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1. Here are four digits.

4 8 3 5

Use all four digits to make the number closest to 4000.

3854
.....
(1)

2. Arrange these distances in order, from shortest to longest

6.077m 6.31m 6.19m 6.4m 6.009m

6.009m	6.077m	6.19m	6.31m	6.4m
--------	--------	-------	-------	------

(1)

3. Sian thinks of two different numbers

The two numbers have a total of 3

The same numbers have a difference of 5

What two numbers did Sian think of?

$$-1 + 4 = 3$$

-1	4
----	---

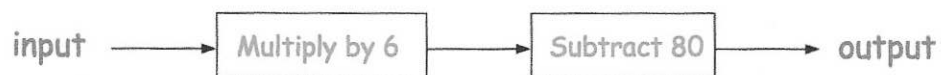
(2)

4. Write all the numbers between 12 and 50 that are factors of 90

15, 18, 30, 45

(2)

5. Here is a function machine.



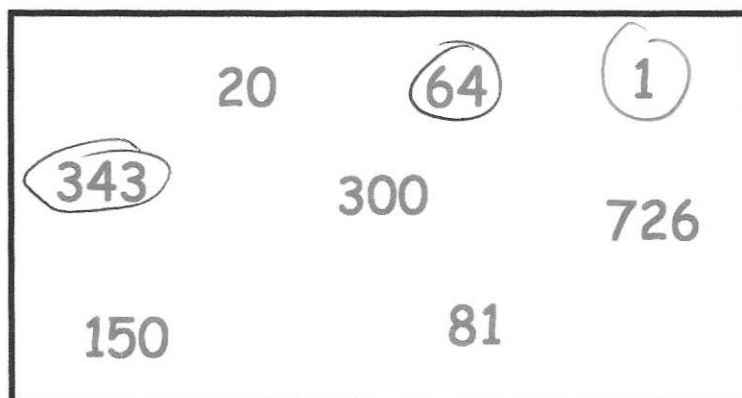
The output is equal to the input.

Find the input.

$$\begin{aligned} 6x - 80 &= x \\ 5x &= 80 \\ x &= 16 \end{aligned}$$

16.....
(2)

- 6.



Circle all the cube numbers.

(2)

7. A bus heading to Belfast leaves Antrim every 25 minutes.
A bus heading to Ballymena leaves Antrim every 30 minutes

At 10am bus to Belfast and a bus to Ballymena both leave Antrim Bus Station.

Work out the next time that both buses leave at the same time.

25, 50, 75, 100, 125, 150 150 minutes = 2.5 hours
30, 60, 90, 120, 150

12.30pm
(3)

8. Complete the table

Fraction	Decimal	Percentage
$\frac{11}{100}$	0.11	11%
$\frac{9}{20}$	0.45	45%
$\frac{17}{25}$	0.68	68%
$\frac{3}{8}$	0.375	37.5%

(3)

9. Heather is making chocolate biscuits.
She has:

2kg of flour
1kg of butter
340g of icing sugar
200g of chocolate

Here is the list of ingredients for making 20 biscuits.

makes 20	
100g flour	$2000 \div 100 = 20$
120g butter	$1000 \div 120 = 8.\bar{3}$
80g icing sugar	$340 \div 80 = 4.25$
25g chocolate	$200 \div 25 = 8$

Heather wants to make as many biscuits as she can.

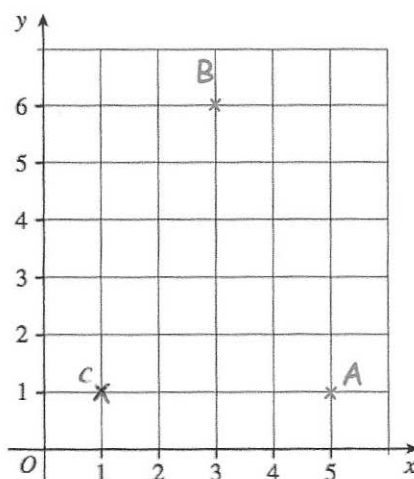
Work out how many biscuits Heather can make.

$$20 \times 4.25$$

85

(3)

10. ABC is an isosceles triangle



Write down the coordinates of point C

(1, 1)

(3)

11. In one week, Gina spent x minutes on the internet.
Sammy spent 15 minutes less than Gina.

(a) Write down an expression for how long Sammy spent on the internet.

$$\underline{x - 15} \quad (1)$$

Neil spent three times as long as Gina on the internet.

(b) Write down an expression for how long Neil spent on the internet.

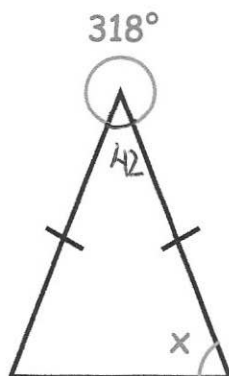
$$\underline{3x} \quad (1)$$

(c) Write down an expression for total time spent on the internet.

$$3x + x + x - 15$$
$$5x - 15$$

$$\underline{5x - 15} \quad (1)$$

12.

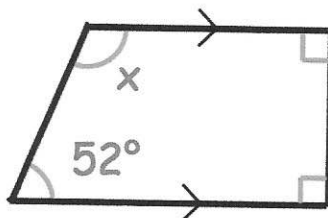


$$180 - 42 = 138$$
$$138 \div 2 = 69$$

Find the size of angle x

$$\underline{69^\circ} \quad (3)$$

13.



