Grade 8 Mathematics
Learner workbook
Whole Numbers

Learner name:

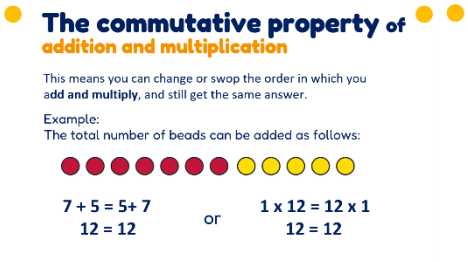
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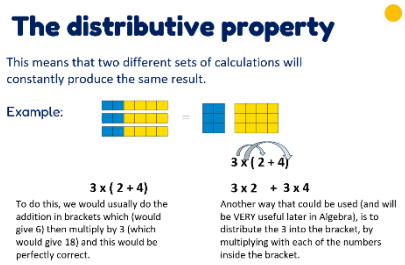
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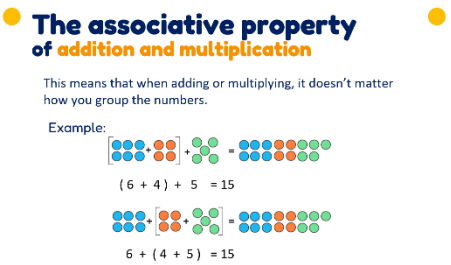
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Lesson 1: Revision if properties of whole numbers







1. Use the commutative property to make the equation equal
   1.1. $4 \times 5 =$
   1.2. $7 + 9 =$
   1.3. $12 \times 3 =$
   1.4. $241 + 29 =$
2. Use the associative property to make the equation equal
   2.1. $(2 + 5) + 3 =$
   2.2. $(4 + 6) + 2 =$
   2.3. $3 + (6 + 7) =$
   2.4. $5 + (3 + 11) =$
3. Use the associative property to show the equation is equal.
   3.1. $(7 \times 4) \times 2 =$
   3.2. $(3 \times 4) \times 3 =$
4. Show that the following equations are true, by using distributive property
   4.1. $5 \times (3 + 8) =$
   4.2. $3 \times (7 + 4) =$
   4.3. $2 \times (8 + 6) =$
5. Identity property
   5.1. $(2 \times 3) \times 1$
   5.2. $(4 + 0) \div 1$
   5.3. $(8 \times 3) + 0$
   5.4. $(3 + 1) \times 0$
   5.5. $16 \div 0$

