

% symbol

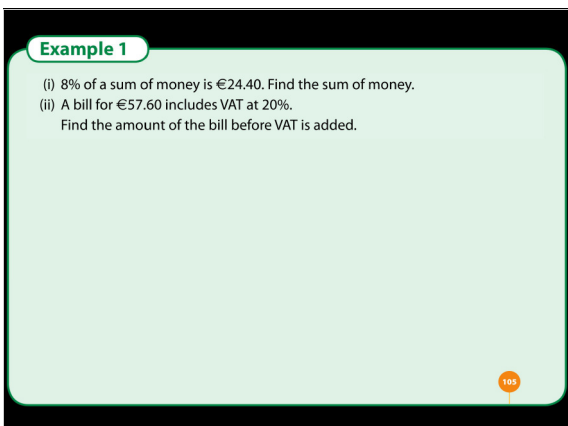
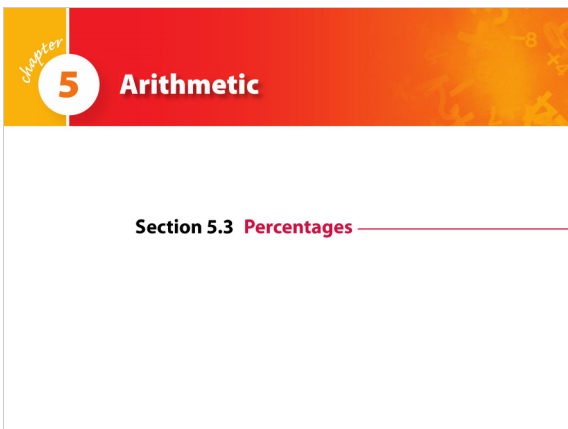
1) To change a percentage to a fraction  
Put the percentage over 100 and simplify.

Eg  $60\% \rightarrow \text{fraction } \frac{60}{100} = \frac{6}{10} \frac{3}{5}$   
Simplify HCF

2) To change a fraction to a percentage  
Multiply by 100% and put % symbol in answer

Eg  $\frac{4}{5} \rightarrow 90 \quad \frac{4}{5} \times \frac{100}{1} = \frac{400}{5} = 80\%$

Classwork Pg 106 Q1+2



VAT, margin, mark up and costing

Cost price: What the shop keeper pays 100% for the goods

Selling price: The price the seller put on the goods either profit or loss.

Eg1) A laptop is sold for €1,028.50 which includes VAT at 21%. Find the cost price.

$$100\% + 21\% = 121\%$$

$$\text{Laptop} + \text{VAT} = \text{Total cost}$$

$$121\% = 1,028.50$$

$$1\% = 1,028.50 / 121 = 8.5$$

$$100\% = 8.5 \times 100 = €850$$

Eg2) A plumber charges €2500, before VAT is added on. The charge after VAT is added is €2837.50. Calculate the rate of VAT which was charged.

$$\text{VAT} = 2837.50 - 2500 = €337.5$$

$$\frac{337.5}{2500} \times 100 = 13.5\%$$

Mark ups and Margins

Mark up is the profit as a percentage of the cost price

Formula:  $\frac{\text{Profit}}{\text{Cost Price}} \times 100$

$$\text{Profit} = \frac{\text{Selling Price} - \text{Cost Price}}{\text{Cost Price}} \times 100$$

Margin: on an item sold is the profit as a percentage of the selling price.

Formula:  $\frac{\text{Profit}}{\text{Selling Price}} \times 100$  where the selling price is the cost price plus the profit.

Eg1) It costs a cafe 48cent to make a cup of coffee

A customer buys a cup of coffee for €3.00. Calculate

- i) The mark up (profit as % of cost price)
- ii) the margin (the profit as % of the selling price)

Cost price = 0.48

Selling Price = 3.00

Profit = Selling - Cost Price  
 $3.00 - 0.48 = 2.52$

$$\frac{2.52}{0.48} \times 100 = 525\%$$

$$\frac{2.52}{3.00} \times 100 = 84\%$$

### Example 2

By selling a car for €14 400, a dealer would lose 4% on the purchase price.

- What did the dealer pay for the car?
- Find his percentage profit if he had sold the car for €17 250.

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### Exercise 5.3

Fraction key  $\left[\frac{\square}{\square}\right]$  calc.

