education

Department of Education
FREE STATE PROVINCE

GRADE 8

MATHEMATICS

ITEMS BANK FOR WHOLE NUMBERS

EXAMINATION

PURPOSE OF THE DOCUMENT

- TO GUIDE TEACHERS ON THE DEPTH OF THEIR PLANNING AND PREPARATION.
- TO HELP BOTH DHs AND TEACHERS TO DETERMINING CURRICULUM COVERAGE.
- TO HELP TEACHERS TO SET THEIR OWN STANDARDISED PAPERS AND TO HELP DHs TO MODERATE THE PAPERS WITH EASY.
- TO HELP TEACHERS TO SET THEIR OWN WEEKLY, BIWEEKLY AND OR MONTHLY TESTS.

NB: THE DOCUMENT IS MEANT FOR TEACHERS NOT LEARNERS. LEARNERS WILL INTERACT WITH THE DOCUMENT VIA FORMATIVE OR SUMMATIVE ASSESSMENT.

WHOLE NUMBERS

PROPERTIES OF NUMBERS

Grade 6:

- **recognize and use the commutative; associative; distributive properties of whole numbers.**
- **recognize and use 0 in terms of its additive property (identity element for addition).**
- **recognize and use 1 in terms of its multiplicative property (identity element for multiplication).**

Grades 7 & 8:

- **Revise:**
  - recognizing and using the commutative; associative; distributive properties of whole numbers.
  - 0 in terms of its additive property (identity element for addition).
  - 1 in terms of its multiplicative property (identity element for multiplication).

Grades 8:

- **Recognize the division property of 0, whereby any number divided by 0 is undefined.**

Knowledge

Recognizing

1. Which of the following is equal to 8×77? (1)

   A $8 \times 7 + 8 \times 7$ B $8 \times 70 + 8 \times 7$
   C $8 \times 70 + 7$ D $8 \times 70 \times 7$

2. Which expression represents the associative property in $(a \times b)(e \times g)$? (1)

   A $(a + e)(b + g)$ B $(a + g) \times (b \times e)$
   C $(a \times e)(b \times g)$ D $(a + b)(e + g)$

3. Which expression represents the distributive property in $(4 + 7) \times 11$? (1)

   A $(4 \times 11) + (4 \times 7)$ B $4 \times (7 \times 11)$
   C $4 + (7 \times 11)$ D $(4 \times 11) + (7 \times 11)$

4. Match column A to column B: (6)

	COLUMN A	COLUMN B
2.1	$\Delta \times \square = \square \times \Delta$	a) Identity property of one
2.2	$\Delta + \square + \otimes = (\Delta + \square) + \otimes = \Delta + (\square + \otimes)$	b) Associative property
2.3	$\Delta(\otimes + \square) = (\Delta + \otimes) + (\Delta + \square)$	c) Identity property of zero
2.4	$\Delta + 0 = \Delta$	d) Distributive property
2.5	$\Delta \times 1 = \Delta$	e) Undefined
2.6	$\frac{\Delta}{0} \neq 0$ and $\frac{\Delta}{0} \neq \Delta$	f) Commutative property

5. Which property is being used in each of the following equations: Commutative, Distributive or Associative?

5.1 $2 \times (3 \times 4) = (2 \times 3) \times 4$ (1)

5.2 $3 + a = a + 3$ (1)

5.3 $(7 + c) + d = 7 + (c + d)$ (1)

6. State whether the following statement is true or false:

$3(7 - 2) = 3 \times 7 - 3 \times 2$ (1)

7. Which identity states that if the number is added to zero, it will give the number itself as the answer? (1)

Routine procedure

Using

1. Use the correct order of operations to show that the equation below is true:

$7 + (4 + 5) = (7 + 4) + 5$ (4)

2. By using the commutative, associative and/or distributive properties, calculate:

2.1 $16 - 83 + 82 - 6$ (4)

2.2 $19 - 7 + 21 - 13$ (4)

2.3 $599 + 17 + 4 - 7 + 26 + 1$ (5)

2.4 $2 \times 17 \times 5$ (3)

2.5 15×23 (6)

2.6 8×77 (4)

Knowledge

1. Calculate:

1.1 $97 + 0$ (1)

Routine procedure

1.2 $3890 + 0 - 3890 \times 1$ (3)

Knowledge

1.3 $\frac{1010000}{0}$ (1)

1.4 $\frac{30}{0} \times 1$ (1)

Routine procedure

1.5 $\frac{1000}{-7+7}$ (2)

1.6 $(25 - 15) \div (125 - 125)$ (3)

Knowledge

2. Compare using >; < or =

0×35 35×1 (1)

3. State whether the following statements is true or false:

$102 \div 0 = 102$ (1)

CALCULATIONS WITH NUMBERS

- **Revise:**
  - calculations using all four operations on whole numbers, estimating and using calculators where appropriate.