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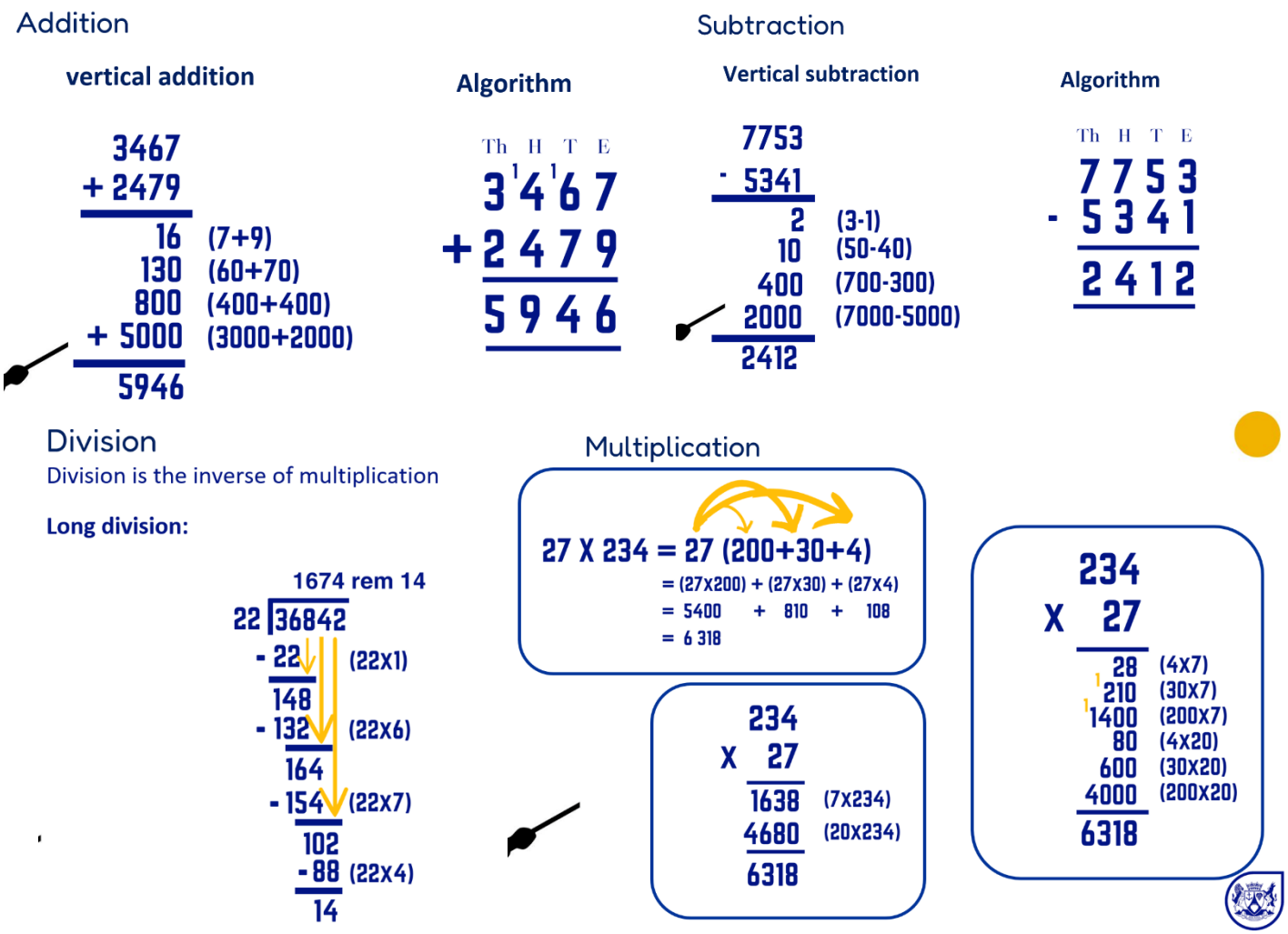
6. Identify the property in each of the following:

   6.1. (32 + 11) + 89 = 32 + (11 + 89)

   6.2. 20 (5 + 7) = 20 x 5 + 20 x 7

   6.3. 17 + 46 + 23 = 17 + 23 + 46

Lesson 2: Revision of Calculation Techniques



1. Estimate the answers for each of the following sums:

   1.1. 921 + 367 ≈

   1.2. 829 - 764 ≈

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2. Now do the following calculations. Do not use a calculator

   2.1. 921 + 367 =

   2.2. 829 – 764 =

3. Calculate each of the following. Do not use a calculator.

   3.1. $276 \times 67 =$

   3.2. $178 \times 84 =$

   3.3. $7284 \div 48 =$

   3.4. $8347 \div 24 =$

4. The municipal head gardener wants to buy young trees to plant along the main street of the town. The young trees cost R27 each and an amount of R9 400 has been budgeted for the trees. He needs 324 trees. Do you think he has enough money?

Lesson 3: Multiples, factors and prime numbers

1. Write down the first 10 multiples of the following numbers:

   1.1. 5

   1.2. 12

   1.3. 7

2. Write down the factors of the following numbers:

   2.1. 54

   2.2. 62

3. Write down the factor pairs of the following number

   3.1. 24

4. Find all the prime numbers between 1 and 100 in a systematic way. The following method, known as the Sieve of Eratosthenes, can be used. The steps of this process are provided below.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

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4.1. Use the following steps of the Sieve to find the prime numbers

- Cross 1 out, which is not prime
- Cross out all multiples of two, except 2
- Cross out all multiples of three, except 3
- Cross out all multiples of five, except 5
- Cross out all the multiples of seven, except 7
- Shade the remaining numbers

The shaded numbers are all the prime numbers between 1 and 100 😊

4.2. How many prime numbers are there between 1 and 100?

4.3. Why is it not necessary to cross out the multiples of 4, 6, 8 or 9?

4.4. How many pairs of primes are consecutive natural numbers?

4.5. Can the product of two prime numbers be prime? Explain your answer.

5. Use the numbers below to answer the questions that follow:

18 , 19 , 23 , 24 , 25 , 26 , 29 , 30 , 31 , 34 , 36 , 45

5.1. Write down the prime numbers

5.2. List the odd numbers

5.3. Write down the multiples of 5

5.4. Write down three consecutive composite numbers

5.5. State the smallest number that has exactly four factors

Lesson 4: Finding the LCM and HCF

1. Write down the first 8 multiples and identify all the common multiples of each of the following pairs. Identify then the LCM.

