

Grade 8 Percentages Worksheet

Conversions

1 Express as fractions in lowest terms:

- | | | | |
|---------------------|---------------------|--------------------|---------|
| a 85% | b 42% | c 105% | d 15% |
| e 48% | f $7\frac{1}{2}\%$ | g $6\frac{1}{4}\%$ | h 132% |
| i $16\frac{2}{3}\%$ | j $33\frac{1}{3}\%$ | k 160% | l 0.25% |

2 Express as decimals:

- | | | | |
|---------|-----------|----------|---------|
| a 92% | b 106% | c 112.4% | d 88.2% |
| e 7.5% | f 1% | g 256% | h 0.05% |
| i 1150% | j 0.0037% | k 342.8% | l 63.7% |

One Quantity as a Percentage of Another

3 Express as a percentage:

- | | |
|----------------------------|----------------------------|
| a 40 marks out of 50 marks | b 21 marks out of 35 marks |
| c 5 km out of 40 km | d 500 m out of 1.5 km |
| e 8 km out of 58 km | f 130 kg out of 2.6 tonnes |
| g 4 hours out of 1 day | h 3 months out of 3 years |

4 Anastasia was given €20 pocket money and Emma was given €24. Anastasia saved €7 while Emma saved €9. Who saved the greater percentage of their pocket money?

5 Matt spent \$40 on jeans, \$25 on a top and \$65 on shoes. He received \$20 change from \$150. What percentage of his money did Matt spend on:

- a jeans b a top c shoes
d all of his clothes?

6 Maya scored 32 out of 40 for a Maths test and 41 out of 55 for a Science test. For which test did she score a lower percentage?



Finding a percentage of a quantity

1 Find:

- | | |
|------------------------------|--------------------------------|
| a 30% of 90 kg | b 25% of €170 |
| c 4% of 50 L | d 75% of 40 km |
| e 6.5% of \$540 | f 95% of 5 m |
| g $47\frac{1}{2}\%$ of £1400 | h $1\frac{1}{2}\%$ of \$53 600 |



2 Solve the following problems:

- Su-la scored 45% in her test out of 80. What mark did she score?
- John scored 72% for an examination marked out of 150. How many marks did he actually score out of 150?
- A mixture of petrol and oil for a two-stroke lawn mower contains 85% petrol. How much oil is required for 18 litres of the fuel mixture?
- A real estate agent receives $4\frac{1}{2}\%$ commission on the sale of all property she handles. How much does she receive for a house she sells for £148 500?
- A share farmer receives 65% of the proceeds of the sale of a crop of wheat. If the wheat is sold for \$62 400, how much does he receive?
- To insure goods to send them overseas it costs the exporter $2\frac{1}{2}\%$ of the value of the goods. If the goods are valued at €16 400, what will the insurance cost?



- 3 38.8% of Canada's population live in Ontario. The population of Ontario is 12.9 million.
- Use the unitary method to find the population of Canada.
 - If 2.8% of Canadians live in Nova Scotia, how many actually live in Nova Scotia?

Percentage Increase and Decrease

Profit and Loss

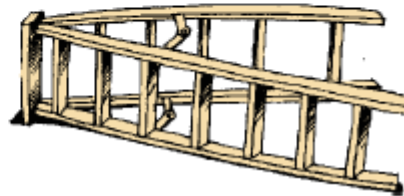
- For the following items, find the: **i** profit or loss **ii** selling price
 - a bicycle is purchased for \$300 and marked up 80%
 - a ring is purchased for €650 and marked down 45%
 - a house is purchased for £137 000 and sold at a 15% profit
 - a car is purchased for ¥2 570 000 and sold at a 22% loss.
- A bicycle costs \$260 and is sold for \$480. Calculate the profit as a percentage of the cost price.
- A greengrocer buys fruit and vegetables from the market and sells them at a 25% mark up. On one particular morning, her fruit and vegetables cost her €500. If she sells all of her produce, find: **a** her profit **b** her total income.
- A 30 m roll of wire mesh was bought wholesale for £216. If it is sold for £8.50 per metre, find the profit and express it as a percentage of the wholesale or cost price.

- A used car firm pays \$6000 for a car, but, because of financial difficulties, has to sell it immediately and receives only \$4920 for the sale. Find the loss incurred by the used car firm and express this loss as a percentage of the cost price.



