1. On Saturday, some adults and some children were in a theatre.
The ratio of the number of adults to the number of children was 5 : 2

Each person had a seat in the Circle or had a seat in the Stalls.

$\frac{3}{4}$ of the children had seats in the Stalls.
117 children had seats in the Circle. → 117 = ¼

There are exactly 2600 seats in the theatre.

On this Saturday, were there people on more than 60% of the seats?
You must show how you get your answer.

Total number of children = 117 × 4 = 468 children (1)

A : C
= 5 : 2 (×234)
1170 : 468 (×234)

Total number of people
= 468 + 1170 = 1638 (1)

Total number of adults = 1170 adults (1)

60% of 2600 = 0·6 × 2600 = 1560 seats. (1)

Yes, there were people on more than 60% of the seats because 1638 > 1560. (1)

(Total for Question is 5 marks)

2. Daniel bakes 420 cakes.
He bakes only vanilla cakes, banana cakes, lemon cakes and chocolate cakes.

$\frac{2}{7}$ of the cakes are vanilla cakes.

35% of the cakes are banana cakes.

The ratio of the number of lemon cakes to the number of chocolate cakes is 4 : 5

Work out the number of lemon cakes Daniel bakes.

vanilla: $\frac{2}{7} \times 420 = 120$ vanilla cakes. (1)

Banana: $0.35 \times 420 = 147$ banana cakes (1)

$120 + 147 = 267$.

Lemon and chocolate $= 420 - 267 = 153$. (1)

L : C

4 : 5 = 9

÷9 → 9 parts = 153

1 part = 17 (1)

÷9 →

number of lemon cakes

$= 17 \times 4 = 68$ (1)

68

(Total for Question is 5 marks)

3. A factory makes 450 pies every day.
The pies are chicken pies or steak pies.

Each day Milo takes a sample of 15 pies to check.

The proportion of the pies in his sample that are chicken is the same as the proportion of the pies made that day that are chicken.

On Monday Milo calculated that he needed exactly 4 chicken pies in his sample.

(a) Work out the total number of chicken pies that were made on Monday.

Let x be number of chicken pies

$\frac{4}{15} = \frac{x}{450}$

$(\times 450)$ $(\times 450)$

$\frac{4 \times 450}{15} = x$

$\frac{4 \times 450}{15} = x$

$4 \times 30 = x$

$120 = x$

120

(2)

On Tuesday, the number of steak pies Milo needs in his sample is 6 correct to the nearest whole number.

Milo takes at random a pie from the 450 pies made on Tuesday.

(b) Work out the lower bound of the probability that the pie is a steak pie.

$5.5 = 5.5$ ✓

Let y = number of steak pies

$\frac{5.5}{15} = \frac{y}{450}$

$\times 450$ $\times 450$

$\frac{5.5 \times 450}{15} = y$

$5.5 \times \frac{450}{15} = y$

$5.5 \times 30 = y$

$165 = y$

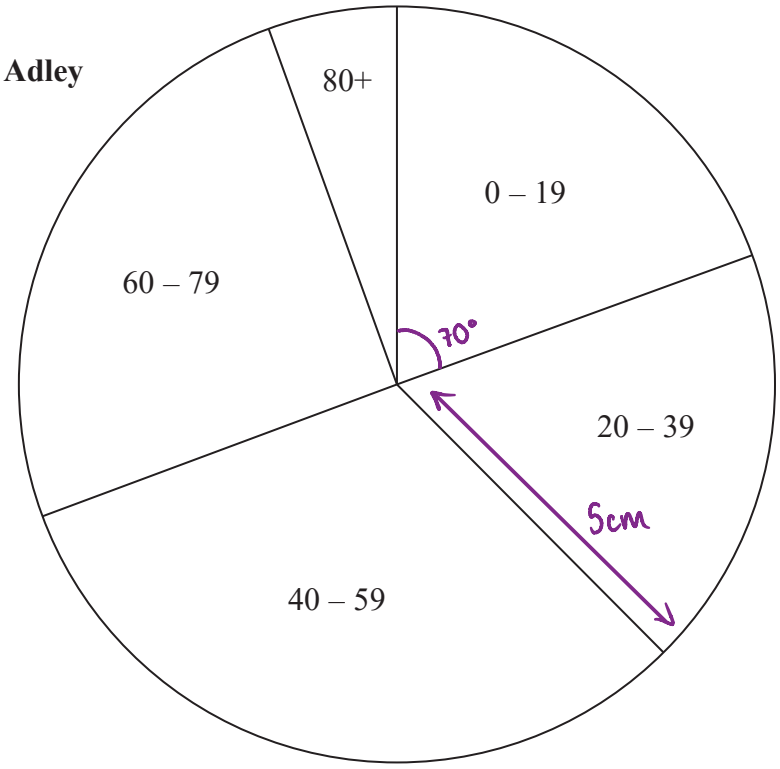
$\frac{165}{450}$ ✓

(2)