   1.1. LCM of 3 and 4

2. What are the common factors and HCF for these pairs of numbers?

   2.1. 8 and 24

   2.2. 6 and 9

   2.3. 6 , 8 and 12

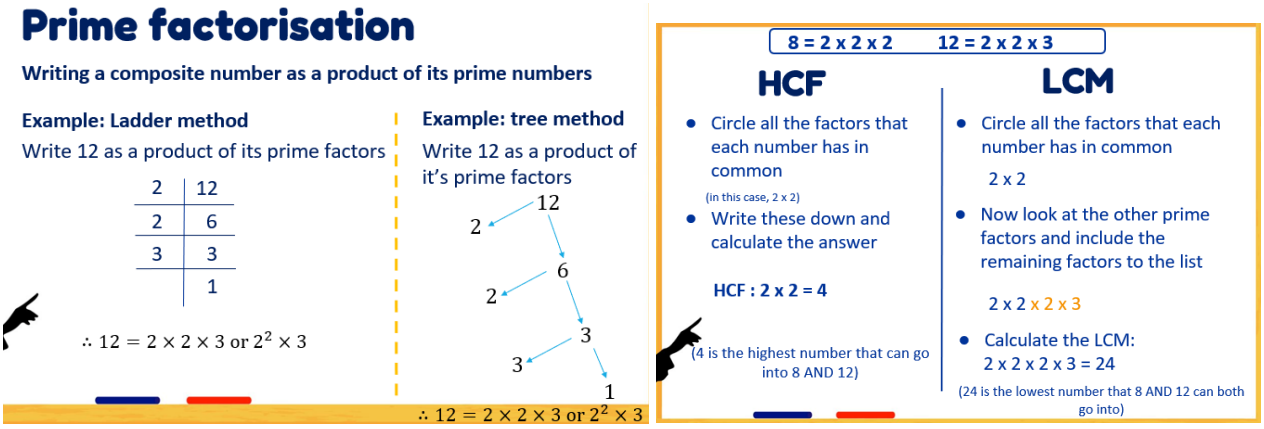
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Problem Solving example

3. Sandy wants to make flower arrangements. She has 21 roses and 35 tulips.
   How many vases can Sandy use if she wants to make all the arrangements exactly the same using all the flowers?

4. Zoleka wants to make fun-packs for the children in the local creche. She has 12 toy cars and 18 bouncy balls.
   If she wants to make identical fun-packs, what is the greatest number of packs she could make?

Lesson 5: Prime numbers and Prime Factorization



1. Determine the prime factors of 150, using prime factorisation.
2. Using prime factorisation (the ladder or tree method), find the HCF of the following:
   2.1. 32 and 72
   2.2. 48 and 36
   2.3. 205 and 315
3.
   3.1. Write 5 184 as a product of it's prime factors. Show all your calculations.
   3.2. Hence determine $\sqrt{5\ 184}$

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Lesson 6: Ratio

Question 1: Multiple choice

1. Choose the correct answer and circle the appropriate letter.

1.1. What is a ratio?

a. A measurement of a single quantity
b. A comparison of two or more quantities with different units
c. A comparison of two or more quantities that have the same unit
d. A fraction expressing a quantity

1.2. How are ratios often expressed?

a. With a plus sign between the numbers
b. With a colon (:) or the word "to" between the numbers
c. Using decimal notation
d. As a percentage

1.3. In the ratio 4:7, what does the 4 represent?

a. The first quantity
b. The second quantity
c. The sum of the quantities
d. The difference between the quantities

