PROJECT MATHS

Text & Tests

Leaving 3 Certificate

chapter 5

Arithmetic

Section 5.3 Percentages

① Decimal / fraction → Percentage
- Multiply the fraction/decimal by 100
- Use % sign in answer

Eg Convert each of the following to a percentage

① $\begin{array}{r} .28 \\ \times 100 \\ \hline 28\% \end{array}$

② $\frac{2}{5} \times 100 = 40\%$

③ $\begin{array}{r} .875 \\ \times 100 \\ \hline 87.5\% \end{array}$

④ $\frac{3}{8} \times 100 = 37.5\%$

(2) Percentage to fraction/decimal

- Divide the percentage by 100

Eg. Convert each of the following to a fraction in its simplest form

(1) 30% (2) 22% (3) 65% (4) 62.5%

$\frac{30}{100} = \frac{3}{10}$ $\frac{22}{100} = \frac{11}{50}$ $\frac{65}{100} = \frac{13}{20}$ $\frac{62.5}{100} = \frac{5}{8}$

[SD] = .3

Example 1

(i) 8% of a sum of money is €24.40. Find the sum of money.

(ii) A bill for €57.60 includes VAT at 20%.
Find the amount of the bill before VAT is added.

Example 2

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

(i) What did the dealer pay for the car?

(ii) Find his percentage profit if he had sold the car for €17 250.

Exercise 5.3

1. Express each of these as a percentage:

(i) 0.25 25%

(ii) 0.34 34%

(iii) $\frac{1}{4}$ 25%

(iv) $\frac{2}{5}$ 40%

(v) $\frac{3}{20}$ 15%

Exercise 5.3

2. Express each of these percentages as a decimal:

(i) 75%

$\frac{3}{4}$

$\cdot 75$

(ii) 50%

$\frac{50}{100} = \frac{1}{2}$

$\cdot 5$

(iii) 64%

$\frac{64}{100} = \frac{16}{25}$

$\cdot 64$

(iv) 6%

$\frac{3}{50} = \cdot 06$

(v) $2\frac{1}{2}\%$

$\frac{1}{40} = \cdot 025$

(3) Find the percentage of a given amount

Method = $\frac{\text{Given } \%}{100} \times$ amount.

Eg) What is 25% of 24.

$\frac{25}{100} \times 24 = 6$

Eg) Find 8% of 168

Calculator [168] × 8 [SHIFT] [(] = 13.44

Bracket key

Exercise 5.3

HW

3. Work out each of these:

(i) 15% of 75 (ii) 80% of 70 (iii) 45% of 120

(iv) 9% of €350 (v) 26% of €850 (vi) 29% of 600 cm

Exercise 5.3

HW

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

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

Exercise 5.3

6. (i) Express 510 marks as a percentage of 600 marks.

(ii) Express 50 ml as a percentage of 1 litre.

Exercise 5.3

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

$35\% = 297.5$

$1\% = \frac{297.5}{35} = 8.50$

$100\% = 8.50 \times 100 = 850$

Exercise 5.3

HW

8. Work out each of these:

(i) 30% of 150 45

(ii) 80% of 140 112

(iii) 35% of 140 49

(iv) 32% of 180

57.6%

58%

(v) 16% of 200 kg

32kg

(vi) 69% of €88

€60.72

Percentage Increase.

Q increase €134 by 9%

① Get 9% of 134 and add it on

$134 + 12.06 = €146.06$

② €134 = 100% + 9% = 109% (increase)

$134 \times 109\% = €146.06$

% sign [SHIFT] [C] [=]

③ $\frac{109}{100} = 1.09 \times 134 = €146.06$

% Decrease

Q Decrease 890 by 26%

① Get 26% and subtract

$890 \times 26\% = 231.4$

$890 - 231.4 = 658.6$

② Work out %

$100\% - 26\% = 74\%$

$890 \times 74\% = 658.6$

Q1) A persons wages were increased from €260 per week to €279.50. Find the % increase

$$\begin{array}{r} 279.50 \\ -260 \\ \hline 19.50 \end{array}$$ increase

$$\frac{19.50}{260} \times 100$$

$$= 7.5\%$$

Q2) A playstation costs €336 after a discount of 20% has been taken off. What was the marked price of the playstation.

€336 = 80%

4.2 $\frac{336}{80}$ = 1% Unitary method.

4.2 x 100 = 100%

€420 marked price before reduction.

(Q3) A solicitors fee for the sale of a house is $2\frac{1}{2}\%$ of the selling price. If the fee is €10,500 calculate the selling price?

$2\frac{1}{2}\% = €10,500$

$1\% = \frac{10,500}{2.5} = 4200$

$100\% = 4200 \times 100 = €420,000$

Per

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%

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?

$100 - 15 = 85$

$1360 = 85\%$

$1.6 = \frac{1360}{85} = 1\%$

$1.6 \times 100 \quad 100\%$

€1600

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.

1) 350 × 30% = 105

−105

€245 sale price.

2) Full price?

€168 = 70%

2.4 $\frac{168}{70}$ = 1%

2·4 × 100 100%

€240 marked price.

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.

100%

TV + VAT

Cost 100% + 20% = 120%

120% = 780

$1\% = \frac{780}{120} = 6.5$

$100\% = 6.5 \times 100 = 650.$

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.

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 €450 000 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.

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?

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.

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.

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%?

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?

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.

(i) Calculate his commission on a boat which he sells for €20 000.

(ii) Find the sale price of a boat on which he gets a commission of €740.

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?

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?

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.

Answers 5.3

1. (i) 25% (ii) 34% (iii) 25%
(iv) 40% (v) 15%

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