Find the size of angle x

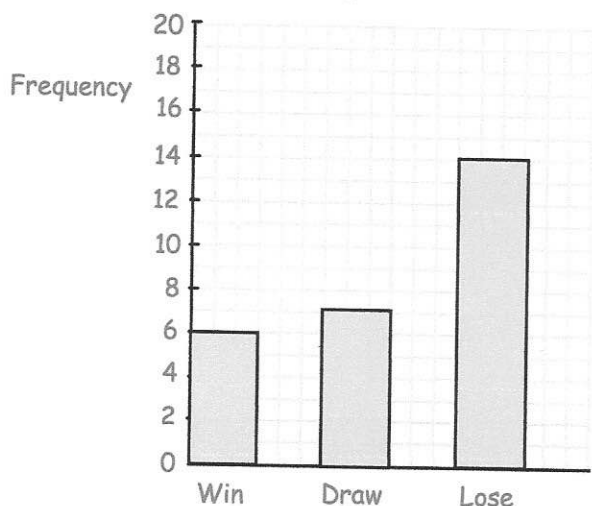
$$90 + 90 + 52 = 232$$

$$360 - 232 = 128^\circ$$

..... 128°
(2)

14. Peterborough Pirates are an ice hockey team.
They play in a league where a win earns 5 points, a draw earns 2 point and a loss earns -1 points.

Peterborough Pirates results



Belfast Giants:	50 points	(3)
Cardiff Devils:	23 points	(9)
Coventry Blaze:	49 points	(4)
Edinburgh Capitals:	51 points	(2)
Manchester Storm:	12 points	(10)
Nottingham Panthers:	28 points	(8)
Sheffield Steelers:	55 points	(1)
Swindon Wildcats:	33 points	(5)
Telford Tigers:	32 points	(6)

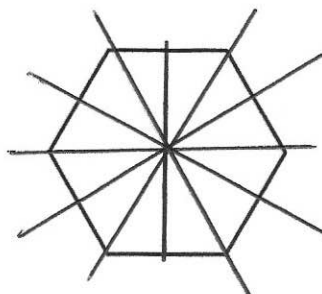
The bar chart shows information about their results in 2019.
The table shows the final points for the other 9 teams in the league.

In which position did Peterborough Pirates finish?

$$\left. \begin{array}{l} 6 \times 5 = 30 \\ 7 \times 2 = 14 \\ 14 \times -1 = -14 \end{array} \right\} 30 \text{ points } (7)$$

.....7th.....
(4)

15. The diagram below shows a regular hexagon.



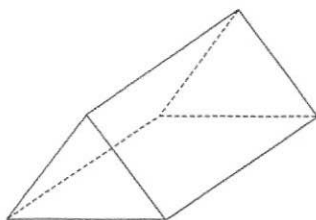
- (a) Write down the order of rotational symmetry of the hexagon.

6
.....
(1)

- (b) On the diagram draw in all the lines of symmetry.

(2)

-
16. Below is a solid shape.



- (a) What is the mathematical name for the shape?

Triangular Prism
.....
(1)

- (b) Write down the number of vertices

6
.....
(1)

- (c) Write down the number of faces

5
.....
(1)

- (d) Write down the number of edges

9
.....
(1)

17. Here is part of a bus timetable.

Ballymena	15 12	16 12	17 12
Antrim	15 34	-----	17 34
Templepatrick	15 50	-----	17 50
Belfast	16 10	17 00	18 10

58 minutes 48 minutes

Evelyn wants to travel from Ballymena to Belfast.
The 16:12 is an "express bus."

How many minutes shorter is the journey if she takes the "express bus?"

10 minutes
(3)

- 18.

Foxtown			
52	Sandcliff		
70	32	Red Island	
31	14	28	Donhampton

Martin lives in Foxtown.
He works in Donhampton.
Martin drives to work in the morning and back home in the evening.
He works Monday to Friday. 5 days

Work out how many miles Martin drives each week.

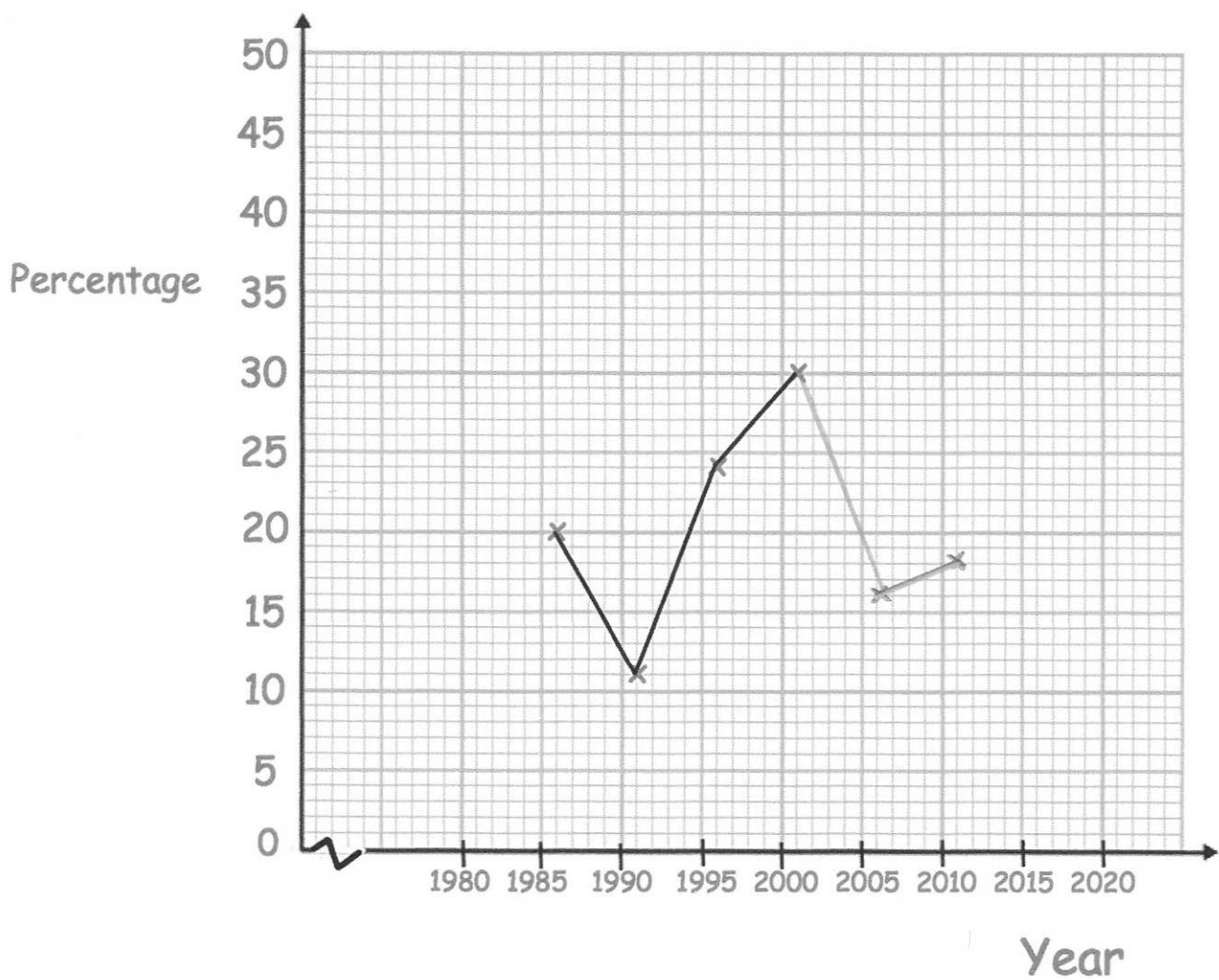
$$\begin{array}{r} 31 \\ \times 2 \\ \hline 62 \\ \hline \end{array}$$