- Ulrich and Jade purchased a new house for £320 000. Due to interest rate rises after 3 years they were unable to afford their mortgage repayments and had to sell the house for £285 000. Find:
 - the loss incurred
 - the loss as a percentage of their total costs.

- A hardware store has a closing down sale. They advertise an aluminium ladder at \$256. If the wholesale or cost price of the ladder was \$274, find the loss and express it as a percentage of the cost price.



Discount

- Find the discount offered on the following items and hence find the sale price:
 - a pair of shoes marked at €70 and discounted 40%
 - a suit marked at £150 and discounted 25%
 - a cap marked at \$24 and discounted $12\frac{1}{2}\%$.
- A plumber buys supplies worth €220 but is given a 5% discount. What does she save with the discount?
- A builder buys timber worth €4800 but is given a 12% discount. What does he pay for the timber?
- A dressmaker buys material in bulk. It is marked at ¥13 200 but she is given a $7\frac{1}{2}\%$ discount. How much does she actually pay for the material?
- Ronan purchases a CD marked at €28 but actually pays €23.80. What percentage discount was he given?
- Nghia saw a car advertised for sale at \$17 875, having been discounted from \$27 500. Calculate the percentage discount.
- A supermarket employee buys groceries worth ¥7600 but is only charged ¥7030. What employee discount did she receive?

Percentage Change

- Find the percentage increase in the following, to 1 decimal place if necessary:
 - £80 changes to £96
 - €14 000 changes to €16 000
 - 32 hours changes to 37.5 hours
 - 180 cm changes to 185 cm
 - 42 kg changes to 49 kg
 - \$156 000 changes to \$164 000
 - 3.5 kg changes to 7 kg
 - 52.4 L changes to 61.7 L
- My dairy herd produced a daily average of 467 L of milk last year. This year production has increased to 523 L. What is the percentage increase in milk production?
- Find the percentage decrease in the following:
 - \$80 to \$70
 - 95 kg to 90 kg
 - 60 hours to 40 hours
 - 8 km to 4 km
 - \$155 to \$140
 - €16 to €4
- Increase \$1000 by 10% and then decrease your answer by 10%. What do you notice?
- My parents increased my pocket money by 10% and then three months later increased it by a further 10%. My father said this was an increase of 21%. Can you explain this?

Application Problems

- 1 When a car priced at €14 200 is bought, a further 10% must be added for tax. What is the selling price of the car?
- 2 A leather coat costs a fashion store \$150. They will sell it for a 70% profit. Find:
 - a the selling price of the coat
 - b the profit as a percentage of the selling price.
- 3 A real estate company buys a block of units for €326 000. They spend €22 000 on renovations and repairs. Three months later they are able to sell the units at a profit of 11% on their total investment. Find the total sale price for the block of units.



- 4 The car firm *AA Autos* paid \$13 600 for a car, but were forced to sell it for a 15% loss. For what price did they sell the car?
- 5 A share trader buys WMC shares for \$9.50 each. She will sell her shares if they lose 20% of their value. At what price will she sell her WMC shares?
- 6 A washing machine is priced at €440 but advertised for sale with a 30% discount. What will it cost to buy?
- 7 Answer the questions posed in the **Opening Problem** on page 74.
- 8 Dan Brogen's Electrical buys a television set for \$720. They add 30% to get the showroom price. At a sale the store offers a 15% discount. Find:
 - a the customer's price
 - b the profit, as a percentage of the cost price.
- 9 My pocket money is €15 per week. When I turn 14 it will be increased by 200%. What will my pocket money be when I turn 14?
- 10 Find the percentage change in the area of a rectangle if all of its side lengths are:
 - a increased by 20%
 - b decreased by 20%.
- 11 A machine costing \$80 000 loses value or *depreciates* at 10% per year. Find its value after 2 years.

Original Amount

- Find the original amount given that:
 - after an increase of 25% the price was RM250
 - after an increase of 35% the price was \$243
 - after a decrease of 10% the price was £81
 - after a decrease of 17% the price was €37.35
 - after a decrease of 37.5% the price was 115 pesos
 - after a decrease of $22\frac{1}{2}\%$ the price was €9300
- 'Blacks Furniture Mart' sells a lounge suite for \$3280.50, making a profit of 35% on the cost price. How much did the business pay for the lounge suite?
- A retailer sells a microwave oven for €640. This is a 25% profit on the cost price. How much did the retailer pay for the microwave oven?
- An electrical firm sells a washing machine for \$383.50, making a 30% profit on the wholesale or cost price. Find the wholesale price of the machine.
- Jason sells a bicycle for \$247 at a loss of 35%. What did Jason pay for the bicycle originally?