1.4. What does the ratio 2:3 mean?

a. There are 2 parts for every 3 parts of the same quantity
b. There are 3 parts for every 2 parts of the same quantity
c. The ratio is equal to 5
d. It represents addition of two quantities

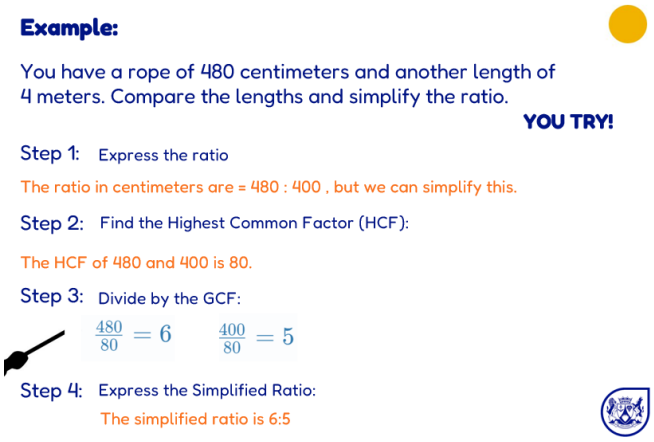
1.5. What is the primary purpose of using ratios?

a. To compare quantities with different units
b. To perform mathematical operations
c. To represent relationships and proportions
d. To measure time

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Example: Simplifying a ratio

You have a rope of 480 centimeters and another length of 4 meters. Compare the lengths and simplify the ratio.

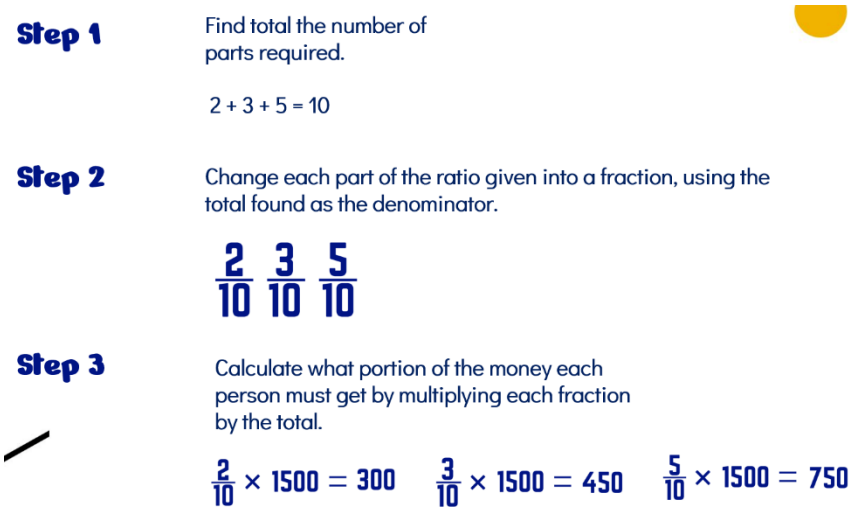


Questions

2. Jack's dad earns R264 000 a year. He spends R18 000 a month on household expenses and saves the rest.
   Find the ratio, in simplest form of:
   2.1. His income to his savings, monthly.
   2.2. His income to his expenditure, monthly.
   2.3. His savings to his expenditure, monthly.

3. In a nearby village there is a total of 108 cats and dogs. If there are 24 cats, what is the ratio in it's simplest form of cats and dogs in this village?

Example: Sharing in a given ratio



4. Olivia, Thembi and Darren starts a small business together. Olivia invests R80 000 , Thembi invests R100 000 and Darren invests R120 000. During the first year they make a profit of R750 000.
   4.1. In what ratio should they divide the profit?
   4.2. Calculate how much of this profit Darren should get

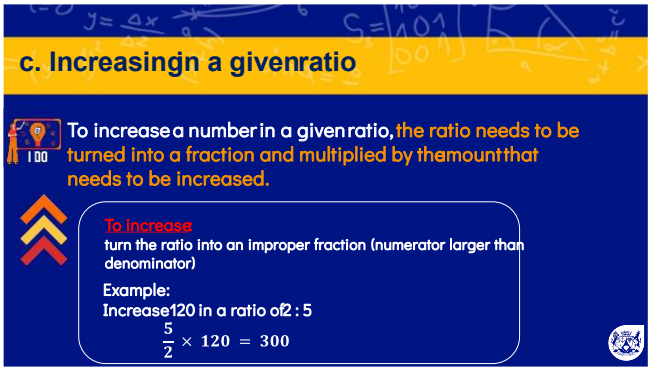
5. Lemon juice, Sugar and water are mixed to make lemonade. They are mixed in a ratio of 4:3:5 respectively. Find the amount needed of each ingredient if you want to make 6 liters of lemonade for a market day.