$$\begin{array}{r} 62 \\ \times 5 \\ \hline 310 \\ \hline \end{array}$$

310 miles
(3)

19. The table shows the percentage of the vote that the Purple Party received in six general elections.

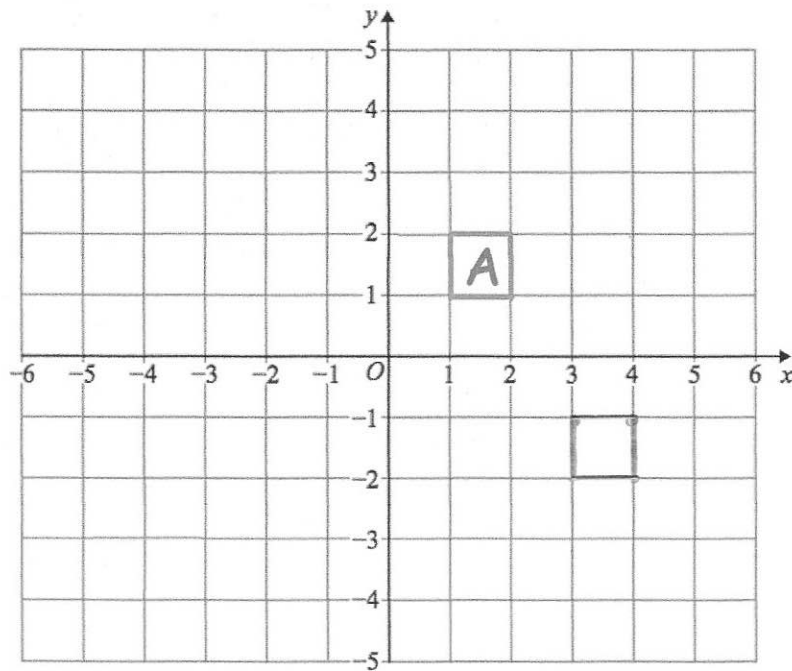
Year	Percentage
1986	20%
1991	11%
1996	24%
2001	30%
2006	16%
2011	18%



Complete the line graph.

(2)

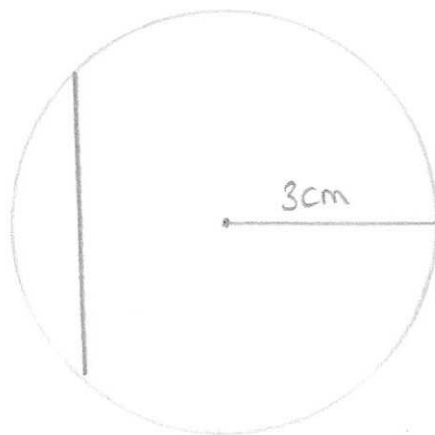
20.



Translate A by $\begin{pmatrix} 2 \\ -3 \end{pmatrix}$

(2)

21. (a) Draw a circle of radius 3cm.



(1)

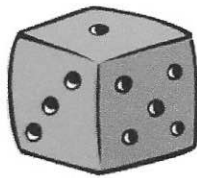
(b) Write down the length of the diameter of the circle.

.....6.....cm
(1)

(c) On your diagram draw a chord.

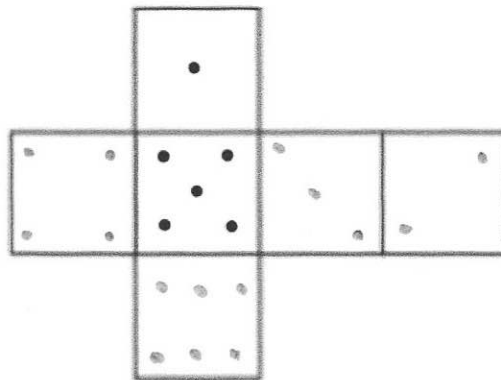
(1)

22. Shown is the view of a dice.



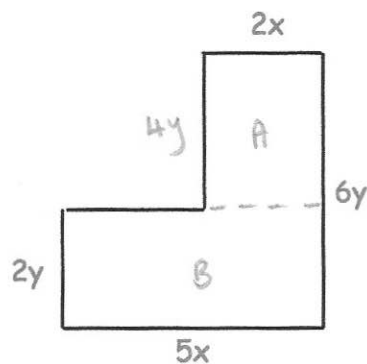
The number of dots on the opposite faces add to 7.

