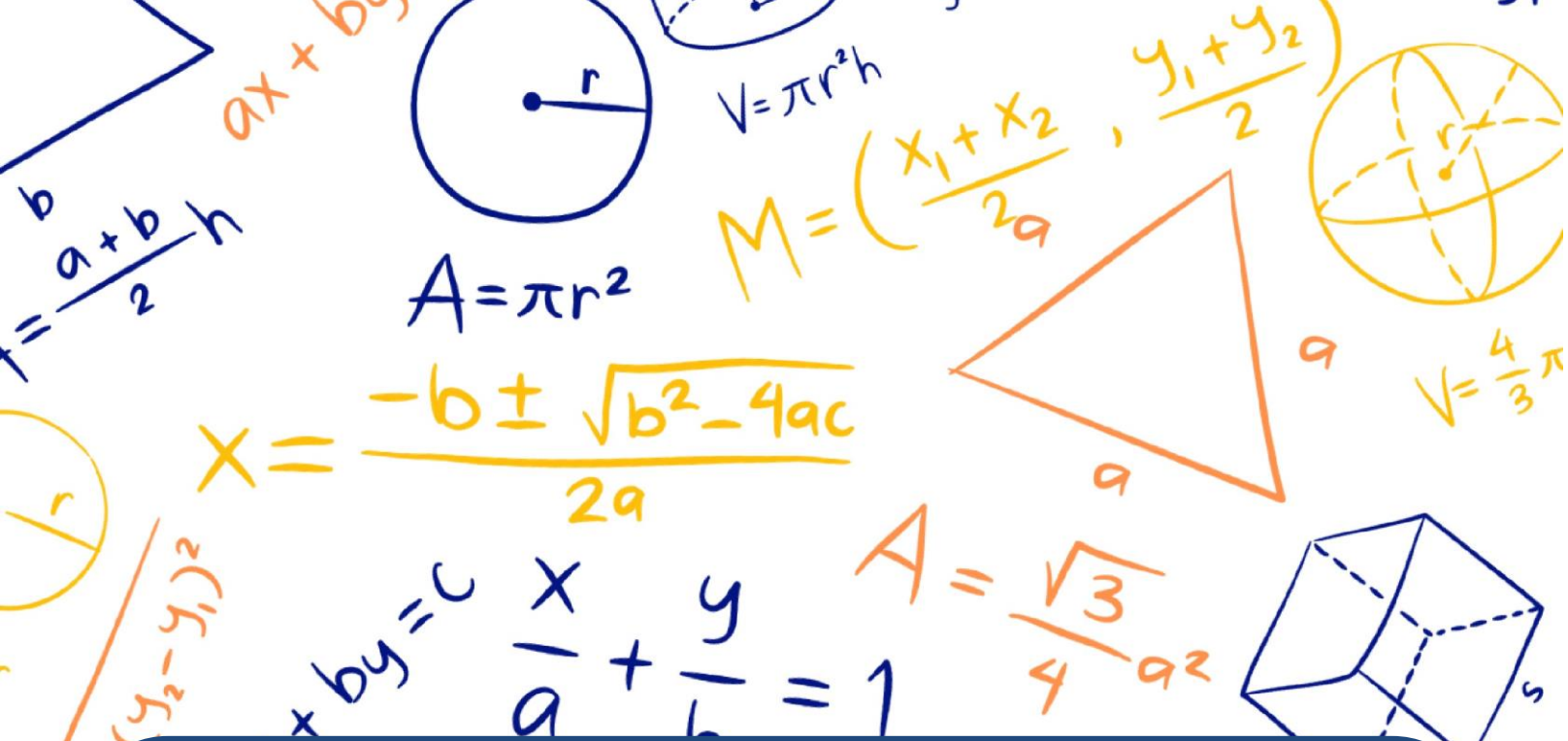
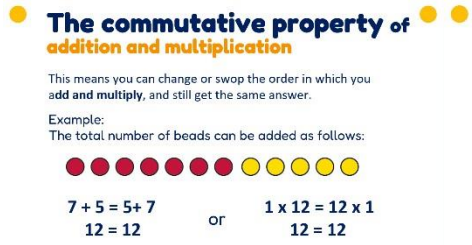


