1 (a) The expected number of visitors to the park each day depends on the temperature.

Temperature	Expected number of visitors each day
Less than 21°C	700
21°C or more	900

On each of the 30 days in June

the park is open

the probability that the temperature is less than 21°C is 0.4

Work out the **total** number of expected visitors to the park in June.

[3 marks]

Less than 21°C : $0.4 \times 30 \times 700 = 8400$ (1)

21°C or more : $0.6 \times 30 \times 900 = 16\,200$

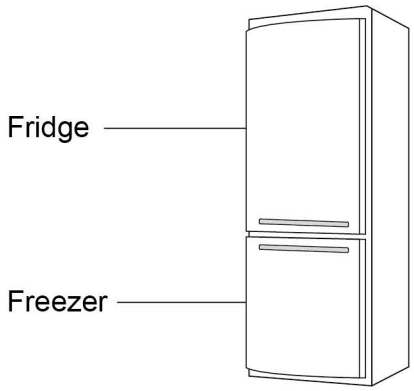
Total : $8400 + 16\,200$ (1)

$= 24\,600$

Answer 24 600 (1)

2 Information about two fridge-freezers, A and B, is shown.

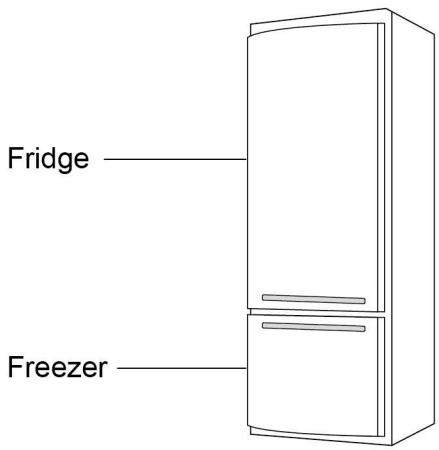
A



Total capacity is 330 litres

fridge capacity : freezer capacity = 3 : 2

B



Fridge capacity is 294 litres

fridge capacity : freezer capacity = 7 : 3

Grace buys one of these fridge-freezers.

She buys the one with the greater **freezer** capacity.

Which one does she buy?

You **must** show your working.

[4 marks]

A : $\frac{2}{3+2} \times 330 = \frac{2}{5} \times 330 = 132$ (1) (1)

B : $\frac{294}{7} \times 3 = 126$ (1)

Grace buys A. (1)

Answer A

3 A town has

a population density of 278 people per km^2

and

a population of 158 460

$$\text{population density} = \frac{\text{population}}{\text{area}}$$

The population increases to 168 720

Work out the population density after the increase.

[3 marks]

Area = $\frac{158\,460}{278}$ = 570 (1)

population density after increase = $\frac{168\,720}{570}$ (1)

= 296 (1)

Answer 296 people per km^2

4 Jess saves 2p, 5p and 10p coins.

She has

- 45 10p coins
- 8 times as many 2p coins as **10p coins**
- £17.70 in total.

Work out total **value** of 2p coins : total **value** of 5p coins

Give your answer in its simplest form.

[4 marks]

2p : $45 \times 8 = 360$ coins (1)

5p : $17.70 - (45 \times 0.10) - (360 \times 0.20)$

: $17.70 - 4.50 - 7.20$ (1)

: 6.00 (1)

2p : 7.20

2p : 5p = $7.20 : 6.00$ } ÷ 12

: $6 : 5$ (1)

Answer 6 : 5

5 A company has 123 employees.

Information about their hourly rates of pay is shown in the table.

Hourly rate, £p	Number of employees
$10 \leqslant p < 14$	66
$14 \leqslant p < 20$	32
$20 \leqslant p < 40$	15
$40 \leqslant p < 100$	10
	Total = 123

The owner of the company uses the data to make two statements.

Statement A

"Over 30% of employees have an hourly rate that is more than £17"

Statement B

"The average hourly rate of pay is more than £20"

5 (a) Show working that supports **Statement A**.

[3 marks]

$66 + \frac{1}{2}(32)$ (1)

$= 66 + 16$

$= 82$

(1)

$\frac{82}{123} \times 100\% = 66.67\%$ (less than £17)

$= 100 - 66.67 = 33.33\%$ (more than £17)

(1)

5 (b) Why might **Statement A not** be true?

[1 mark]

All employees in the second interval might earn less than £17 (1)

5 (c) Work out an estimate of the mean to support **Statement B**.

[3 marks]

$$\text{mean} = \frac{(66 \times 12) + (32 \times 17) + (15 \times 30) + (10 \times 70)}{123} \quad (1)$$

$$= \frac{792 + 544 + 450 + 700}{123}$$

$$= \frac{2486}{123} \quad (1)$$

$$= £20.21 \quad (1)$$

5 (d) Why is the mean **not** the best average to represent the data?

[1 mark]

Less than half earned more than £20. (1)

6 Jing has £2450

She saves some and gives the rest to her four brothers.

money saved : money given to brothers = 2 : 5

She gives each of her **four** brothers the **same** amount.

Does each brother receive more than £430 ?

You **must** show your working.

[4 marks]

Total ratio : 2 + 5 = 7

money she gives : $\frac{5}{7} \times 2450 = 1750$ (1) (1)

Each brother receive : $\frac{1750}{4} = 437.50$ (1)

Yes. Each receive £437.50. (1)

7 A tank contains 40 litres of water.

7 (a) Water leaks out of the tank at a rate of 1.2 litres per minute.
The leak is stopped after 20 minutes.

Show that, when the leak is stopped, the tank contains 16 litres of water.

[1 mark]

Total water leaks : $1.2 \times 20 = 24$ litres

(1)

$40 - 24 = 16$

8 Fred bought an apartment for £137 500

He made 8% profit when he sold the apartment.

He used all of this profit to pay 40% of the deposit on a house.

The deposit was one sixth of the price of the house.

Work out the price of the house.

[4 marks]

Profit : $\frac{8}{100} \times 137\,500 = 11\,000$ (1)

11 000 = 40 % of deposit

deposit = $\frac{11\,000}{0.4} = 27\,500$ (1)

price of the house = 27 500 × 6 (1)

= 165 000 (1)

Answer £ 165 000

9 4 chocolate bars and 3 packets of mints cost £4.70

5 chocolate bars and 1 packet of mints cost £4.50

Work out the cost of a chocolate bar and the cost of a packet of mints.

[4 marks]

Let chocolate bars = C and packet of mints = M

$4C + 3M = 4.70$ — (1)

$5C + M = 4.50$ — (2) ✓(1)

$M = 4.50 - 5C$ — (3)

Substitute (3) into (1):

$4C + 3(4.50 - 5C) = 4.70$ ✓(1)

$4C + 13.50 - 15C = 4.70$

$11C = 8.80$ ✓(1)

$C = 0.80$

$M = 4.50 - 5(0.80) = 0.50$

chocolate bar £0.80 ✓(1)

packet of mints £0.50

10 Town A has

a population of 84 000

an area of 7 **square miles**.

Town B has a population density of 4695 people per **square kilometre**.

$$\text{Population density} = \frac{\text{population}}{\text{area}}$$

Which town has the greater population density?

Use 1 square mile = 2.6 square kilometres

Tick a box.

Town A ☐ Town B ☑

Show working to support your answer.

[3 marks]

Town A area = 7 × 2.6 square km

= 18.2 square km

Town A population density = $\frac{84000}{18.2}$ = 4615 people per square km (2)

∴ Town B has greater population density (1)