Fill in the missing faces.



(2)

- 23.



Write down an expression for the area of the shape.

$$\text{Area } A = 8xy$$

$$\text{Area } B = 10xy$$

$$\text{Total} = 18xy$$

$$\underline{18xy} \quad (3)$$

24. There are 120 students in Year 11 at a school.
Each student studies one language, either French, Spanish, German or Welsh.

21 of the 40 students studying Welsh are male.

18 males and 9 females study French.

12 of the 17 students studying Spanish are female.

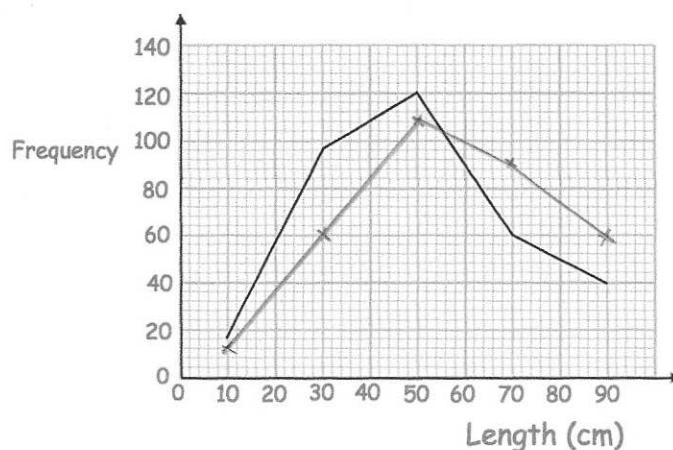
Twice as many females study German than males.

How many students in Year 11 are female?

	French	Spanish	German	Welsh	Total
Male	18	5	12	21	56
Female	9	12	24	19	64
Total	27	17	36	40	120

64.....
(3)

25. The frequency polygon shows the length of 330 river eels.



The table shows the lengths of 330 sea eels.

Length (cm)	Frequency
$0 < t \leq 20$	12
$20 < t \leq 40$	60
$40 < t \leq 60$	108
$60 < t \leq 80$	90
$80 < t \leq 100$	60

Midpoints
~~10~~
~~30~~
~~50~~
~~70~~
~~90~~
 + 1330
 1400

Draw a frequency polygon to show this information on the diagram above.

(2)

26. Orla has four types of vegetable.

Peas
 Carrots
 Turnip
 Spinach

Orla is going to choose 2 different types of vegetable.

Write down all the possible combinations of vegetable she can choose.

Peas + Carrots Peas + Turnip Peas + Spinach
 Carrots + Turnip Carrots + Spinach
 Turnip + Spinach

(2)

27. Simplify $8a + 3c - 5c + 3a$

$$\underline{11a - 2c}$$

(2)

-
28. A set of six numbers have a median of 5.
All of the numbers are even.
The range of the numbers is 6.
The mode of the numbers is 4.

Write down a possible set of six numbers.

$\underline{4}$, $\underline{4}$, $\underline{4}$, $\underline{6}$, $\underline{8}$ and $\underline{10}$

(4)

29. The number of people visiting a cafe each day, for 11 days, is listed below.

~~104~~ ~~131~~ ~~120~~ ~~115~~ ~~109~~ ~~124~~ ~~128~~ ~~118~~ ~~116~~ ~~120~~ ~~125~~

- (a) Complete an ordered stem and leaf diagram for this information.

* A key has been included. *

Key:
11 | 5 means 115

10	4	9			
11	5	6	8		
12	0	0	4	5	8
13	1				

(2)

- (b) Write down the mode.

120
(1)

- (c) Write down the median.

120
(1)

- (d) Write down the range.

131 - 104

27
(1)

30. Here is a list of words connected with angles.

Acute

Reflex

Obtuse

Right

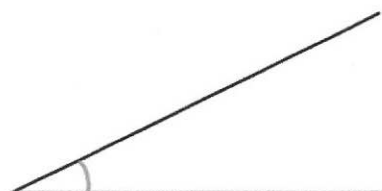
Straight

Full-turn

Choose the correct word to describe each angle.



Answer Right..... angle



Answer Acute..... angle



Answer obtuse..... angle



Answer Reflex..... angle

(3)

31. (a) Round the number 7.819 to one decimal place.

7.8.....
(1)

- (b) Round the number 7.819 to two decimal places.

7.82.....
(1)

32. Put brackets in the following statements to make them true

(a) $2 \times (7 + 1) \times 3 = 48$

(1)

(b) $(9 + 3^2) \times 10 \div 2 = 90$

(1)

33. A bus to Belfast leaves Antrim Bus Station every 25 minutes.
The first bus each day leaves at 7am.
Darren wants to get a bus after 8am.

What time is the first suitable bus?

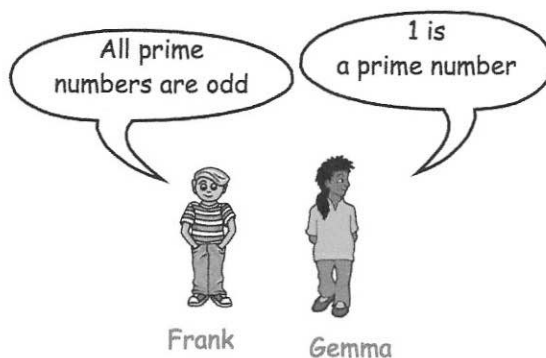
25 50 75

1 hour 15 minutes

8:15am.....

