

1 Fraction of an amount



a) $\frac{3}{8}$ of a number is 21 more than $\frac{1}{5}$ of it.

Find the number.

b) x is $\frac{2}{3}$ of y , and y is $\frac{3}{4}$ of z . What fraction of z is x ?

$$a) \frac{3}{8} - \frac{1}{5} = \frac{7}{40}, 21 \div 7 \times 40 = 120$$

$$b) \frac{2}{3} \times \frac{3}{4} = \frac{1}{2}$$

2 Percentage of an amount



a) x is 30% of y . What percentage of x is y ?

Give your answer to 1 decimal place.

b) $a\%$ of b is 30. Work out $b\%$ of $2a$.

$$a) y \div 0.3y \times 100 = 333.3\%$$

$$b) \text{both are } ab \div 100, \text{ so } 2 \times 30 = 60$$

3 One number as a percentage of another



a) A circle of radius 4 cm is drawn inside a square of side 8 cm. What percentage of the square does the circle cover? Give an exact answer.

b) 45% of a school are boys. 20% of the boys and 30% of the girls walk to school. What percentage of the school walks?

$$a) 16\pi \div 64 \times 100 = 25\pi\% \text{ (about 78.5\%)}$$

$$b) 0.45 \times 20 + 0.55 \times 30 = 25.5\%$$

4 Percentage change



a) A rectangle's length goes up by 10% and its width goes down by 10%. Find the percentage change in its area.

b) A price goes up by $x\%$ and then down by $x\%$.

Overall it has fallen by 9%. Find x .

$$a) 1.1 \times 0.9 = 0.99: \text{a } 1\% \text{ decrease}$$

$$b) (1 + x/100)(1 - x/100) = 0.91$$

$$b) x^2/10\,000 = 0.09, x = 30$$

Percentages, growth and decay

revision mat answers



5 Reverse percentages



a) A shop sells a lamp for £56.70, making a profit of 35% of what it paid. How much profit does it make?

b) A value rises by 40%. What percentage decrease takes it back to where it started? Give your answer to 2 decimal places.

$$a) 56.70 \div 1.35 = 42, \text{ so } £14.70$$

$$b) 1 \div 1.4 = 0.7143$$

$$b) 28.57\%$$

6 Simple interest



a) An account pays simple interest. After 4 years it is worth £1596 and after 7 years £1743. How much was invested?

b) Work out the rate of interest a year.

$$a) 1743 - 1596 = 147 \text{ in 3 years, so } 49 \text{ a year}$$

$$a) 1596 - 4 \times 49 = £1400.00$$

$$b) 49 \div 1400 \times 100 = 3.5\%$$

7 Compound growth



a) £4000 is invested at $r\%$ compound interest a year.

After 3 years it is worth £4630.50. Find r .

b) At 6% compound interest a year, after how many whole years has an investment first doubled?

$$a) 4630.50 \div 4000 = 1.157625, \sqrt[3]{1.157625} = 1.05$$

$$b) 1.06^{11} = 1.898, 1.06^{12} = 2.012$$

$$a) r = 5 \quad b) 12 \text{ years}$$

8 Compound decay



a) A machine loses 8% of its value each year. After 3 years it is worth £9733.60. What was it worth when new?

b) Car A is worth £20 000 and loses 18% a year. Car B is worth £15 000 and loses 10% a year. After how many whole years is A first worth less than B?

$$a) 9733.60 \div 0.92^3 = £12\,500.00$$

$$b) \text{year 3: } £11\,027.36 > £10\,935.00$$

$$b) \text{year 4: } £9042.44 < £9841.50, 4 \text{ years}$$