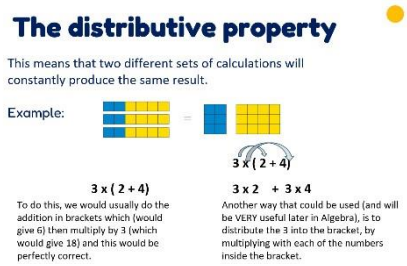
Grade 8 Mathematics
Learner book
Whole Numbers

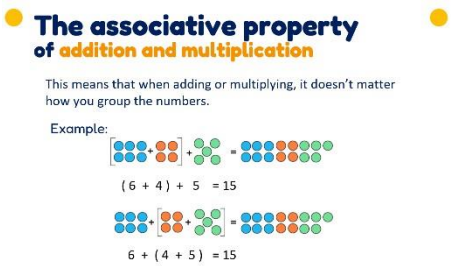
Learner name:

_____

Lesson 1: Revision if properties of whole numbers



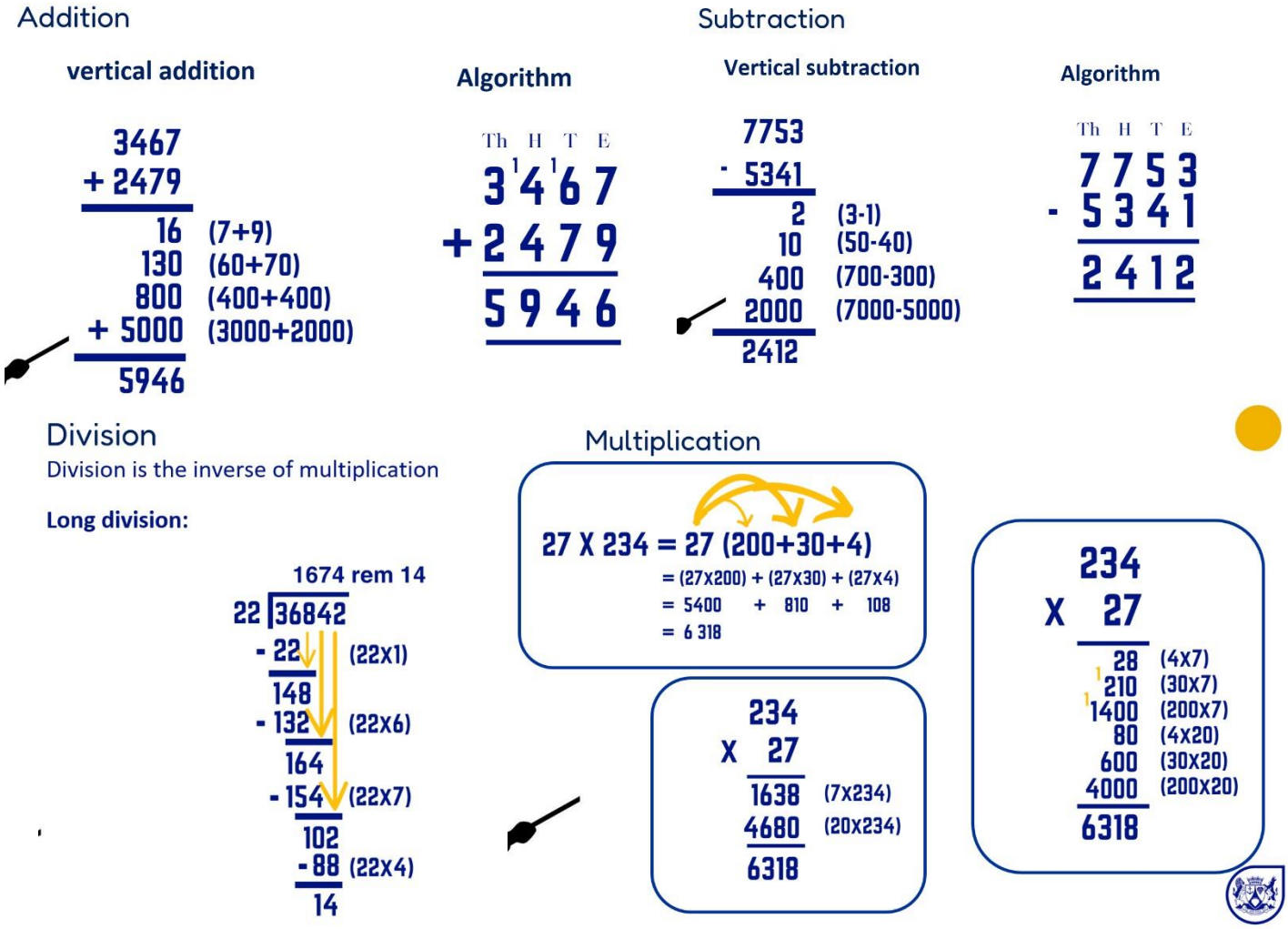




1. Use the commutative property to make the equation equal
   - 1.1 $4 \times 5 =$
   - 1.2 $7 + 9 =$
   - 1.3 $12 \times 3 =$
   - 1.4 $241 + 29 =$
2. Use the associative property to make the equation equal
   - 2.1 $(2 + 5) + 3 =$
   - 2.2 $(4 + 6) + 2 =$
   - 2.3 $3 + (6 + 7) =$
   - 2.4 $5 + (3 + 11) =$
3. Use the associative property to show the equation is equal.
   - 3.1 $(7 \times 4) \times 2 = 7 \times (4 \times 2)$
   - 3.2 $(3 \times 4) \times 3 = 3(4 \times 3)$
4. Show that the following equations are true, by using distributive property
   - 4.1 $5 \times (3 + 8) = (5 \times 3) + (5 \times 8)$
   - 4.2 $3 \times (7 + 4) = (3 \times 7) + (3 \times 4)$
   - 4.3 $2 \times (8 + 6) = (2 \times 8) + (2 \times 6)$
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 $16 \div 0$
6. Calculate the following and state each time which property was useful. NO calculator may be used.
   - 6.1 $(32 + 11) + 89 = 32 + (11 + 89)$
   - 6.2 $20 (5 + 7) = 20 \times 5 + 20 \times 7$
   - 6.3 $17 + 46 + 23 = (17 + 23) + 46$

Western Cape Government
QUALITY EDUCATION
for every child | in every classroom | in every school in the province.
Back on Track

Lesson 2: Revision of Calculation Techniques



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

   1.1 921 + 367 ≈

   1.2 829 - 764 ≈

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 × 67 =

   3.2 178 × 84 =

   3.3 7284 ÷ 48 =

   3.4 8347 ÷ 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?

Western Cape Government
QUALITY EDUCATION
for every child | in every classroom | in every school in the province
Back on Track

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

   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

Western Cape Government
QUALITY EDUCATION
for every child | in every classroom | in every school in the province
Back on Track

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?