(2)

34.



Give a reason why each child is wrong.

Frank: 2 is the only even prime number
So not all primes are odd.

Gemma: 1 is not a prime number.
Prime numbers have two factors, 1 and itself.

(2)

35. William is thinking of two numbers.
Both numbers are square numbers greater than 1.
The sum of the numbers is 100.

Write down the two numbers.

.....36..... and64.....
(2)

36. (a) Express 108 as a product of its prime factors.
Give your answer in index form.

$$\begin{array}{r} 2 \overline{)108} \\ 2 \overline{)54} \\ 3 \overline{)27} \\ 3 \overline{)9} \\ 3 \overline{)3} \\ 1 \end{array}$$

$$2 \times 2 \times 3 \times 3 \times 3$$

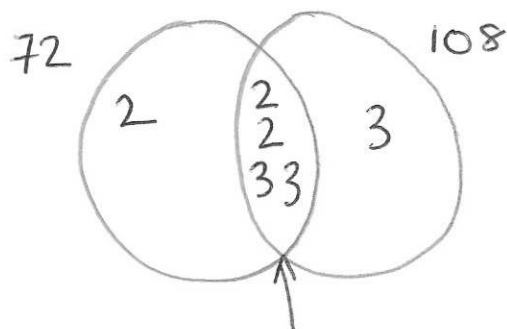
$$2^2 \times 3^3$$

..... $2^2 \times 3^3$
(3)

- (b) Find the Highest Common Factor (HCF) of 108 and 72.

$$108: 2 \times 2 \times 3 \times 3 \times 3$$

$$72: 2 \times 2 \times 2 \times 3 \times 3$$



$$\text{HCF: } 2 \times 2 \times 3 \times 3 = 36$$

.....36.....
(2)

37. The size of a packet of pasta is increased by one-quarter.
The new size is later reduced by one-quarter.

Is the new packet smaller, the same size or larger than the original?

Explain how you worked out your answer.

or let packet
= 200g

200 $\xrightarrow{+1/4}$ 250g $\xrightarrow{-1/4}$ 187.5g

less

\therefore packet is smaller

Increase by $\frac{1}{4}$: $x(1.25) = 1.25x$

Decrease by $\frac{1}{4}$: $1.25x \times 0.75 = 0.9375x$

An increase by one-quarter, followed by a decrease of one-quarter will result in a 6.25% decrease

(3)

38. The table gives information about the number of people voting for each party at an election.

Party	Number of Votes
Gold Party	12598
Pink Party	9112
Brown Party	20059
Purple Party	4466

46235 voted.

There are 52852 people who can vote

The target was that 88% of people would vote.

Was the target met?

88% of 52852 = 46509.76

Therefore the target was not met.

(3)

39. 1,935 people visit a library during one week.

The ratio children : adults is 1 : 4

5 parts

How many more adults than children visited the library?

$$1935 \div 5 = 387$$

$$387 \times 4 = 1548 \text{ — Adults}$$

$$387 \text{ — Children}$$

1161 more adults

(3)

- 40.

$$m = abc$$

Find m if $a = 3$, $b = -8$ and $c = 2$

$$m = (3)(-8)(2)$$

$$= -48$$

$$m = -48$$

(2)

41. A game is played with a five sided spinner.

Each section is a different colour.

The spinner is biased.

The table shows some of the probability of the spinner landing on each colour.

Colour	Red	Blue	Green	Pink	Black
Probability	0.34	0.1	0.22	0.22	0.12

The probability of green is equal to the probability of pink.

Calculate the probability the spinner lands on pink.

$$0.22$$

(3)

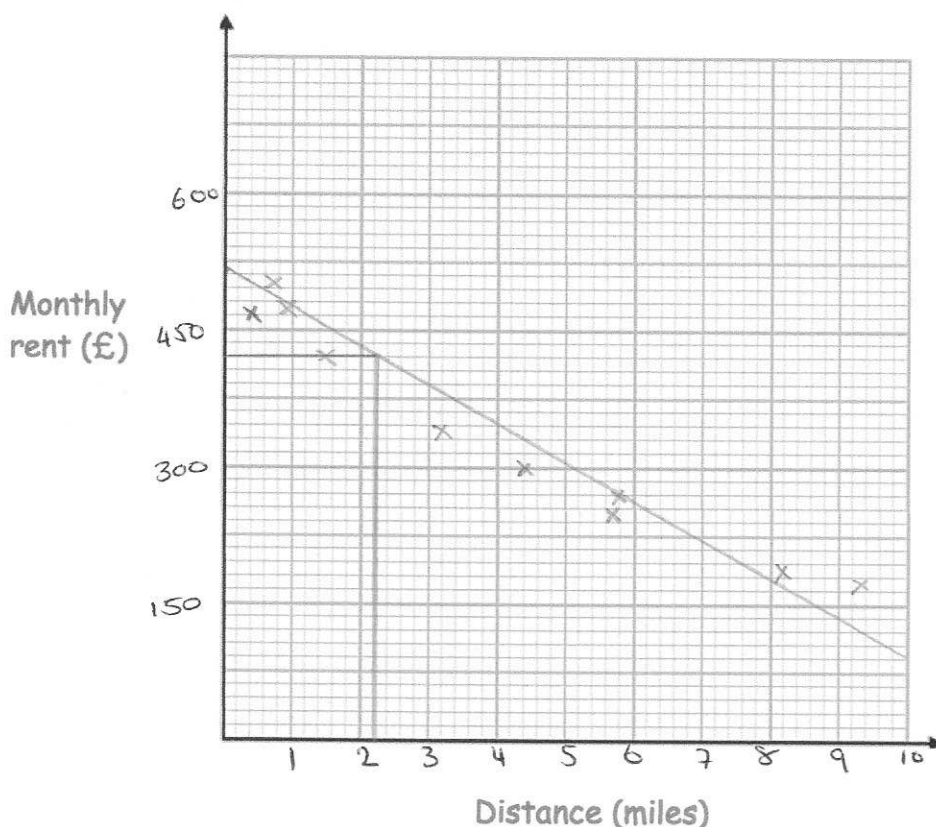
42.

