Section Seven — Mixed Problems

Pages 45-46

1. 50%

The black and silver segments make up half of the pie chart (135° + 45° = 180°). That means that 50% of the people drove black or silver cars.

2. $\frac{1}{3}$

The total angle of the segments for blue and red cars is 90° + 30° = 120°. This as a fraction of the entire chart is $\frac{120}{360}$ which can be simplified to $\frac{1}{3}$.

3. 8

To find how long it will take to eat 40% of the bag you need to work out what $\frac{1}{20}$ is as a percentage. Convert $\frac{1}{20}$ into an equivalent fraction with a denominator of 100. Multiply the numerator and the denominator by 5 to get $\frac{5}{100}$. That means that $\frac{1}{20}$ is the same as 5%. It takes Greg 1 day to eat 5% of the bag, so it takes him 40 ÷ 5 = 8 days to eat 40% of the bag.

4. D

The pictogram shows more people chose Blueberry pie than any other pie, so this is the most popular. 1 pie icon represents 2 people, and there are 4 icons for Blueberry, so $2 \times 4 = 8$ people chose Blueberry.

5. 25p

Convert £4.50 into pence by multiplying it by 100. $4.5 \times 100 = 450$p. 9 days worth of seeds cost 450p, so 1 day's worth of seeds costs $450 \div 9 = 50$p. 2 cups of seeds are used each day, so the cost of 1 cup is $50\text{p} \div 2 = 25$p.

6. £198

150 cm = 1.5 m.
The area of the hallway is $6 \times 1.5 = 9\ m^2$
The cost of the carpet is $£22 \times 9 = £198$

7. 2000 litres

From 8:20 am to 9 am is 40 minutes.
From 9 am to 10 am is 60 minutes.
$40 + 60 = 100$ minutes. 20 litres goes into the pool every minute, so $100 \times 20 = 2000$ litres

8. £400

The area of the yard is $5 \times 8 = 40\ m^2$
Mr Taylor wants to turf half of it which is $40 \div 2 = 20\ m^2$. $4\ m^2$ of turf costs £80.
He will need $20 \div 4 = 5$ rolls of turf to cover half of his yard. 5 rolls of turf will cost $5 \times £80 = £400$

9. B

Angles on a straight line add up to 180°.
So $x = 180° - 75° - 60° = 45°$
$45° \times 4 = 180°$, so x is $\frac{1}{4}$ of 180°.

10. £100

If the mean of Mrs Farooq's gas bills is £80, then the total is $4 \times £80 = £320$.
Reading off the chart, July's bill = £40, October's = £60 and January's = £120.
$£40 + £60 + £120 = £220$, so the bill in April is $£320 - £220 = £100$

11. £80

The smallest value is for July (£40). The largest value is for January (£120).
The difference is $£120 - £40 = £80$

12. 310 kg

If the mean weight of the crop from the 5 trees is 320 kg, then the total weight would be
$5 \times 320\text{ kg} = 1600\text{ kg}$
The total crop from four trees is
$370 + 280 + 330 + 310 = 1290$ kg.
The crop from the 5th tree will be
$1600 - 1290 = 310$ kg

13. C

Volume = length x width x height
So the volume of the container is
$25 \times 10 \times 10 = 2500\ cm^3$. The container is filled with $1000\ cm^3$ of water, so the fraction of the container filled with water is $\frac{1000}{2500} = \frac{10}{25}$.
To find this as a percentage you need to turn it into an equivalent fraction with 100 as the denominator. Multiply the numerator and the denominator by 4 to get $\frac{40}{100} = 40\%$

14. B

If you read off the bar chart the number of German books is 8. There are 40 books in total, and 8 are German books. This as a fraction is $\frac{8}{40}$.
This can be simplified to $\frac{1}{5}$ if you divide the numerator and the denominator by 8.

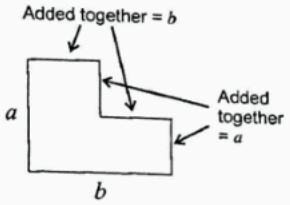
15. 10

Find how much washing liquid is needed per bucket.
1 litre = 1000 ml, so 500 ml is 0.5 litres.
In 6 litres there are 12 lots of 0.5 litres ($12 \times 0.5 = 6$).
So the total amount of washing liquid in 1 bucket = $12 \times 5\text{ ml} = 60$ ml. The bottle contains 600 ml of washing liquid, so $600\text{ ml} \div 60\text{ ml} = 10$ buckets.

16. B

The pattern uses 2 hexagons and 4 squares (which have been cut into 8 triangles).
The area of 1 hexagon is H, so the area of 2 hexagons = $2H$. The area of 1 square is S, so the area of 4 squares = $4S$. Altogether the area of Hannah's pattern is $2H + 4S$.

17. A



The two unknown sides opposite to the labelled side a add together to make a. The two unknown sides opposite to the labelled side b add together to make b. So the perimeter is $2a + 2b$.

18. B

Find which rule will give the first number in the sequence. For the first number $n = 1$, only 2 rules will give 5 as an answer:
If $n = 1$, $7n - 2 = 7 - 2 = 5$, and $n + 4 = 1 + 4 = 5$.
Try these rules for $n = 2$:
$7n - 2 = 14 - 2 = 12$, and $n + 4 = 2 + 4 = 6$.
Only $7n - 2$ gives the right number for both terms.

19. 25

If the sequence value is 173, it can be written that $173 = 7n - 2$. Adding 2 to each side gives $175 = 7n$ and so $n = 175 \div 7 = 25$

20. £66.50

Gerald is paid £3.50 for every half hour, so he is paid £3.50 × 2 = £7.00 for every hour.
Next work out how many hours he was at work for:
From 6:20 am to 4:20 pm is 10 hours.
From 4:20 pm to 4:50 pm is 30 minutes, or half an hour. So he was at work for a total of 10 and a half hours. He took 1 hour unpaid for his lunch so he got paid for 9 and a half hours work.
He was paid 9 × £7.00 = £63.00 for the nine hours, and £3.50 for the half hour. So he earned £63.00 + £3.50 = £66.50 in total.

21. 360 ml

From 4 pm on Monday to 4 pm on Tuesday is 24 hours. From 4 pm on Tuesday to 4 pm on Wednesday is 24 hours, but subtract 2 hours to get back to 2 pm. So that's 24 − 2 = 22 hours.
24 + 22 = 46 hours. 46 ÷ 2 = 23 doses, but this doesn't include her first dose, so the total number of doses = 23 + 1 = 24 doses.
1 dose = 15 ml, so 24 × 15 = 360 ml