Routine Procedure

Calculate without the use of a calculator:

1. $15 + 4 \times 2$ (2)
2. $125 \div 5 + 4 \times 6$ (3)
3. $2 \times 3 \div 2 \times 8 \div 12$ (4)
4. $4 + 6 \div 2 \times 3 - 6$ (4)
5. $(4 - 1 + 8 \div 8) \times 5$ (4)
6. $(8 + 4) \times 3 - 18 \div 2$ (4)
7. $2 + 3 \times 7 - 12 \div (4 + 2)$ (5)
8. $20 + 3(2 + 8 \times 3) - 4$ (5)
9. $18 - 18 \div 3 \times 2 + 7 - (3 \times 0 + 4 \times 1)$ (6)

CALCULATION TECHNIQUES

- **Use a range of techniques to perform and check written and mental calculations of whole numbers including:**
  - long division
  - adding and subtracting and multiplying in columns
  - estimation
  - rounding off and compensating
  - using a calculator

Routine Procedure

1. Calculate each of the following without using a calculator:

   1.1 $9\,500 \div 364$ (5)

   1.2 $5\,346 + 1\,708$ (2)

   1.3 $1\,714 - 829$ (2)

   1.4 18×36 (3)

2. Is 47×79 more than 3 000 or less than 3 000?

   Calculate by estimating and use calculator to check the error: (4)

3. Round off and compensate to calculate each of the following accurately:

   3.1 $473 + 638$ (6)

   3.2 $3\,017 - 2\,572$ (6)

MULTIPLES AND FACTORS

- **Revise:**
  - Prime factors of numbers to at least 3-digit whole numbers
  - LCM and HCF of numbers to at least 3-digit whole numbers, by inspection or factorisation

Routine Procedure

1. The highest common factor of 12 and 16 is… (1)

   A 8 B 2 C 4 D 6

2. What is the lowest common multiple of 4 and 5? (1)

   A 8 B 60 C 15 D 20

3 Use prime factorisation to determine LCM and HCF of 156 and 264. (4)

4. Use prime factorisation to determine LCM and HCF of 540 and 1800. (4)

5. Using prime factorisation, find the HCF and LCM of 156 and 1 056. (4)

6. The following three numbers are given.

   $216\ ;\ 252\ ;\ 900$

   6.1 Using prime factorisation, determine the LCM of the three numbers. Show all your workings. (5)

   6.2 Determine the $\sqrt{900}$ using prime factorisation. Show all your workings (3)

7. Calculate the value of $\sqrt{1296}$, by using prime factorisation. (3)

8. Calculate by using prime factorisation:

   $\sqrt[3]{4096}$ (4)

9. Write 350 as a product of its prime factors (3)

10. Determine the Lowest Common Factor of 150 and 1260 (4)

11. Determine the Highest Common Factor (HCF) of 12 and 18 (3)

Problem solving

3.4 Tracy is buying nuts and bolts at a local hardware store. The store sells nuts in packs of 5 and bolts in packs of 9. If Tracy wishes to buy the same number of nuts and bolts, what is the smallest number of nuts that she can buy? (3)

3.5 At Mbombela Station, a bus arrives every 35 minutes and a train arrives every 30 minutes. The bus and the train at the same time at 11 am. After how many minutes will they both arrive at the same time? (Assuming that the buses and the trains are always on time) (3)

SOLVE PROBLEM

- **Solve problems involving whole numbers, including**
  - comparing two or more quantities of the same kind (ratio)
  - comparing two quantities of different kinds (rate)
  - sharing in a given ratio where the whole is given
  - increasing or decreasing of a number in a given ratio
- **Solve problems that involve whole numbers, percentages and decimal fractions in financial contexts such as:**
  - profit, loss, discount and VAT
  - budgets
  - accounts
  - loans
  - simple interest
  - hire purchase
  - exchange rate

Routine Procedure

Ratios

1. Write the following ratios in its simplest form.

   1.1 $42 : 66$ (2)

   1.2 $32 : 24 : 40$ (3)

2. Simplify $216 : 252 : 900$ to its simplest ratio form. (3)

3. 20 metres : 8000 centimetres (2)

4. Express 0,5 m : 20 cm in its simplest form. (1)

5. Divide R350 in the ratio 2 : 5 (3)

6. Increase 22 in a ratio of 11: 2 (2)

7. Increase 240 in the ratio 4:9.

8. Increase 252 in the ratio $3:5$. Show all your workings. (2)

9. Decrease 32 in the ratio of 3:4 (2)

10. Alex and Thomas share 30 sweets. They divide them in the ratio 3:2. How many sweets does Thomas have? (3)

11. Alice and Busi split a bill of R750 in the ratio Alice: Busi $= 21$. How much does Busi have to pay according to the ratio split? (3)

Complex procedure

12. Tim and Mpho buy a box containing 20 easter eggs. The cost of the box is R250. Tim contributes R180 and Mpho, the balance. How many eggs will each of them receive. (4)

13. There are 854 Learners in the School. How many boys are in the school, if $\frac{3}{7}$ of the Learners are girls? (1)

A 366 B 244 C. 122 D. 488

13. There are 854 Learners in the School. How many boys are in the school, if $\frac{3}{7}$ of the Learners are girls? (3)

Rate

1. Tshepo is driving his car at 60km/h. How far does he drive in 90 minutes (4)

2. The distance between Kimberley and Durban is 460 km. A train covers the distance in 345 minutes. Find the speed of the train in km/h. (4)