The table below shows information about the monthly rent of an apartment and the distance of the apartment from a city centre, in miles.

Distance (miles)	3.2	1.5	5.7	8.2	0.7	0.9	4.4	5.8	9.3	0.4
Monthly rent (£)	340	420	250	190	500	470	300	260	170	510

- (a) Plot the data on the scatter graph below.
Clearly label your axes.

(3)



- (b) Describe the relationship between the distance from the city centre and the monthly rent.

The further away from the city centre, the less the rent

(1)

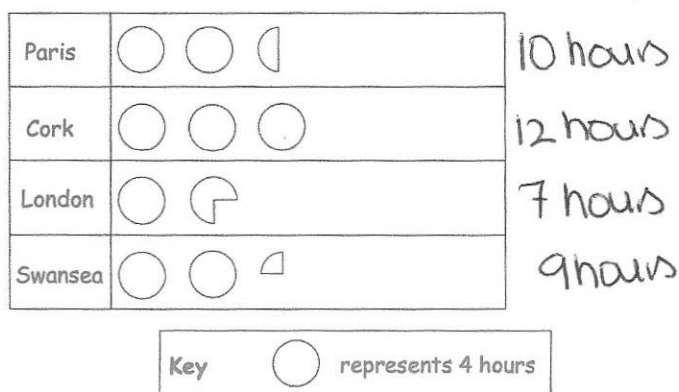
An apartment is 2.2 miles from the city centre.

- (c) Find an estimate for the monthly rent

£ 420

(2)

43. The number of hours of sunshine on a day, across a number of cities is shown below.



- (a) Which city had the most sunshine?

Cork.....
(1)

- (b) How many hours of sunshine did Swansea have?

.....9.....hours
(1)

- (c) How many more hours of sunshine did Paris have than London?

.....3.....hours
(1)

44. In a school, all 240 students study one language.

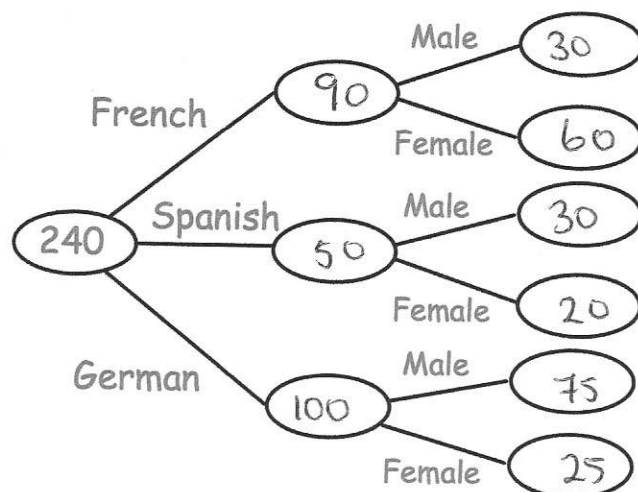
40 more students study French than Spanish.

Twice as many students study German than Spanish.

Twice as many students studying French are female than male.

60% of the students studying Spanish are male.

Three quarters of the students studying German are male.



How many of the students in the school are female?

105.....

(6)

45. Kelly has two dogs, Pixie and Fifi.

Pixie weighs 8.5 kilograms

Fifi is 720 grams lighter than Pixie.

Work out how much Fifi weighs.

State your units.

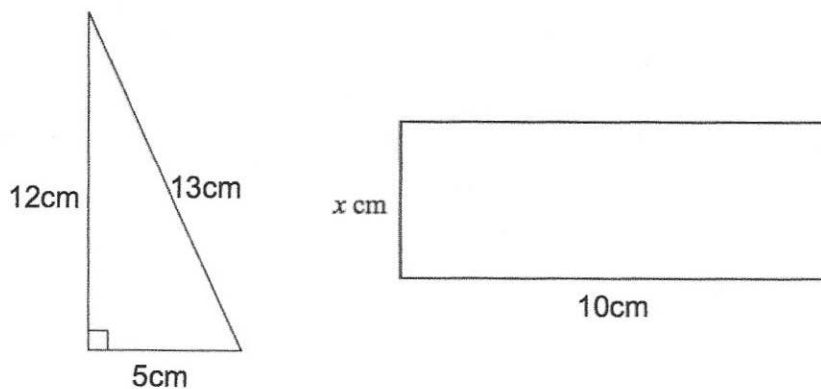
$$8.5 \text{ kg} = 8500 \text{ grams}$$

$$8500 - 720 = 7780$$

7.78 kg.....

(3)

46. Below is a right-angled triangle and a rectangle.



The area of the right-angled triangle is equal to the area of the rectangle.

