Answers - Decimals and percentages

Year: Year 7

Answer to Question 1

a. Line up the points and write 3.6 as 3.60: $4.75 + 3.60 =$**8.35**.
b. Write 12.3 as 12.30 and subtract: $12.30 - 5.78 =$**6.52**. Check: $6.52 + 5.78 = 12.3$.
c. Write 2.14 as 2.140: $0.906 + 2.140 =$**3.046**.
d. Write 20 as 20.000: $20.000 - 7.365 =$**12.635**.
e. Fill gaps with zeros: $15.40 + 8.07 + 0.90 =$**24.37**.

Answer to Question 2

a. $32 \times 4 = 128$; one decimal place in the question, so **12.8**.
b. $6 \times 7 = 42$; two decimal places in total, so **0.42**.
c. $45 \times 12 = 540$; three decimal places in total, so 0.540, which is **0.54**.
d. $72 \div 6 = 12$ and 7.2 is ten times smaller than 72, so **1.2**.
e. Multiply both by 100: $240 \div 8 =$**30**.
f. Multiply both by 10: $0.45 \div 9 =$**0.05**. Check: $0.05 \times 0.9 = 0.045$.

Answer to Question 3

Fraction	Decimal	Percentage
$\frac{3}{4}$	0.75	75%
$\frac{7}{20}$	0.35	35%
$\frac{3}{25}$	0.12	12%
$\frac{3}{8}$	0.375	37.5%
$\frac{9}{200}$	0.045	4.5%

Method: to go from a decimal to a percentage multiply by 100, and to go back divide by 100. $\frac{3}{4} = 3 \div 4 = 0.75$. $0.35 = \frac{35}{100} = \frac{7}{20}$ after dividing by 5. $12\% = \frac{12}{100} = \frac{3}{25}$. $\frac{3}{8} = 3 \div 8 = 0.375$. $0.045 = \frac{45}{1000} = \frac{9}{200}$.

Answer to Question 4

a. Divide by 10: $80 \div 10 =$**£8**.
b. 25% is a quarter: $64 \div 4 =$**16 kg**.
c. 10% = £12, so 30% = £36 and 5% = £6. Then 35% = $36 + 6 =$**£42**.
d. 1% = $250 \div 100 = 2.5$, so 7% = $7 \times 2.5 =$**17.5 m**.
e. 12.5% is one eighth: $400 \div 8 =$**50**.

Answer to Question 5

a. An increase of 10% means 110%, multiplier 1.1: $60 \times 1.1 =$**£66**.
b. A decrease of 20% leaves 80%, multiplier 0.8: $150 \times 0.8 =$**£120**.
c. 115% gives multiplier 1.15: $40 \times 1.15 =$**46 kg**. (15% of 40 is 6.)
d. 75% remains, multiplier 0.75: $84 \times 0.75 =$**£63**. (25% of 84 is 21.)

Answer to Question 6

a. Write as a fraction and convert: $\frac{18}{24} = \frac{3}{4} = 0.75 =$**75%**.
b. $\frac{7}{50} = \frac{14}{100} =$**14%**.
c. Use the same units first: 1.5 m = 150 cm. $\frac{45}{150} = 0.3 =$**30%**.
d. 2 kg = 2000 g. $\frac{350}{2000} = 0.175 =$**17.5%**.

Answer to Question 7

a. 20% off leaves 80%, multiplier 0.8. Trainers $65 \times 0.8 =$**£52**, football $18 \times 0.8 =$ **£14.40**, tracksuit $48 \times 0.8 =$**£38.40**.
b. She spends $52 + 14.40 + 38.40 =$**£104.80**. Full price $65 + 18 + 48 = £131$, so she saves $131 - 104.80 =$**£26.20** (which is 20% of £131).
c. Second shop: $70 \times 0.75 = £52.50$. The first shop is cheaper by $52.50 - 52 =$**50p**.
d. Take a further 10% off the sale price: $38.40 \times 0.9 =$**£34.56**.

Answer to Question 8

a. Divide mark by total and multiply by 100: Asha $\frac{36}{40} =$**90%**, Ben $\frac{27}{30} =$**90%**, Cara $\frac{45}{60} =$**75%**, Dev $\frac{17}{20} =$**85%**, Ella $\frac{70}{80} =$**87.5%**.
b. The highest percentage is 90%, so **Asha and Ben** are joint best, even though

their raw marks are different.

c. The lowest is Cara with 75%, which is above 70%, so **everyone passed**.

d. Out of 100 her mark would equal her percentage: $\frac{70}{80} = 0.875 = 87.5\%$. **Yes**, she is right.

Answer to Question 9

a. 3% of £200: $200 \times 0.03 =$**£6** per year.

b. 2% of £250: $250 \times 0.02 =$**£5** per year.

c. Simple interest is the same each year. Priya: $200 + 4 \times 6 =$**£224**. Max: $250 + 4 \times 5 =$**£270**.

d. $200 + 6n > 230$ means $6n > 30$, so $n > 5$. After 5 years she has exactly £230, so she first has more after **6 years** (£236).