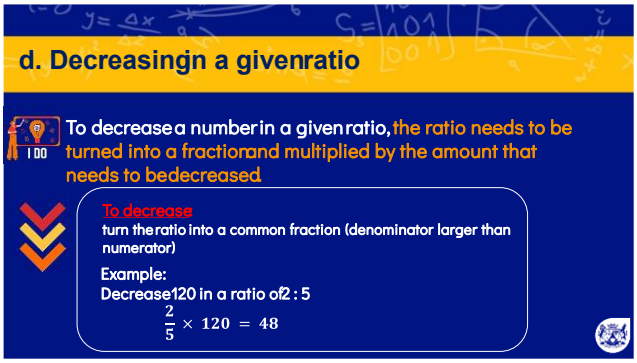
   Give your answer in milliliters.

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Examples:

6. Increasing and Decreasing in a given ratio

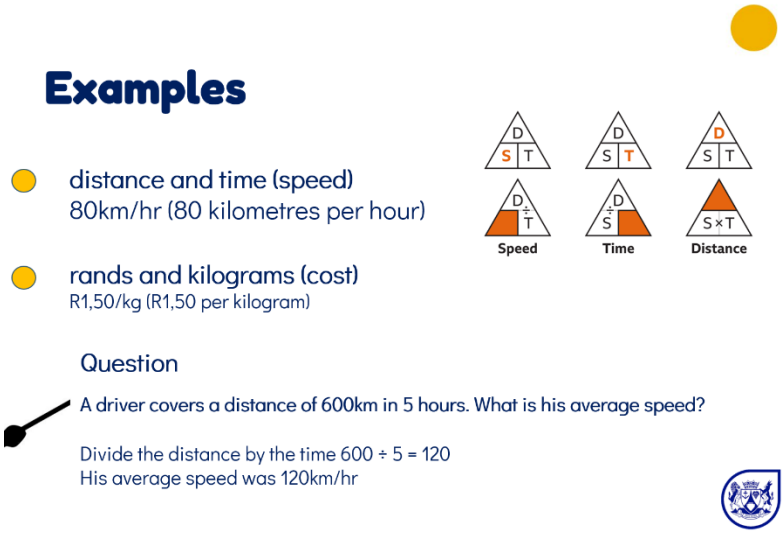




6.1 Increase 56 in the ratio 2:5

6.2 Decrease 36 in the ratio 2:3

Lesson 7: Rate



Questions

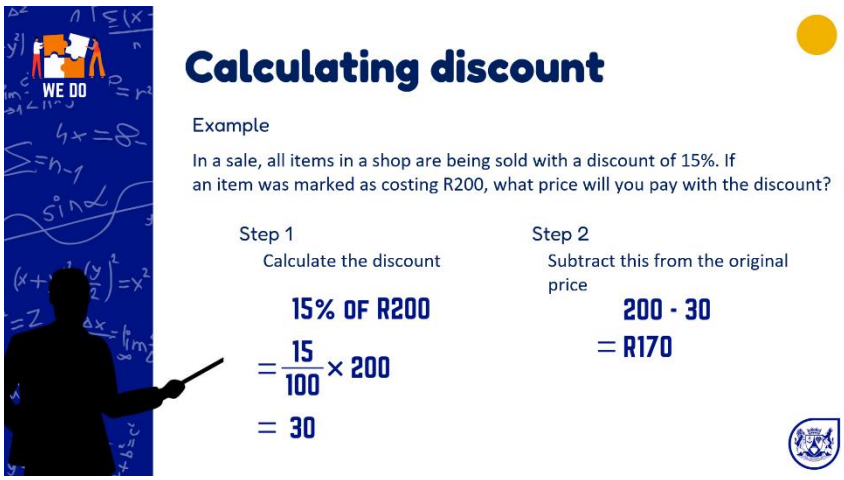
2. Larry can wash 30 cars in 5 days. How many cars can he wash per day?
3. A driver covers a distance of 600km in 5 hours. What is his average speed?
4. The bakers at Jake's Bagels can bake 290 bagels in 2 hours. How many bagels can they bake in 11 hours? How many bagels can be made per hour?
5. Sara is riding her smart bicycle to the park. The bike shows that she rides at a speed of 15 km/h. If the park is 45 km away from her home, how long will it take her to reach the park?