1. Express each of these as a percentage:

(i)  $0.25 \xrightarrow{\times 100} 25\%$     (ii)  $0.34 \xrightarrow{\times 100} 34\%$     (iii)  $\frac{1}{4} \times 100 = 25\%$     (iv)  $\frac{2}{5} \times 100 = 40\%$     (v)  $\frac{3}{20} \times 100 = 15\%$

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### Exercise 5.3

2. Express each of these percentages as a decimal:  $\div 100$

(i)  $75\% = \frac{3}{4} = 0.75$     (ii)  $50\% = 0.5$     (iii)  $64\% = 0.64$     (iv)  $6\% = 0.06$     (v)  $2\frac{1}{2}\% = 0.025$

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### Exercise 5.3

To get a % of a number "of" means multiply.

3. Work out each of these:

(i) 15% of 75    (ii) 80% of 70 **56**    (iii) 45% of 120 **54**  
(iv) 9% of €350 **€31.5**    (v) 26% of €850 **€221**    (vi) 29% of 600 cm **174 cm**

$75 \times 15$  [SHIFT] [C] = 11.25  
%    |  
Bracket key

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Exercise 5.3

4. Find (i)  $2\frac{1}{2}\%$  of 300 (ii)  $7\frac{1}{2}\%$  of €380 (iii) 120% of €400

$$7.5$$

$$28.5$$

$$480.$$

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Exercise 5.3

5. Write these as percentages:  
 (i) 20 out of 80 (ii) 30 out of 200 (iii)  $2\frac{1}{2}$  out of 10

$$25\%$$

$$30/200 \times 100$$

$$0.25 \times$$

$$20/80 \times 100$$

$$= 15\%$$

$$25\%$$

$$= 25$$

H/W Pg 106 Q6,7,8.

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Exercise 5.3

6. (i) Express 510 marks as a percentage of 600 marks.  
 (ii) Express 50 ml as a percentage of 1 litre.

$$i) \frac{510}{600} \times 100 = 85\%$$

$$ii) \frac{50}{1000} \times 100 = 5\%$$

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Exercise 5.3

7. If 35% of a number is 297.5, find the number.

$$35\% = 297.5$$

$$1\% = \frac{297.5}{35} = 8.5$$

$$100\% = 8.5 \times 100 = 850.$$

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Exercise 5.3

8. Work out each of these:

- (i) 30% of 150      (ii) 80% of 140      (iii) 35% of 140  
 (iv) 32% of 180      (v) 16% of 200 kg      (vi) 69% of €88

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Exercise 5.3

9. (i) Increase 12 by 50%      (ii) Increase 140 by 15%  
 (iii) Decrease 75 by 20%      (iv) Decrease 250 by 3%  
 (v) Increase 120 by  $12\frac{1}{2}\%$       (vi) Decrease 45 by 5%

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Exercise 5.3

10. In a sale, the price of a piece of furniture was reduced by 15%. If the sale price was €1360, what was the price before the sale?

cost price = ? 100%  
 Selling price 100% - 15% = 85%  
 $85\% = 1360$       H/W  
 $1\% = \frac{1360}{85} = 16$       Pp 106  
 $100\% = 16 \times 100 = €1600$       Q11+12

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Exercise 5.3

11. In a sale, the marked prices are reduced by 30%.  
 (i) Calculate the sale price of a jacket if the marked price is €350.  
 (ii) Find the marked price of a dress if the sale price is €168.

i)  $350 \times 30\% = €105$   
 $350 - 105 = €245$   
 ii) MP Reduktion SP  
 $100 - 30 = 70\%$        $70\% = 168$   
 $1\% = \frac{168}{70} = 2.4$   
 $100\% = 2.4 \times 100 = €240$

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Exercise 5.3

12. The price of a television set is €780.  
If this includes VAT at 20%, find the price before VAT is added.

$$\begin{aligned} ? + \text{VAT} &= \text{Sale Price} \\ 100\% + 20 &= 120\% \end{aligned}$$

$$\begin{aligned} 120\% &= 780 \\ 1\% &= \frac{780}{120} = 6.5 \\ 100\% &= 6.5 \times 100 = \text{€}650 \end{aligned}$$

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Exercise 5.3

13. By selling a jacket for €416, a store makes a profit of 30%.  
i) Find the cost price of the jacket.  
ii) If the jacket is reduced by 10% in a sale, calculate the percentage profit the store now has on the cost price.

$$\begin{aligned} \text{CP} + \text{Profit} &= \text{Selling Price} \\ 100\% + 30\% &= 416 \\ ? & \\ 130\% &= 416 \\ 1\% &= \frac{416}{130} = 3.2 \\ 100\% &= 3.2 \times 100 = \text{€}320 \end{aligned}$$

$$\begin{aligned} \text{ii) } 416 \times 10\% &= 41.6 \\ 416 - 41.6 &= 374.4 \\ \text{Profit } 374.4 & \\ - 320.0 & \\ \hline 54.4 & \\ \% \text{ Profit } \frac{\text{Profit}}{\text{Cost Price}} & \\ \frac{54.4}{320} \times 100 &= 17\% \end{aligned}$$

HW Pg 107  
Q16, 17.

