Answers - Ratio, proportion and percentages

Year: Year 6

Answer to Question 1

a. Red to blue is **3 : 5**.
b. Blue to red is **5 : 3**. The order matters, because the ratio is written in the order of the things it compares.
c. There are 3 + 5 = 8 counters in the bag, so $\frac{3}{8}$ are red.
d. 12 : 18 divides by 6, so the ratio is **2 : 3**.
e. Write both in the same units: 40 cm to 100 cm. Divide by 20 to get **2 : 5**.

Answer to Question 2

a. The HCF of 45 and 60 is 15, so the ratio is **3 : 4**.
b. The HCF of 24, 36 and 60 is 12, so the ratio is **2 : 3 : 5**.
c. The HCF is 3, so the ratio is **2 : 3**.
d. 120p : 280p. The HCF is 40, so the ratio is **3 : 7**.
e. 2 kg = 2 000 g. 2 000 : 500 divides by 500 to give **4 : 1**.

Answer to Question 3

a. The multiplier is 12 ÷ 3 = 4, so 7 × 4 = **28**.
b. 12 ÷ 3 = 4, so the sugar is 1 × 4 = **4 g**.
c. 3 × 4 = 12, so the cost is 2.40 × 4 = **£9.60**.
d. The multiplier is 40 ÷ 8 = 5, so 5 × 5 = **25**.

Answer to Question 4

a. 3 + 5 = 8 parts. £40 ÷ 8 = £5 a part. Shares: 3 × 5 = **£15** and 5 × 5 = **£25**. Check: 15 + 25 = 40.
b. 2 + 3 + 4 = 9 parts. 72 ÷ 9 = 8. Shares: 16, 24 and 32 sweets. Check: 16 + 24 + 32 = 72.
c. 1 + 4 = 5 parts. 90 ÷ 5 = 18 kg. Shares: **18 kg** and **72 kg**.
d. 3 + 4 = 7 parts. 56 ÷ 7 = 8. Shares: 24 and 32. The second friend gets **8 more** stickers.

Answer to Question 5

a. 3 × 4 = 12 cm and 5 × 4 = 20 cm. The new rectangle is **12 cm by 20 cm**.
b. The scale factor is 12 ÷ 4 = 3. The other sides are 6 × 3 = **18 cm** and 8 × 3 = **24 cm**.
c. 6.5 × 5 = **32.5 km**.
d. 40 ÷ 5 = **8 cm** on the map.

Answer to Question 6

a. 10% = 35, so 20% = **70**.
b. 10% = £4.80 and 5% = £2.40, so 15% = **£7.20**.
c. Class A: 18/24 = 3/4 = 75%. Class B: 21/30 = 7/10 = 70%. **Class A** is higher.
d. 25% of £80 = £20. £80 + £20 = **£100**.

Answer to Question 7

a. 3 parts = 450 g, so 1 part = 150 g. Bananas = 2 × 150 = **300 g**.
b. 450 + 300 = **750 g**.
c. $\frac{2}{5}$ of the mixture is bananas, so $\frac{2}{5}$.
d. 2 parts = 600 g, so 1 part = 300 g. Strawberries = 3 × 300 = **900 g**. The total is 900 + 600 = **1 500 g**.

Answer to Question 8

a. 3 parts = 15 tins, so 1 part = 5. Blue = 2 × 5 = **10 tins**.
b. 10 + 15 = **25 tins**.
c. 2 parts = 20 tins, so 1 part = 10. White = 3 × 10 = **30 tins**. Total = 20 + 30 = **50 tins**.
d. Blue is 2 out of 5 parts, so $\frac{2}{5} = \frac{40}{100} =$ **40%**.

Answer to Question 9

a. 3 + 4 = 7 parts. 28 ÷ 7 = 4. Boys: 3 × 4 = **12**. Girls: 4 × 4 = **16**.
b. 28 + 7 = **35** pupils.
c. There are 12 boys and 16 + 7 = 23 girls, so the ratio is **12 : 23**. This cannot be simplified (12 and 23 have no common factor).
d. 16 ÷ 28 = 4/7 = 0.571..., so about **57%**.

Answer to Question 10

a. Lake path: 6.5 × 5 = **32.5 km**. River path: 4.2 × 5 = **21 km**. Hill path: 2.8 × 5 = **14 km**.
b. The **Lake path** is the longest. 32.5 − 14 = **18.5 km** longer than the Hill path.
c. 32.5 ÷ 3.5 = 9.28..., so it takes about **9 hours 17 minutes** (9.29 hours).
d. 4.2 − 1.5 = 2.7 cm on the map, and 2.7 × 5 = **13.5 km**.

Answer to Question 11

a. 3 + 5 = 8 parts. £40 ÷ 8 = £5. Sam gets 3 × £5 = **£15**. Tia gets 5 × £5 = **£25**.
b. Sam worked 3 hours, so 1 part is 1 hour. Tia worked **5 hours**.
c. £16 ÷ 8 = £2 a part. Sam gets **£6**. Tia gets **£10**.
d. Sam: £15 + £6 = **£21**. Tia: £25 + £10 = **£35**. Check: 21 + 35 = 56 = 40 + 16.