Answer to Question 10

a. 12% more means 112%: $8500 \times 1.12 =$**9 520** steps.

b. 15% fewer means 85% of Tuesday: $9520 \times 0.85 =$**8 092** steps.

c. Change $= 8092 - 8500 = -408$. $\frac{-408}{8500} = -0.048$, so a decrease of **4.8%**.

d. 8 500, 9 520 and 8 092 are all below 10 000, so he did **not** meet his target on any day.

Answer to Question 11

a. The percentages must total 100%: $100 - 45 - 20 - 15 =$**20%** honey.

b. 1% of 500 g is 5 g. Oats $45 \times 5 =$**225 g**, nuts **100 g**, fruit **75 g**, honey **100 g** (total 500 g).

c. 40% = 240 g, so 1% = $240 \div 40 = 6$ g and 100% = **600 g**.

d. Second bar 240 g of oats, first bar 225 g, so the **second** has $240 - 225 =$**15 g** more.

Answer to Question 12

a. Percentage points are subtracted directly: $85 - 18 =$**67%**.

b. A drop of 12% of the current level leaves 88%: $67 \times 0.88 = 58.96$, about **59%**.

c. Percentage points are a simple difference (85% to 67%). A drop of 18% is 18% of 85, which is 15.3 points, leaving 69.7%, a smaller drop.

d. 85% of 4000: $4000 \times 0.85 =$**3 400 mAh**.

Answer to Question 13

a. $100 - 38 - 24 - 18 =$**20%** choose a sandwich.
b. 1% of 250 is 2.5. Pizza $38 \times 2.5 =$**95**, pasta **60**, salad **45**, sandwich **50** (total 250).
c. 15% more salad means 115%: $45 \times 1.15 = 51.75$, about **52 pupils**.
d. One day: $250 \times 2.40 = £600$. Five days: $600 \times 5 =$**£3 000**.

Answer to Question 14

a. 15% off leaves 85%: $320 \times 0.85 =$**£272**.
b. First take £40 off: £280. Then 5% off: $280 \times 0.95 =$**£266**.
c. $272 - 266 = 6$, so **deal B** is cheaper by **£6**.
d. 12% of £266: $266 \times 0.12 =$**£31.92**.

Answer to Question 15

a. Adding 20% VAT means 120%: $480 \times 1.2 =$**£576**.
b. £560 is 120% of the price before VAT, so divide by 1.2: $560 \div 1.2 =$**£466.67**.
c. Compare prices with VAT: $576 - 560 = 16$. The **second laptop** is cheaper by **£16**.
d. 10% off leaves 90%: $576 \times 0.9 =$**£518.40**.

Answer to Question 16

a. Multiply year by year. Year 1: $24000 \times 1.05 = 25200$. Year 2: $25200 \times 1.03 = 25956$. Year 3: $25956 \times 0.98 = 25436.88$, about **25 437**.
b. $\dfrac{25437 - 24000}{24000} = 0.0599$, so about **6.0%**.
c. Each percentage is applied to a different amount (the population at that time), so they cannot simply be added. Here the true answer is 5.99%, close to 6% only by chance.
d. $25437 - 24000 =$**1 437** more people.

Answer to Question 17

a. A: 75% of 80 is **£60**. B: $\dfrac{2}{3}$ of 80 is **£53.33**. C: $80 - 20 =$**£60**.
b. £53.33 is the lowest price, so **shop B** is cheapest (a third is more than 25%).
c. 10% off £60 leaves 90%: $60 \times 0.9 =$**£54**.
d. $\dfrac{20}{80} = \dfrac{1}{4} =$**25%**, the same as shop A.

Answer to Question 18

a. Ali multiplied wrongly: $0.15 \times 60 = 9$, since 10% is 6 and 5% is 3. The answer is **9**.
b. Beth found the increase but not the new price. The new price is $80 + 20 =$**£100**.
c. Carl lost the decimal point: $32 \times 5 = 160$, with two decimal places, gives **1.6**.
d. Dina used the wrong number. The fall is £10, and $\frac{10}{50} =$**20%**, not 40%.

Answer to Question 19

a. Each year interest = 4% of the start amount. Year 1: 40, end 1 040. Year 2: $1040 \times 0.04 = 41.60$, end 1 081.60. Year 3: $1081.60 \times 0.04 = 43.26$, end 1 124.86.
b. From the table, after 3 years she has **£1 124.86**.
c. Simple interest gives £40 a year: $1000 + 120 = 1120$. Compound gives $1124.86 - 1120 =$**£4.86** more.
d. Year 4: $1124.86 \times 1.04 = 1169.85$. Year 5: $1169.85 \times 1.04 = 1216.65$. She first exceeds £1 200 after **5 years**.

Answer to Question 20

a. Sale: $50 \times 0.8 = 40$. Increase: $40 \times 1.2 =$**£48**.
b. **No**. The 20% decrease was of £50 (£10) but the 20% increase was of £40 (only £8), so the price ends £2 lower.
c. To get from £40 back to £50 we need £10 more: $\frac{10}{40} =$**25%** increase.
d. Let the price be P. Increase: $1.2P$. Decrease: $0.8 \times 1.2P = 0.96P$. 0.96 is 96%, so the price is 4% lower than at the start, whatever P is.