1 = €1.25

(a) Work out the cost of hiring the car in euros (€).

620 x 1.25

= €775

€ 775

(2)

Eddie bought some perfume in Italy.

The cost of the perfume in Italy was €50
The cost of the same perfume in London was £42

The exchange rate was still £1 = €1.25

(b) Work out the difference between the cost of the perfume in Italy and the cost of the perfume in London.
Give your answer in pounds (£).

Cost in London = £42 or €52.50 (42 x 1.25)

Cost in Italy = €50 or £40 (50 ÷ 1.25)

£42 - 40 = £2.

The cost of the perfume in London was £42, and £40 in Italy, therefore it was £2 cheaper in Italy

£ 2

(3)

(Total 5 marks)

12. An internet bookshop uses this advert.

Each day every 3rd customer gets a mystery prize.
Each day every 20th customer gets free postage and packaging.

On Tuesday the internet bookshop had 150 customers.

(a) How many of the 150 customers got a mystery prize? ← Every 3rd

150 ÷ 3 = 50

50

(2)

(b) How many of the 150 customers got free postage and packaging? Every 20 customers

150 ÷ 20 = 7.5

Can't have 0.5 of a person

∴ 7 people got free postage

7

(2)

(c) How many of the 150 customers got both a mystery prize (3rd) **and** free postage (20th) and packaging?

3 x 20 = 60 ← Every 60th customer gets both.

150 ÷ 60 = 2.5

Can't have 0.5 of a person...

∴ 2 people got both

2

(2)

(Total 6 marks)

13. Mrs Phillips needs to decide when to have the school sports day.

The table shows the number of students who will be at the sports day on each of 4 days.
It also shows the number of teachers who can help on each of the 4 days.

	Tuesday	Wednesday	Thursday	Friday
Number of students	179	162	170	143
Number of teachers	15	13	14	12
	11.93	12.46	12.14	11.91

For every 12 students at the sports day there must be at least 1 teacher to help.

On which of these days will there be enough teachers to help at the sports day?
You must show all your working.

Tuesday = 179 ÷ 15 = 11.93 ⇐ Yes

Wednesday = 162 ÷ 13 = 12.46 ⇐ No

Thursday = 170 ÷ 14 = 12.14 ⇐ No

Friday = 143 ÷ 12 = 11.91 ⇐ Yes

Tuesday and Friday are the only days where there are at most 12 students per teacher.

(Total for Question 24 is 3 marks)

Note - Wednesday / Thursday there are more than 12 students per teacher therefore not suitable for sports day.

14. 30% of a number is 120
Work out the number.

$120 \div 0.3 = 400$

OR

If 120 is 30%. then $10\% = \frac{120}{3} = 40$

$\therefore 100\% = 40 \times 10 = 400$

OR

$30\% = 120$,

so $1\% = \frac{120}{30} = 4$

$\therefore 100\% = 4 \times 100$

$= 400$

400

(Total 3 marks)

---

15. Show that $7\frac{1}{2} - 4\frac{2}{3} = 2\frac{5}{6}$ ← convert to improper fractions.

$\frac{15^{\times 3}}{2^{\times 3}} - \frac{14^{\times 2}}{3^{\times 2}} = \frac{17}{6}$ ← Find common denominator

$= \frac{45}{6} - \frac{28}{6} = \frac{17}{6}$

$= \frac{17}{6} = \frac{17}{6}$

(Total 3 marks)

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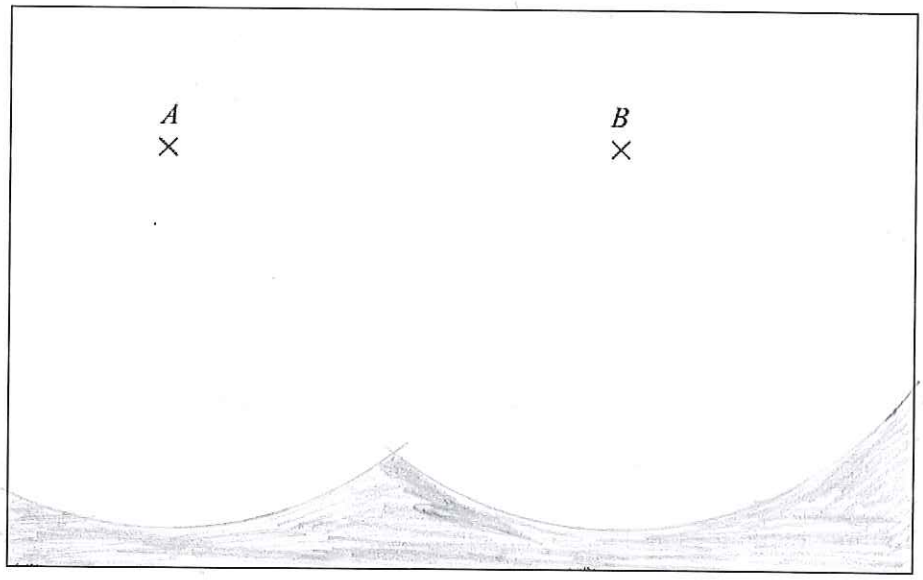
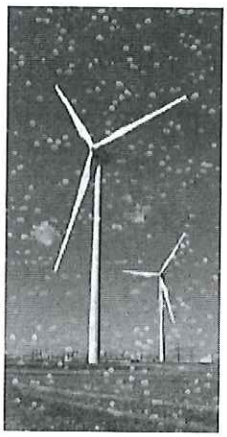
16. The diagram shows a map of a field.
The scale of the map is 1 cm represents 20 m.