(Total for Question is 4 marks)

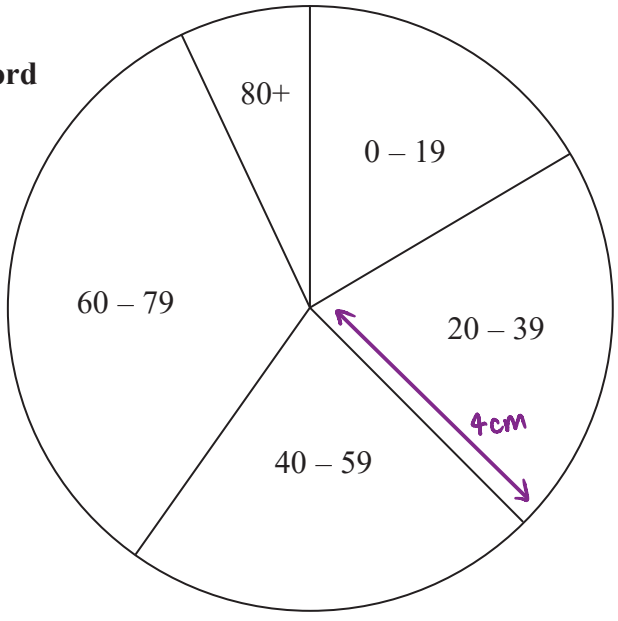
4. The pie charts give information about the ages, in years, of people living in two towns, Adley and Bridford.

Adley



Diagrams accurately drawn

Bridford



The ratio of the number of people living in Adley to the number of people living in Bridford is given by the ratio of the areas of the pie charts.

What proportion of the total number of people living in these two towns live in Adley **and** are aged 0 – 19?
Give your answer correct to 3 significant figures.

Area of circle = πr^2

Adley

$A = \pi \times 5^2$

$= 25\pi$

Area of 0-19 sector - Adley

$\frac{70}{360} \times 25\pi = 15.27$

Bridley

$A = \pi \times 4^2$

$= 16\pi$ ✓

$25\pi + 16\pi = 41\pi$

$\frac{15.27}{41\pi}$ ✓ $= 0.1185...$

$= 0.119$ (3.s.f)

0.119 ✓

(Total for Question is 3 marks)

5. Raya buys a van for £8500 plus VAT at 20%

Raya pays a deposit for the van.
She then pays the rest of the cost in 12 equal payments of £531.25 each month.

Find the ratio of the deposit Raya pays to the total of the 12 equal payments.
Give your answer in its simplest form.

A) Total cost of Van:

= 120% of £8500

$1.2 \times 8500 = £10\,200$ (1)

B) Total cost of payments:

$12 \times £531.25 = £6375$ (1)

C) Deposit: A Van cost − B payment cost

$= 10200 - 6375$

$= £3825$ (1)

C : B

Deposit : Total of 12 payments

3825 : 6375 (1)

Simplify Ratio

3825 : 6375 (÷3825)

1 : $\frac{5}{3}$

(×3) 3 : 5 (×3)

Whole number ratio

3 : 5 (1)

(Total for Question is 5 marks)

6. There are some counters in a bag.
The counters are red or white or blue or yellow.

Bob is going to take at random a counter from the bag.

The table shows each of the probabilities that the counter will be blue or will be yellow.

Colour	red	white	blue	yellow
Probability	$2x$	x	0.45	0.25

There are 18 blue counters in the bag.

The probability that the counter Bob takes will be red is twice the probability that the counter will be white.

(a) Work out the number of red counters in the bag.

Probabilities sum to 1:

$2x + x + 0.45 + 0.25 = 1$

$3x = 0.3$ (1)

$x = 0.1$

$2x = P(\text{Red}) = 0.2$ (1)

$P(\text{Blue}) = 0.45$ ← total counters

$0.45t = 18$ ← number of blue counters

$t = \frac{18}{0.45} = 40$ counters (1)

Number of red counters:

$40 \times 0.2 = 8$

8 (1)

(4)

A marble is going to be taken at random from a box of marbles.
The probability that the marble will be silver is 0.5

There must be an even number of marbles in the box.

$\frac{1}{2}t$ must be a whole number

(b) Explain why.

0.5 multiplied by an odd number will never be a whole number and we can not have half a marble. For half of a number to be an integer, the number must be even.