Calculate x

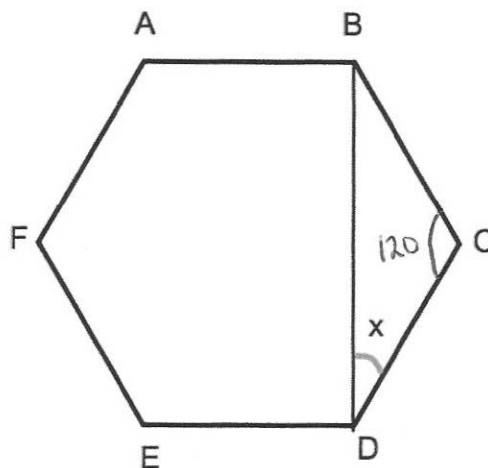
$$\frac{1}{2}(5 \times 12) = 30 \text{ cm}^2$$

$$10x = 30$$

$$x = 3 \text{ cm}$$

.....3.....cm
(4)

47. Shown below is a regular hexagon ABCDEF.



$$720 \div 6 = 120^\circ$$

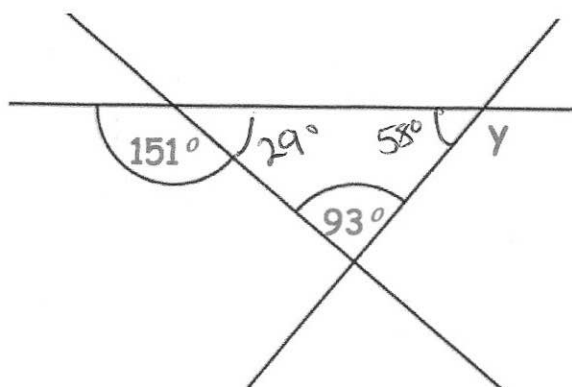
Calculate angle x.

$$180 - 120 = 60$$

$$60 \div 2 = 30$$

x = 30.....°
(3)

48. Below are 3 straight lines.



Find the size of angle y .

$$180 - 151 = 29^\circ$$

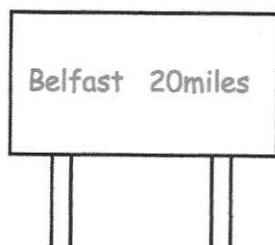
$$180 - (93 + 29) = 58$$

$$180 - 58 = 122^\circ$$

$$y = 122^\circ$$

(3)

- 49.



A village is 20 miles from Belfast.

Conor drives from the village to Belfast at 40mph

Kelly drives from the village to Belfast at 50mph

Work out how much longer the journey takes Conor.
Give your answer in minutes.

$$t = \frac{d}{s}$$

$$\text{Conor: } t = \frac{20}{40} = 0.5 \text{ hours}$$

$$\text{Kelly: } t = \frac{20}{50} = 0.4 \text{ hours}$$

$$0.5 \text{ hours} = 30 \text{ minutes}$$

$$0.4 \text{ hours} = 24 \text{ minutes}$$

$$\dots\dots\dots 6 \text{ minutes}$$

(3)

50.

Mass	Frequency
$20 < m \leq 25$	12
$25 < m \leq 30$	24
$30 < m \leq 35$	17
$35 < m \leq 40$	15
$40 < m \leq 45$	4

72

Midpoints	fx
22.5	270
27.5	660
32.5	552.5
37.5	562.5
42.5	170
	<u>2215</u>

Calculate an estimate of the mean mass.

$$\frac{2215}{72} = 30.763\ldots$$

.....30.8.....kg
(3)

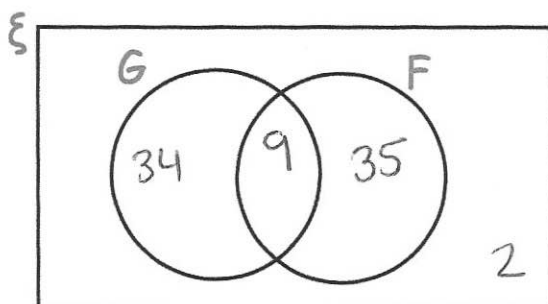
51. There are 80 students in year 11.

9 students study French and German.

35 students only study French

2 students do not study French or German.

(a) Complete the Venn diagram



(2)

(b) Work out how many students study only German.

$$80 - 9 - 35 - 2 = 34$$

.....34.....
(1)

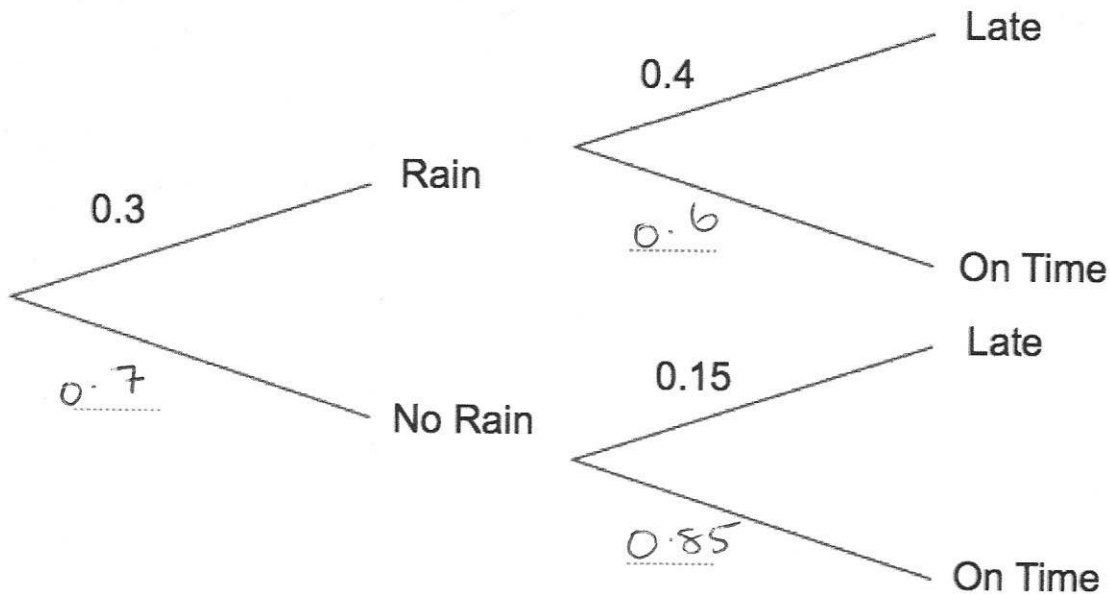
52. In a small village, one bus arrives a day.