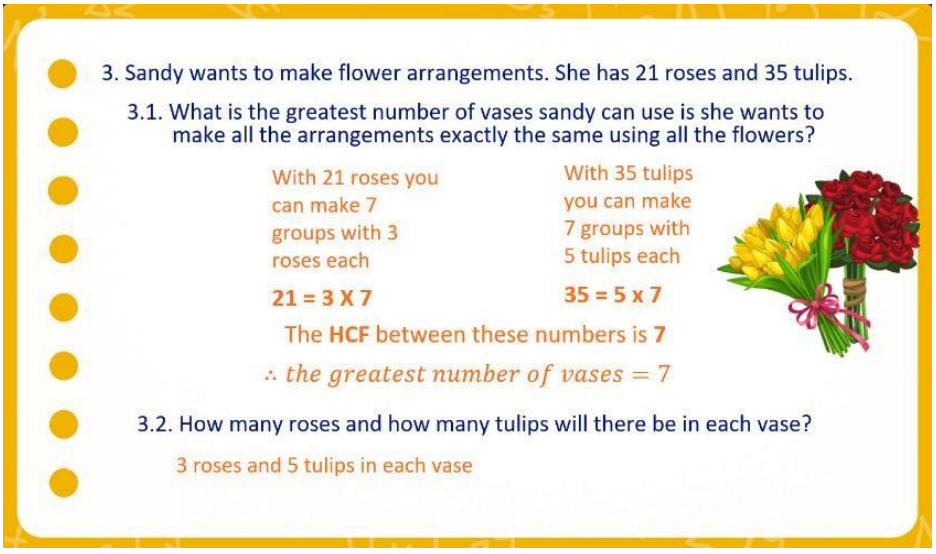
2.1 8 and 24

2.2 6 and 9

2.3 6 , 8 and 12

Problem Solving example

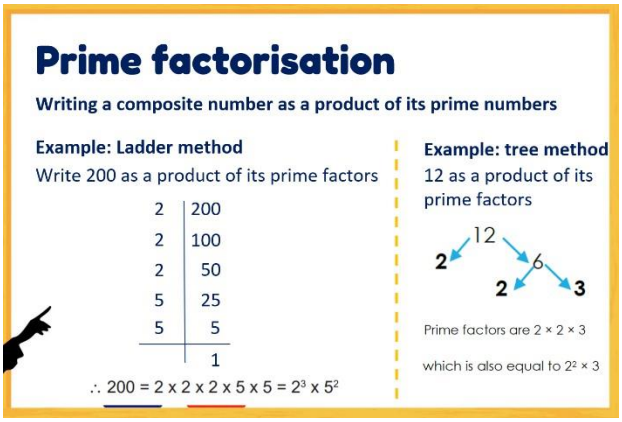
3. Sandy wants to make flower arrangements. She has 21 roses and 35 tulips.

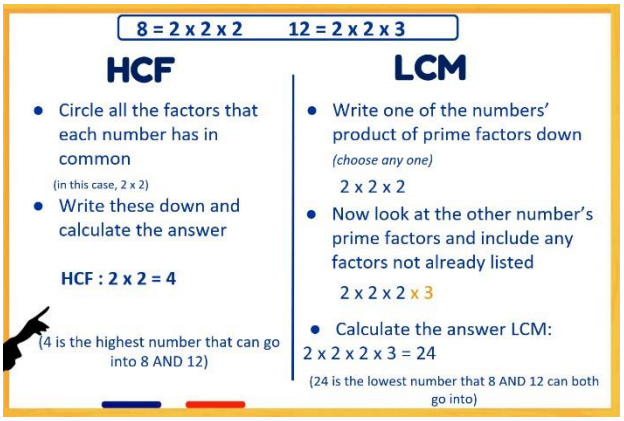


4. Zoleka wants to make fun-packs for the children in the local creche. She has 12 toy cars and 18 bouncy balls.

   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. What is the prime factorisation of 150?
2. Use the ladder or tree method of factorisation to find the HCF of the following:
   - 2.1 32 and 72
   - 2.2 48 and 36
   - 2.3 205 and 315
3. Determine the following:
   - 3.1 Write 5 184 as a product of powers of prime factors. Show all your working.
   - 3.2 Hence determine $\sqrt{5\,184}$

Lesson 6: Ratio

Question 1: Multiple choice

1. Choose the correct answer and circle the appropriate letter.
   - 1.1 What is a ratio?
     - a. `
   - 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

Western Cape Government
QUALITY EDUCATION
for every child | in every classroom | in every school in the province
Back on Track

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

Example: Simplifying a ratio

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

Step 1: Express the ratio

The ratio of centimeters to meters is = 480:400 , but we can simplify this.

Step 2: Find the Greatest Common Factor (GCF):

The GCF of 480 and 400 is 80.