(1)

(Total for Question is 5 marks)

7. A bonus of £2100 is shared by 10 people who work for a company.
40% of the bonus is shared equally between 3 managers.
The rest of the bonus is shared equally between 7 salesmen.

One of the salesmen says,

"If the bonus is shared equally between all 10 people I will get 25% more money."

Is the salesman correct?
You must show how you get your answer.

100% - 40% = 60%

50% + 10% = 60% ✓

1050 + 210 = 1260 ✓

1260 ÷ 7 = 180 ✓

$$7\overline{)1260} = 180$$

Amount per salesman is £180

2100 ÷ 10 = 210 ✓

125% = 100% + 25%

= 180 + 45

= £225

No, because when split evenly, each salesman gets £210, but 25% extra from £180 is £225 ✓

(Total for Question is 5 marks)

8. Jack and Sadia work for a company that sells boxes of breakfast cereal.

The company wants to have a special offer.

Here is Jack's idea for the special offer.

> Put 25% more cereal into each box and do **not** change the price.

Here is Sadia's idea.

> Reduce the price and do **not** change the amount of cereal in each box.

Sadia wants her idea to give the same value for money as Jack's idea.

By what percentage does she need to reduce the price?

Compare price per gram → $\frac{\text{cost}}{\text{mass}}$

Let c be the cost
Let m be the mass
Let x be the multiplier for Sadia's price reduction

	Jack	Sadia
cost	c	xc
mass	1·25m	m

$\frac{c}{1{\cdot}25m} = \frac{xc}{m}$ ✓

$(\times m)$ $(\times m)$

$\frac{c}{1{\cdot}25} = xc$

$(\times 1{\cdot}25)$ $(\times 1{\cdot}25)$

$c = 1{\cdot}25xc$

$(\div c)$ $(\div c)$

$1 = 1{\cdot}25x$

$(\div 1{\cdot}25)$ $(\div 1{\cdot}25)$

$x = \frac{1}{1{\cdot}25}$

$= \frac{4}{5}$

$= 80\%$ ✓

Reduction of 20%.

20 ✓ ..... %

(Total for Question is 3 marks)

9. Deon needs 50 g of sugar to make 15 biscuits.

She also needs

three times as much flour as sugar
two times as much butter as sugar

Deon is going to make 60 biscuits.

(a) Work out the amount of flour she needs.

15 BISCUITS. ×4 → 60 BISCUITS. (1)

Sugar: 50 g		Sugar:
Flour: 150 g	×4 (1)	Flour: 600 g.
Butter: 100 g	×4	Butter: 400 g

600 (1) g

(3)

Deon has to buy all the butter she needs to make 60 biscuits.
She buys the butter in 250 g packs.

(b) How many packs of butter does Deon need to buy?

60 biscuits = 400 g butter.

$\frac{400}{250} = 1.6$ (1) → he can't buy 1.6 packs of butter.

= 2 packs of butter.

(1) 2

(2)

(Total for Question is 5 marks)

10. A shop sells packs of black pens, packs of red pens and packs of green pens.

There are

2 pens in each pack of black pens
5 pens in each pack of red pens
6 pens in each pack of green pens

On Monday,

number of packs of black pens sold : number of packs of red pens sold : number of packs of green pens sold = 7 : 3 : 4

A total of 212 pens were sold.

Work out the number of green pens sold.

Ratio of the number of pens of each colour sold:

B : R : G

(2 × 7) : (5 × 3) : (6 × 4) (1)

= 14 : 15 : 24 ⟹ 53 parts in total.

Number of green pens sold:

(1) $\frac{24}{53}$ × 212 (1) = 96 (1)

↳ proportion of green pens sold.

96

(Total for Question is 4 marks)

11. Natalie makes potato cakes in a restaurant.

She mixes potato, cheese and onion so that

weight of potato : weight of cheese : weight of onion = 9 : 2 : 1

Natalie needs to make 6000 g of potato cakes.

Cheese costs £2.25 for 175 g.

Work out the cost of the cheese needed to make 6000 g of potato cakes.

Amount of cheese needed for 6000 g of potato cakes:

P : C : O

= 9 : 2 : 1 → total 12 parts. (1)

12 parts = 6000 g ÷ 12

1 part = 500 g.

Cheese has 2 parts ∴ amount of cheese needed

= 2 × 500 g = 1000 g. (1)

Cost of 1000 g of cheese:

175 g = £2.25 (1)

× 1000/175 ↓ ↓ × 1000/175

1000 g = £12.86

(1)

£ 12.86

(Total for Question is 4 marks)