Wind turbines



A and *B* are two wind turbines in the field.
A third wind turbine is to be put in this field.

There must be at least 100 m between wind turbines.

Show, by shading, where the third wind turbine can be put.

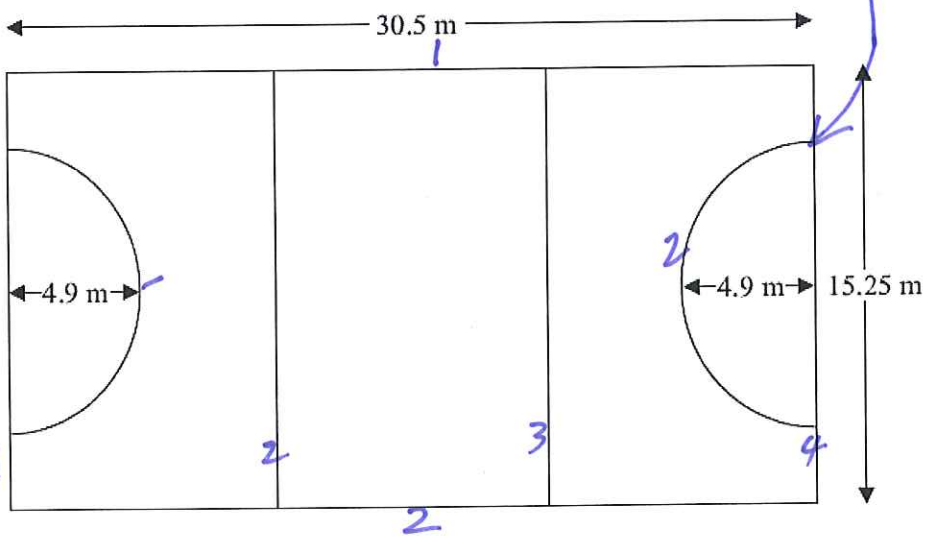
(Total 3 marks)

100 ÷ 20 = 5.

∴ must be 5cm space between turbines (at least)

2 semi-circles = 1 full circle

17. The diagram shows the lines of a netball court.



The court is made from three rectangles and two semi-circles.
All the corners are right angles.

Mr Handy is painting the lines for the netball court on the floor of a school sports hall.

Work out the total length of the lines of the netball court.
Give your answer correct to the nearest metre.

2 Horizontal lines = $30.5 \times 2 = 61$ m

4 Vertical lines = $15.25 \times 4 = 61$ m

2 semicircles or 1 circle circumference

$= 2\pi r = 2 \times \pi \times 4.9$

$= 30.79$.

$61\text{m} + 61\text{m} + 30.79 = 152.79\text{m}$

Circumference of circle
$= 2\pi r$ or πD

152.79 ..... m

(Total 4 marks)