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6. Mr Maloka will be travelling to Durban. He has booked a plane ticket for his travels and the flight to Durban will take 1h 45min. If Durban is 1540 km from Cape Town, at what speed will the plane be travelling?
7. Jack earned R1260 in 20 hours and Sam earned R1500 in 25 hours. Who gets paid more per hour?

Lesson 8 : Consolidation with Siyavula

Lesson 9: Calculating discount and VAT



1. At a recent Black Friday sale clients were offered 60% off all items. Calculate the discount and then the total to be paid for the following sale:



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2. Valerie's Dress Shop has a sale on Saturday. Dresses will be for sale at a discount of 25% and skirts will be for sale at a discount of 30%. Lihle buys a dress for R214 and a skirt for R140. The price of the clothing does not include VAT.
    2.1. How much will she pay for both items after she gets discount?
    2.2. If she has to pay VAT of 15%, how much would she pay in total?

3. A dealer buys a television for R7 500 and increased the price with 30%. He then sells the television at a 20% discount.
    3.1. What is the selling price of the television (TV)?
    3.2. What is the dealer's percentage profit?

4. VAT is calculated at 15%
    4.1. What would the cost, including VAT, of an item be that is marked at R200 excluding VAT?
    4.2. What would the cost, excluding VAT, be on an item marked R500 including VAT?

Lesson 10: Percentage increase and decrease

Percentage increase

To find by what percentage an amount has been increased we need to find the difference of the two amounts (new and original) then divide it by the original amount. This multiplied by 100 will give the percentage.

$$\text{percentage increase} = \frac{\text{actual increase}}{\text{original amount}} \times 100\%$$

The actual increase: new amount subtract original amount.
This may be easier to remember as:

$$\text{percentage increase} = \frac{\text{new - old}}{\text{old}} \times 100\%$$

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Example:

Finding the percentage change between an initial amount and a final amount

A salary is increased from R10 000 to R11 500. Find the percentage increase

$$\text{percentage increase} = \frac{11\,500 - 10\,000}{10\,000} \times 100\%$$

= 15% increase

1. Increase 160km by 10%
2. Decrease R450 by 40%
3. There are different sizes of Jojo tanks. Calculate the percentage difference of a tank with a capacity of 540 litres and one with a capacity of 1800 litres.

Lesson 11: Simple interest and Hire purchase

Simple interest questions

Let's check your answer!

If you borrow R 1000 and the interest charged is 12% p.a. *(per annum or every year)*, how much would you pay back if:

a. you took 1 year to pay it back?

Interest : $\frac{12}{100} \times R1000\ x\ 1 = R120$

Total amount to pay: R120 + R1000 = R1120

b. you took 5 years to pay it back?

Interest: $\frac{12}{100} \times R1000 \times 5\ 5 = R600$

Total amount to pay: R600 + R1000 = R1600

1. Carlos saved R2 000 last year. After learning about financial mathematics at school, he decides to invest his money. He invests it at 3% p.a. simple interest rate. How much interest would Carlos have earned at the end of 5 years?

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2. Claire made a deposit of R10 500 in a bank and in a period of a year earned an interest of R 1 470. What percentage interest did she earn for that year?

3. Mr. Jamba buys a lounge suite for his wife. The cash price of the lounge suite is R7500.00. He buys it by borrowing money from a bank which charges 13% interest per annum, on the loan. Calculate the amount Mr. Jamba pays monthly if the bank requires him to pay back the loan in one year.