Answer to Question 12

a. 2 + 3 + 4 = 9 parts. 72 ÷ 9 = 8. Red: **16**, green: **24**, yellow: **32**.
b. 72 − 16 = **56 sweets**.
c. 24 : 32 divides by 8 to give **3 : 4**.
d. 24 ÷ 56 = 3/7 = 0.428..., so about **43%**.

Answer to Question 13

a. 4.8 m = 480 cm. 480 ÷ 24 = **20 cm**.
b. 3 × 24 = 72 cm, so the real wheel has a diameter of **72 cm**.
c. 1.68 m = 168 cm. 168 ÷ 24 = **7 cm**.
d. 5 × 24 = 120 cm = **1.2 m**.

Answer to Question 14

a. The multiplier is 10 ÷ 4 = **2.5**.
b. Rice: 200 × 2.5 = **500 g**. Milk: 800 × 2.5 = **2 000 ml**. Sugar: 60 × 2.5 = **150 g**. Butter: 20 × 2.5 = **50 g**.
c. 800 ml serves 4 people, so 200 ml serves 1 person. 2 000 ÷ 200 = **10 people**.
d. 200 : 60 divides by 20 to give **10 : 3**.

Answer to Question 15

a. Rovers: 18/24 = 75%. United: 21/30 = 70%. Town: 14/20 = 70%. City: 20/25 =

80%.
b. **City** has the best record, with 80%.
c. **United and Town** both have 70%, because $\frac{21}{30} = \frac{7}{10}$ and $\frac{14}{20} = \frac{7}{10}$.
d. Rovers: 23 out of 29 = 79.3%. Town: 19 out of 25 = 76%. (To the nearest 0.1%, Rovers 79.3% and Town 76.0%.)
e. No. Rovers have played more matches, so the total number of wins is not a fair comparison. Percentages (or fractions) compare fairly: 75% for Rovers and 70% for Town.

Answer to Question 16

a. 1 + 2 + 3 = **6 parts**.
b. 1.8 tonnes = 1 800 kg. 1 800 ÷ 6 = 300 kg a part. Cement: **300 kg**. Sand: **600 kg**. Gravel: **900 kg**.
c. 300 ÷ 25 = **12 bags**.
d. 2/6 = 1/3 = 33.3...%, so about **33%**.
e. Sand is 2 parts out of 6. 200 kg of sand is 2 parts, so 1 part = 100 kg. The total mass is 6 × 100 = **600 kg**.

Answer to Question 17

a. 3 × 2.5 = **7.5 m** and 5 × 2.5 = **12.5 m**.
b. Small bed: 2 × (3 + 5) = 16 m. Large bed: 2 × (7.5 + 12.5) = 40 m. The perimeter is multiplied by the scale factor: 16 × 2.5 = 40.
c. Small bed: 3 × 5 = 15 m². Large bed: 7.5 × 12.5 = 93.75 m². The area is 93.75 ÷ 15 = **6.25** times bigger, which is 2.5 × 2.5.
d. 40 × 4.80 = **£192**.
e. 150 ÷ 4.80 = 31.25, so she can buy **31.25 m** (31 m of whole metres).

Answer to Question 18

a. 10% of £240 = £24 and 5% = £12, so 15% = £36. Sale price = 240 − 36 = **£204**.
b. 5% of £204 = £10.20. Price = 204 − 10.20 = **£193.80**.
c. Saving = 240 − 193.80 = **£46.20**. Percentage = 46.20 ÷ 240 = 0.1925, which is 19.25%, so **19%** to the nearest whole number (not 20%).
d. 20% of £250 = £50, so the price is £200. The first shop (with the loyalty card) is cheaper: 200 − 193.80 = **£6.20** cheaper.
e. 193.80 + 18 = **£211.80**.

Answer to Question 19

a. 3.50 ÷ 5 = **70p** each.

b. 8 × 70p = 560p = **£5.60**.
c. Pack of 12: 780p ÷ 12 = **65p**. Pack of 20: 1 200p ÷ 20 = **60p**.
d. The pack of 20 has the lowest cost for each pen (60p), so it is the **best value**.
e. 60 ÷ 20 = 3 packs of 20, costing 3 × £12 = **£36**. (60 ÷ 12 = 5 packs would cost £39, and 12 packs of 5 would cost £42.)

Answer to Question 20

a. Blue minus red is 3 − 2 = 1 part, and 1 part = 10 beads. Red = 20, blue = 30, so there are **50 beads** altogether.
b. For a ratio of 1 : 1 there must be 30 red beads, so **10** red beads are added. The total is now 60 beads.
c. 3 + 2 = 5 parts. 60 ÷ 5 = 12. The friends get **36 beads** and **24 beads**.