$y = mx + c$

18. On the grid, draw the graph of $y = 3x - 2$ for values of x from -1 to 3

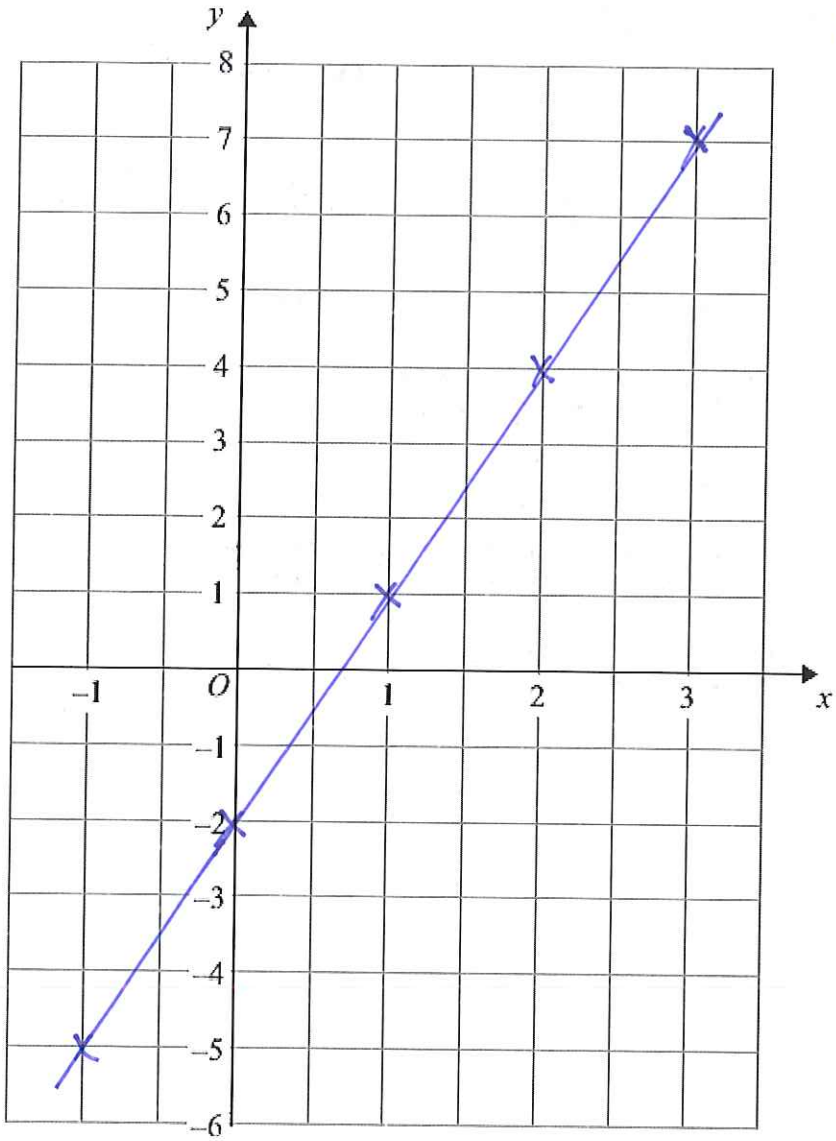
($m = 3$, $c = -2$)

x	-1	0	1	2	3
y	-5	-2	1	4	7

$y = 3(-1) - 2 = -5$

$y = 3(0) - 2 = -2$

$y = 3(1) - 2 = 1$ ...



Gradient is +3.

(Total 3 marks)

x+5 x

19. Abbie is 5 years older than Cathy.
Bhavna is twice as old as Abbie.
The total of their ages is less than 30

2(x+5)

What is Bhavna's greatest possible age?

Give your answer as a whole number of years.
You must show all your working.

Let Cathy's age be x.

Abbie $= x + 5$

Bhavna $= 2(x+5)$. OR $2x+10$

$x + x + 5 + 2(x+5) < 30$.

$4x + 15 < 30$

$\therefore \quad 4x < 15$

$x < 3.75$

Bhavna $= 2(3.75) + 10 = 17.5$

$\therefore \quad 2x + 10 < 17.5$

17 years.

(Total 4 marks)