Simple Interest

- Find the simple interest payable on an investment of:
 - \$4000 at 8% p.a. for 5 years
 - £1500 at 11% p.a. for 3 years
 - €2500 at $10\frac{1}{2}\%$ p.a. for 2 years
 - \$20 000 at $12\frac{1}{4}\%$ p.a. for 4 years.
- Find the simple interest payable on an investment of:
 - \$5000 at 7% p.a. over 6 months
 - €8000 at 9% over 3 months
 - ¥1 600 000 at $3\frac{1}{2}\%$ p.a. over 10 months
 - £11 500 at $5\frac{1}{4}\%$ p.a. over 18 months.
- Stella Ho deposits €46 000 in a special investment account on March 17th. If the account pays $9\frac{1}{2}\%$ p.a. simple interest and she withdraws the money on June 30th, how much will her investment have earned during this time?
- Tony Giacomini deposited \$1600 on July 3rd in a special investment account which earns 13% p.a. simple interest. On August 17th he deposited another \$5600 in the account. If he closed the account on November 12th by withdrawing the total balance, calculate how much his investment has earned over this period of time.

- 5 If £2000 is borrowed under simple interest terms, how much must be repaid after:
- a 3 years at 5% p.a.
 - b 8 months at 12% p.a.
 - c 4 years at $8\frac{1}{2}\%$ p.a.?
- 6 Jamil borrows \$5400 from the finance company to buy his first car. The rate of simple interest is 13% per annum and he borrows the money over a 5 year period. Find:
- a the amount Jamil must repay the finance company
 - b his equal monthly repayments. **Hint:** There are 60 months in 5 years.

Compound Interest 1

- 1 Calculate:
- a the simple interest earned on €2000 at 5% p.a. for 3 years
 - b using a table, the compound interest earned on €2000 at 5% p.a. for 3 years.
- 2 If £50 000 is invested at 9% p.a. compound interest, use a table to find:
- a the final amount after 2 years
 - b how much interest was earned in the 2 year period.
- 3 Use a table to determine the interest earned for the following investments:
- a €4000 at 8% p.a. compound interest for 2 years
 - b \$12000 at 6% p.a. compound interest for 3 years
 - c £500 at 3% p.a. compound interest for 3 years.

Compound Interest 2

- 1
 - a What will an investment of \$3000 at 10% p.a. compound interest amount to after 3 years?
 - b What part of this is interest?
- 2 How much compound interest is earned by investing €20 000 for 4 years at 12% p.a.?
- 3 £5000 is invested for 2 years at 10% p.a. What will this investment amount to if the interest is calculated as:
 - a simple interest
 - b compound interest?
- 4
 - a What will an investment of \$30 000 at 10% p.a. compound interest amount to after 4 years?
 - b What part of this is interest?
- 5 How much compound interest is earned by investing €80 000 at 9% p.a. over a 3 year period?
- 6 £6000 is invested for 2 years at 15% p.a. What will this investment amount to if the interest is calculated as:
 - a simple interest
 - b compound interest?
- 7 You have €8000 to invest for 3 years and there are 2 possible options you have been offered:

Option 1: Invest at 9% p.a. simple interest.

Option 2: Invest at 8% p.a. compound interest.

 - a Calculate the amount accumulated at the end of the 3 years for both options and decide which option to take.
 - b Would you change your decision if you were investing for 5 years?
- 8 What percentage increase will occur if I invest any amount over a 4 year period at 10% p.a. compound interest? **Hint:** Let the principal be 1000 of your local currency.
- 9 An investment of \$5000 at 7% interest compounded annually over x years will grow to $\$5000 \times (1.07)^x$. Enter the function $Y_1 = 5000 \times (1.07)^X$ into a graphics calculator and use the calculator to find:
 - a the value of the investment after
 - i 5 years
 - ii 10 years
 - iii 20 years
 - b how long it takes for the investment to increase to:
 - i \$10 000
 - ii \$20 000
 - iii \$40 000.

Comment on your answers.