Step 3: Divide by the GCF:

$\frac{480}{80} = 6$ (length in centimeters) $\frac{400}{80} = 5$ (length in meters)

Step 4: Express the Simplified Ratio:

The simplified ratio is 6:5

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 of cats and dogs in this village?

Western Cape Government
QUALITY EDUCATION
for every child | in every classroom | in every school in the province.
Back on Track

Example: Sharing in a given ratio

Step 1 Find total the number of parts required.

$2 + 3 + 5 = 10$

Step 2 Change each part of the ratio given into a fraction, using the total found as the denominator.

$$\frac{2}{10} \quad \frac{3}{10} \quad \frac{5}{10}$$

Step 3 Calculate what portion of the money each person must get by multiplying each fraction by the total.

$$\frac{2}{10} \times 1500 = 300 \qquad \frac{3}{10} \times 1500 = 450 \qquad \frac{5}{10} \times 1500 = 750$$

4. Olivia, Thembi and Darren start 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.

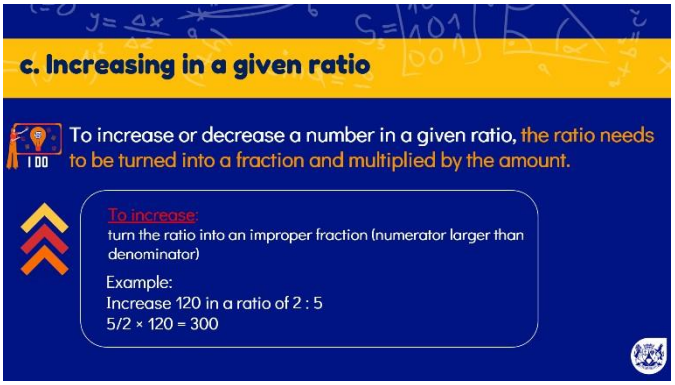
   4.1 In what ratio should they divide the profit?

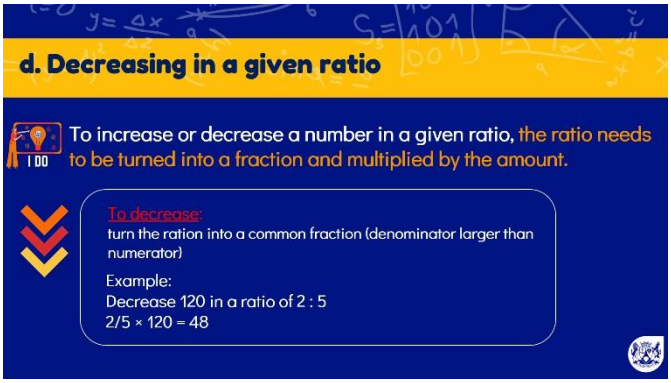
   4.2 Calculate how much of this profit Darren should get

5. Lemon juice, Sugar and water are mixed together 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 market day.

   Give your answer in liters.

Examples: Increasing and Decreasing in a given ratio





6. Increase 56 in the ratio 2:5
7. Decrease 36 in the ratio 2:3

Western Cape Government
QUALITY EDUCATION
for every child | in every classroom | in every school in the province.
Back on Track

Lesson 7: Rate Question 1: Multiple choice

1.1 What is a rate in mathematics?

a. A comparison of two quantities with the same units

b. A comparison of two quantities with different units

c. A multiplication of two quantities

d. A division of two quantities

1.2 How are rates often represented?

a. With a plus sign between the numbers

b. As a fraction with a colon (:) or the word "to" between the numbers

c. In decimal notation

d. As a percentage

1.3 In the rate "30 kilometers per hour," what does the "30" represent?

a. The distance traveled

b. The time taken

c. The speed or rate

d. The total time and distance

1.4 What do rates provide a measure of?

a. The sum of two quantities

b. How one quantity changes with respect to the other

c. The multiplication of two quantities

d. The division of two quantities

1.5 Why are rates useful in mathematics?

a. To represent relationships and proportions

b. To add and subtract quantities

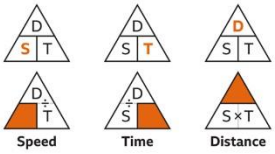
c. To measure time intervals

d. To perform complex calculations

Western Cape Government
QUALITY EDUCATION
for every child | in every classroom | in every school in the province.
Back on Track