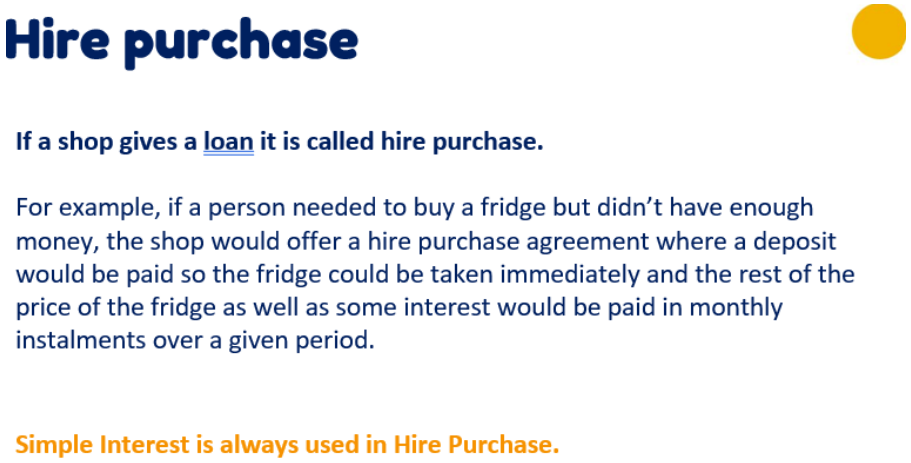
   Additional question:

   Suzanne has R2 000 that she wants to save. She can't decide whether she should:

   - Invest her money in a 5 -year savings account that gives 15,5% simple interest, or
   - If she should use a 3-year savings account which gives 27,5% simple interest.

   Work out how much she would have in both accounts at the end of the respective times and then suggest to Suzane which would be better.

Hire purchase questions



4. A computer costs R5999. The shop requires a 10% deposit, and the rest will be paid in equal monthly instalments over a three-year period at an interest rate of 14%p.a. (per annum which means per year). Find the monthly instalments.

5. Mr Jamba could have bought the lounge suite of R7500.00 on the shop's hire purchase scheme. He would have had to pay a 10% deposit and then 24 monthly repayments of R350.
   5.1. Calculate the deposit Mr Jamba has to pay
   5.2. Calculate the amount Mr Jamba would pay for the lounge suite if he bought it this way (without the deposit)
   5.3. Now calculate the total amount he paid for the lounge suite

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Lesson 12 : Exchange rates

If you visit another country, you would need to change your money (South African Rand) for that country's money. To do this, you need to know what the current (it changes) exchange rate is. *(Remember: rate is a comparison of two different units).*

Example:
If the exchange rate is \$1 = R 9,75 then how many dollars will I get for R 1000?

Example:
If the exchange rate is \$1 = R 9,75 then how many dollars will I get for R 1000?

Let's look at the answer!

Step 1
Write down the rate given:
\$1 = R 9,75

Step 2
What do you have to do, to get from 1 to 9,75?

$\times 9{,}75$
\$1 = R 9,75 Multiply or divide?
$\div 9{,}75$

Step 3
We are exchanging from Rands to Dollars, therefore we divide

$R1\,000 \div 9{,}75 = \$102{,}56$

1. The exchange rate to buy $ and £ is as follows:

   $1 = R14,99 and £1 = R20,55

   1.1. How many rands can I buy with $7 ?

   1.2. How many pounds (£) can I buy with $7 ?

2. The exchange rates of the South African rand to other countries are listed in the table below.

Foreign Currency	**SA Rand**
US Dollar $	R19.00
Euro €	R20,50
British pound £	R24.00

   2.1. what would a jacket worth £35 British pounds cost in rands?

   2.2 If I returned from a holiday in America and I had $32 US Dollars left, how many Rands do I have?

   2.2. If I travelled to Paris in Europe, how many Euros would I be able to exchange for R2000?

3. Dimpho can't find any good quality body boards in South Africa, so she decides to buy them from America. If US$ 1 = R14,99 , how much would she pay (in Rand) for a body board that cost US$ 59,99 ?

4. If one SA Rand = 0.067 American Dollars, what will I pay for a book ordered over the internet that is priced at $19,50 before any delivery costs are added?

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