The probability of rain in the village is 0.3.

If it rains, the probability of a bus being late is 0.4.

If it does not rain, the probability of a bus being late is 0.15.

(a) Complete the tree diagram



(2)

(b) Work out the number of days the bus will be late over a period of 80 days.

$$P(RL) = 0.3 \times 0.4 = 0.12$$

$$P(NRL) = 0.7 \times 0.15 = 0.105$$

$$0.225$$

$$0.225 \times 80 = 18$$

18 days
(3)

53. Kevin is going on holiday to Japan.
He wants to change some money into yen.

The bank only stocks ¥1000 notes.
James wants to change up to £300 into yen.
He wants as many ¥1000 notes as possible.

The exchange rate is £1 = ¥168

How many ¥1000 notes should he get?

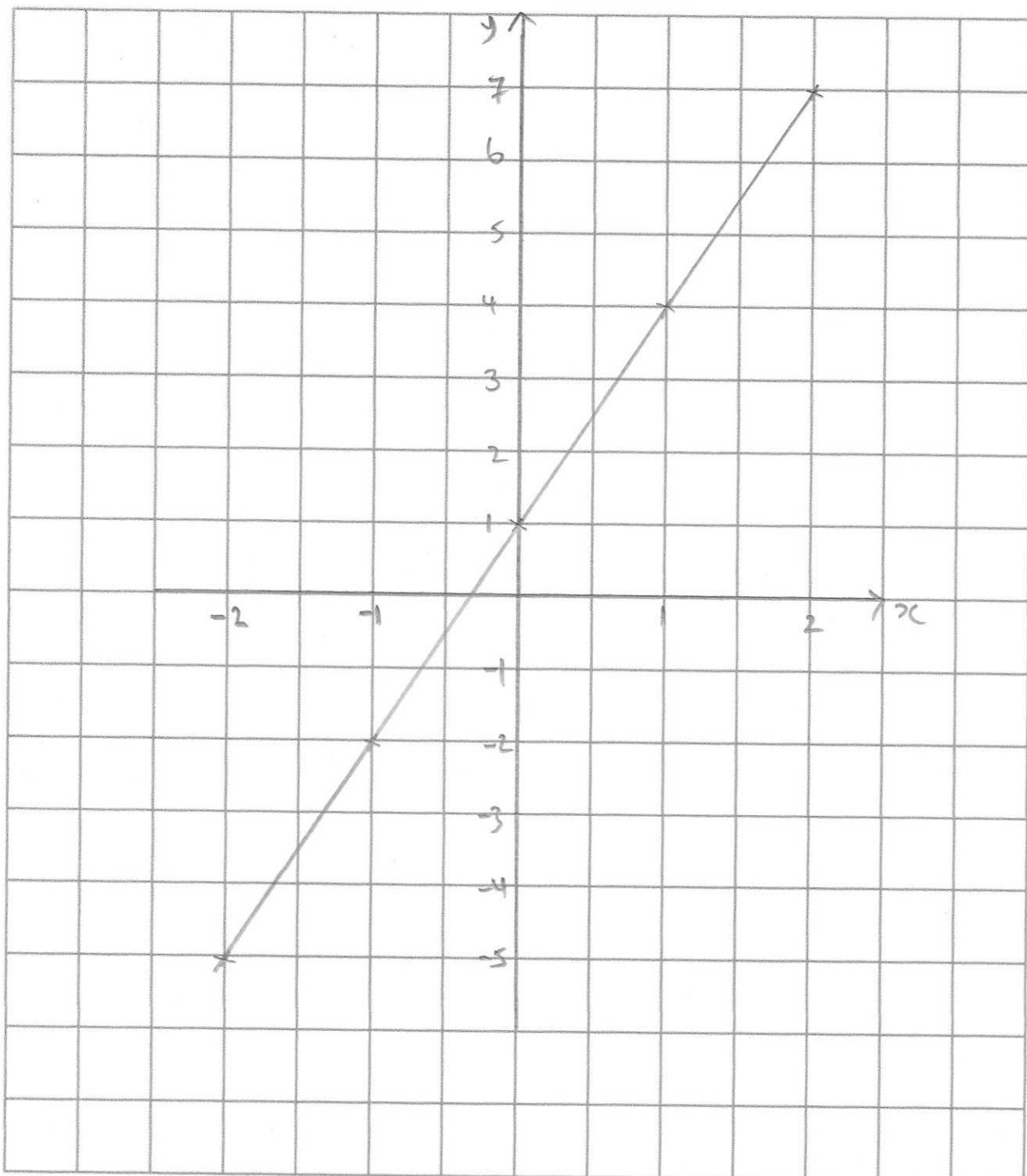
$$300 \times 168 = ¥50400$$

max ¥50,000 ∴ 50 notes

.....50 notes
(3)

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

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



(4)

55. A lamp is on sale at £22.05
This is a 10% reduction of the normal price.

What was the price of the lamp before the reduction?

$$\begin{aligned}90\% &= 22.05 \\10\% &= 2.45 \\100\% &= 24.5\end{aligned}$$

£24.50.....
(3)

-
56. The ratio of boys to girls in a school is 4 : 5
There are 220 boys in the school.

How many students attend the school?

$$\begin{aligned}220 \div 4 &= 55 \\55 \times 9 &= 495\end{aligned}$$

495.....
(3)

-
57. Alice buys a book for £19.80
A year later she sells the book for £12.87

Calculate the percentage decrease in the value of the book.

$$\frac{6.93}{19.80} \times 100 = 35\%$$

.....35%
(3)