Examples

- distance and time (speed)
  80km/hr (80 kilometres per hour)



- rands and kilograms (cost)
  R1,50/kg (R1,50 per kilogram)

Question

A driver covers a distance of 600km in 5 hours. What is his average speed?

Divide the distance by the time 600 ÷ 5 = 120
His average speed was 120km/hr

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? What is their rate 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?
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 will be paid at the highest rate?

Western Cape Government
QUALITY EDUCATION
for every child | in every classroom | in every school in the province.
Back on Track

Lesson 8 : Consolidation with Siyavula Lesson 9: Calculating discount and VAT



1. At a recent Black Friday sale clients were offered 50% off all items. The Pillow Cases were, however, marked down an additional 10%. Calculate the discount and then the total to be paid of the following sale:

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 makes the price 30% higher. 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 9: Siyavula

Western Cape Government
QUALITY EDUCATION
for every child | in every classroom | in every school in the province.
Back on Track

Percentage increase

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

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

The actual increase is: new amount subtract original amount.

This may be easier to remember as:

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

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

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

$$= 15\% \text{ increase}$$

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

Western Cape Government
QUALITY EDUCATION
for every child | in every classroom | in every school in the province.
Back on Track

Lesson 11: Simple interest and Hire purchase Simple interest questions

Example

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 : 12% x R1000 x 1 = R120

Total amount to pay: R120 + R1000 = R1120

b. you took 5 years to pay it back?

Interest: 12% x R1000 x 5 = R600

Total amount to pay: R600 + R1000 = R1600

1. Carlos saves 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?
2. Claire reposits R10 500 in a bank and in a period of a year earns interest of R 13470.

   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.

Hire purchase questions

Hire purchase

If a shop gives a loan it is called hire purchase.

If for example, if a person needed to buy a fridge but didn't have enough money, the shop would offer a hire purchase agreement where a deposit would be paid so the fridge could be taken immediately and the rest of the price of the fridge as well as some interest would be paid in monthly instalments over a given time period.

Simple Interest is always used in Hire Purchase.

Western Cape Government
QUALITY EDUCATION
for every child | in every classroom | in every school in the province.
Back on Track

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 costing 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

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?

Let's look at the answer!

Step 1

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

Step 2

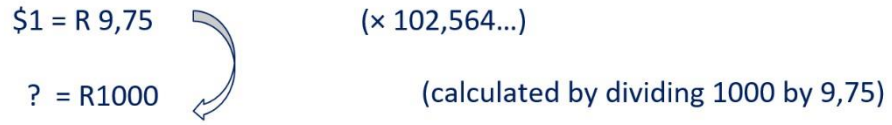
Write underneath the rate, of the other information given (ensuring the same currencies are written underneath each other)

$1 = R 9,75
? = R1000

Step 3

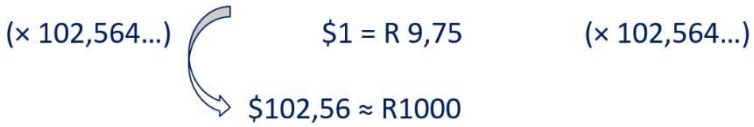
Consider the side with two pieces of information (in this case the rand value) and ask 'what operation was performed to get from one to the other *(in this case, what do I do to R9,75 to get to 1000) – you can ONLY use multiplication or division with it being a ratio.*

Western Cape Government
QUALITY EDUCATION
for every child | in every classroom | in every school in the province.
Back on Track



Step 4

Multiply the other side by the same



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.

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

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

   2.3 If I was travelling 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 mailing costs are added?