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Exercise 5.3

14. An estate agent charges 0.75% fees on the sale price of a house.  
i) Find his fees if a house is sold for €350,000 and VAT @ 20% on his fees is added on.  
ii) Find the selling price of a house if the fees are €2775 before VAT is added.

$$\begin{aligned} 350,000 \times 0.75\% &= \text{€}3375 \text{ fees} \\ \text{VAT on the fees} &= 3375 \times 20\% = 675 \\ \text{Total fees} &= 3375 + 675 = \text{€}4050 \end{aligned}$$

$$\begin{aligned} 0.75\% &= 2775 \\ 1\% &= \frac{2775}{0.75} = 3700 \\ 100\% &= 3700 \times 100 = 370,000 \end{aligned}$$

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Exercise 5.3

15. Over a five-year period the population of a town increased from 145,000 to 205,000.  
What percentage increase is this, correct to the nearest whole number?

$$\begin{aligned} \text{Increase } 205000 & \\ - 145000 & \\ \hline 60,000 & \end{aligned}$$

$$\begin{aligned} \% \text{ increase} &= \frac{\text{Increase}}{\text{The amount on which the increase occurred.}} \times 100 \\ &= \frac{60000}{145,000} \times 100 \\ &= 41\% \end{aligned}$$

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Exercise 5.3

16. When an item is sold for €176, the profit is 10% on the cost price. When the selling price is increased to €192, calculate the percentage profit on the cost price.

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Exercise 5.3

17. A greengrocer buys 30 boxes of strawberries at €5.25 each and sells 28 of them at a profit of 30%. If the remaining two boxes are unsaleable, find his percentage profit on the deal.

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Exercise 5.3

18. By selling a laptop for €1150 a store makes a profit of 25%.  
At what price should the laptop be sold to make a profit of 20%?

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Exercise 5.3

19. (i) Express  $\frac{2}{3}$  of 0.96 as a percentage of 5.12.  
(ii)  $2\frac{1}{2}\%$  of the weight of sea water is made up of salt.  
What weight of sea water would be required to yield 100 kg of salt?

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Exercise 5.3

20. A boat salesman receives a commission on the price at which he sells a boat. The commission is calculated at the rate of 5% of the first €10 000 of the sale price of the boat plus 3% of the remainder.
- Calculate his commission on a boat which he sells for €20 000.
  - Find the sale price of a boat on which he gets a commission of €740.

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Exercise 5.3

21.  $\frac{2}{9}$  of the girls in a school are over the age of 16. The school has 675 pupils of whom 56% are girls. How many girls in the school are over 16 years?

$$56\% \times 675 = \text{Girls } 378$$

$$\frac{2}{9} \times 378 = 84 \text{ girls over 16.}$$

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Exercise 5.3

22. The price of a games console is €484 which includes VAT at 21%. Store A offers a discount of  $22\frac{1}{2}\%$  on the selling price. Store B says that it will not charge VAT. In which store is the selling price the cheaper and by how much?

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Exercise 5.3

23. A petrol-engined car costs €28 600 and a diesel-engined model of the same car costs €31 500. Information on the running costs of the two cars is given in the table below:

	Cost of fuel per litre	No. of km/litre
Petrol car	€1.45	7
Diesel car	€1.36	9

If each car depreciates by 20% in the first year, calculate the difference in running costs (including depreciation) for the first year during which both cars travelled 18 900 km.

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**Answers 5.3**

1. (i) 25% (ii) 34% (iii) 25%  
(iv) 40%
2. (i) 0.75 (ii) 0.5 (iii) 0.64  
(iv) 0.06 (v) 0.025
3. (i) 11.25 (ii) 56 (iii) 54  
(iv) €31.50 (v) €221 (vi) 174 cm
4. (i) 7.5 (ii) €28.50 (iii) €480
5. (i) 25% (ii) 15% (iii) 25%
6. (i) 85% (ii) 5%
7. 850
8. (i) 45 (ii) 112 (iii) 49  
(iv) 57.6 (v) 32 kg (vi) €60.72
9. (i) 18 (ii) 161 (iii) 60  
(iv) 242.5 (v) 135 (vi) 42.75
10. €1600
11. (i) €245 (ii) €240
12. €650
13. (i) €320 (ii) 17%
14. (i) €4050 (ii) €370 000
15. 41% 16. 20%
17.  $21\frac{1}{3}\%$  18. €1104
19. (i) 12.5% (ii) 4000 kg
20. (i) €800 (ii) €18 000
21. 84
22. Store B by €23.50
23. €479