20. The table gives some information about the birds Paula sees in her garden one day.

Bird	Frequency
Magpie	15
Thrush	10
Starling	20
Sparrow	27

$\frac{15}{72} \times 360 = 75°$ ← 75°

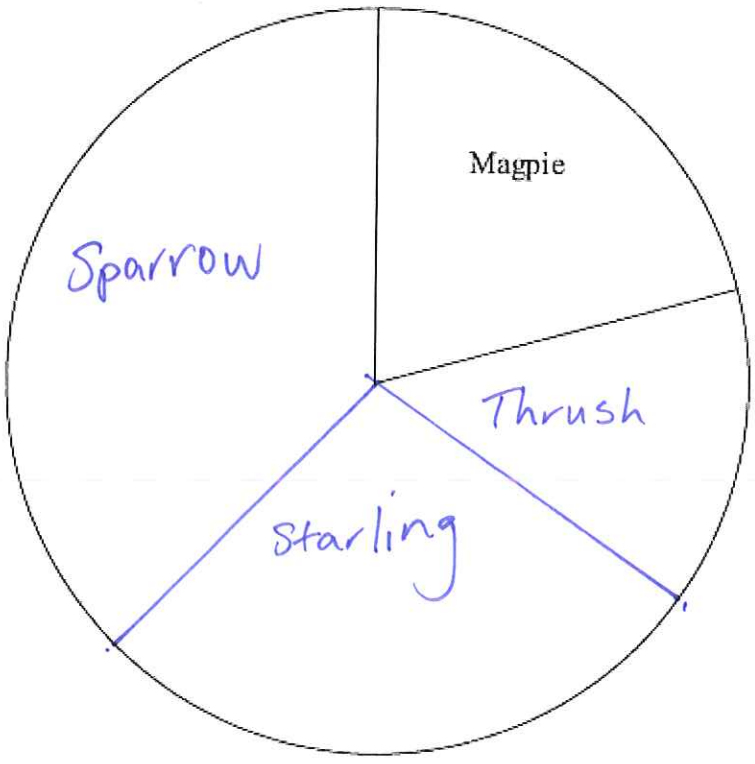
$\frac{10}{72} \times 360 = 50°$ 50°

$\frac{20}{72} \times 360 = 100°$ 100°

$\frac{27}{72} \times 360 = 135°$ 135°

Complete the accurate pie chart.

15 + 10 + 20 + 27 = 72 birds total



(Total 3 marks)

12

21. There are only red pens and blue pens in a box.
There are 12 red pens in the box.

The probability of taking at random a blue pen from the box is $\frac{2}{3}$ ∴ $\frac{1}{3}$ are Red.

Work out the total number of pens in the box.

$\frac{1}{3}$ of pens are Red. There are 12 red pens.

Total = 12 x 3
= 36.

36

.....

(Total 3 marks)

22. Henry is thinking about having a water meter.

These are the two ways he can pay for the water he uses.

Water Meter

A charge of £28.20 per year

plus

91.22p for every cubic metre of water used

1 cubic metre = 1000 litres

No Water Meter

A charge of £107 per year

Henry uses an average of 180 litres of water each day. $= 180 \times 365 = 65{,}700\ L$

Henry wants to pay as little as possible for the water he uses.
Should Henry have a water meter?

Water meter

$65{,}700L \div 1000 = 65.7\ m^3$

$65.7 \times 91.22p = 5993.154p$

$\frac{5993.154}{100} = £59.93$

$59.93 + 28.20 = £88.13$ in Total

Yes, Henry should install a water meter.

(Total for Question 15 is 5 marks)

23. Here are the first four terms of an arithmetic sequence.

3 (+7) 10 17 24

(*a*) Find, in terms of n, an expression for the nth term of this arithmetic sequence.

$7n - 4$

(2)

(*b*) Is 150 a term of this sequence?

You must explain how you get your answer.

$7n - 4 = 150$, $7n = 154$, $n = 154 \div 7$

$n = 22$.

Yes, 150 is the 22nd term of this sequence.

(2)

(Total 4 marks)

24. Each year Wenford Hospital records how long patients wait to be treated in the Accident and Emergency department.

In 2015 patients waited 11% less time than in 2014.
In 2015 the average time patients waited was 68 minutes.

(*a*) Work out the average time patients waited in 2014.
Give your answer to the nearest minute.

68 mins = 89% of 2014 time.
68 ÷ 0.89 = 76.4 mins
76.4 = 100% of 2014 waiting time

76 ..... minutes
(3)

The hospital has a target to reduce the average time patients wait to be treated in the Accident and Emergency department to 60 minutes in 2016.

(*b*) Work out the percentage decrease from 68 minutes to 60 minutes.

68 − 60 = 8 minute decrease.

$\frac{8}{68} \times 100 = 11.76\%$

11.76 .....%
(2)

(Total 5 marks)

25. Each length of the side of square B is twice the length of the side of square A.

John says that this means the area of square B is twice the area of square A.

Is John right?
Justify your answer.

No, because the area of a square is equal to side x side i.e side^2, not side x 2.

eg. A of Square $2 \times 2 = 4cm^2$, $4 \times 4 = 16cm^2$.

(Total 1 mark)

26. Solve $x^2 + 3x - 10 = 0$

Factors of -10

-1×10

1×-10

2×-5

-2×5

must be a pair that adds together to equal +3. So must be -2 and 5.

$(x-2)(x+5)$

$\therefore x = 2, -5$

$x =$ 2, -5

(Total 2 marks)

TOTAL FOR PAPER IS 80 MARKS