Routine Procedure

3. Mr. Mkhize Washes 13 cups each minute. How many cups will he wash in 4 minutes? (4)

4. The price of 3 kg washing powder is R63. What is the price of 2 kg? (3)

Problem solving

5. Tshepo read a total of 15 books over 3 months. After belonging to the book club for 4 months, how many books will Tshepo have read in all? (4)

Complex procedure

Profit, loss, discount and VAT

1. Musa buys a new radio for R125,00 excluding VAT. He pays cash and receives a 5% discount. How much will he pay in total including VAT? (1)

A R118,75 B R136,56

C R131,25 D R143,75

2. A ticket to a show at the school's theatre cost $R380{,}00$ VAT included. Determine the price of the ticket, VAT excluded (VAT $= 15\%$). (4)

3. A new generator costs R22 500 excluding VAT of 15%. After the VAT is added, the price is then discounted by 30%. What is the final discounted price? (4)

Routine Procedure

4. Luke buys a bag of 90 chocolates for R400. He sells them at R5 each. If he sells all the items, how much profit is he going to make? (1)

A R69 B R50 C R28 D R5

5. Tshepo is shopping for clothes at Woolworths. A pair of Jean that he wants cost R220. They gave him a discount of 30%. How much is he going to pay for the discounted Jean? (3)

Budget

1. The Noxi family budget for August looks as follows:

Category	Budgeted amount
INCOME	
Salaries	R 10 000
EXPENDITURE	
Water and Sewerage	R 350
Rent and electricity	R 1 000
Phone	R 250
Food	R 3 000
School	R 2 000
Transport	R 800
Entertainment	R 1 000

1.1 Will the Nozi family be within the budget by the end of August? (4)

1.2 If the Nozi family suddenly had a medical emergency expense of R2 000 that needed to be accounted for in August, would they be able to afford to pay it without changing their budget? (1)

1.3 How much would they need to use from a different category in order to cover the medical emergency? Which category/categories would they be able to adjust? Show all working and explain your answer. (3)

2. Sophia budget for February included R50 for phone, R150 for entertainment and R150 for food. Is Sophia still within budget by the end of the month if her actual phone costs were R70, her actual entertainment costs R230, but her food costs R50? Show all calculations. (5)

Accounts and Loans

1. Jacob borrowed R2 000 from his parents. If he paid it back within a year his parents would not charge him interest. He decided to pay them equal monthly payments of R170.

   1.1 Would he manage to pay it back within a year? Show all your workings. (2)

   1.2 What would his final monthly's payment be for the total payback amount to be exact? (2)

2. Thabo has an account with his pharmacy which is interest free. Complete the following table and answer the questions which follows.

Month	Purchases	Total amount paid	Amount owing
Balance brought forward			R 425,00
January	R 100,00	R 80,00	
February	R 289,00	R 80,00	R 654,00
March	R 43,84		R 597,84
April	R 578,50	R 300,00	
May	R 0,00		R 576,34
June		R 200,00	R 458,69
July			

If his purchase in July were to the amount of R153, how much to pay in order to have a balance of R100? (6)

Simple interest

1. Suppose that you invest R100 000 and earn 2% simple interest per month. How much will you have saved after 5 years? (3)

2. Ruan invest $R10\ 325$ for 5 years at $12{,}3\%$ p.a. simple interest. Determine the value of the investment after 5 years. (3)

3. Tshepo invests R1000 at 9% simple interest per year.

   3.1 How much money does Tshepo earn interest in the first year? (3)

   3.2 How much money does Tshepo have in the account 14 years after he opened the account? (3)

4. Joanne loans R4 800 from a bank to buy a washing machine. The loan is for 3 years at an interest rate of 16,5% simple interest per annum.

   4.1 What will be the total amount that she owes the bank? (3)

   4.2 How much interest did she pay? (2)

Hire purchase

1. Lauren buys a flatscreen TV costing R17 000 on a hire purchase agreement. She will be required to make 24 monthly payments of R960.

   1.1 How much will she pay in total for the flatscreen TV? (2)

   1.2 How much interest did she pay? (2)

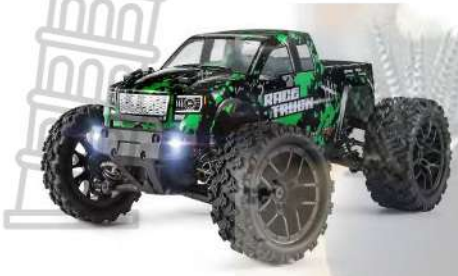
2. Palesa wants to buy a washing machine for R4 999. She is offered a hire purchase agreement that gives a simple interest rate of 12% per annum for a period of 3 years. Determine the monthly payment (3)

3. Nadia buys furniture for her new apartment. The cash price of the furniture is R18 500. She pays a deposit of $R1240$ and makes equal monthly payments of R590 for 3 years.

   3.1 Determine the total amount that Nadia will pay for the furniture. (3)

   3.2 Determine the interest that Nadia must pay for the furniture. (3)

4. Katlego is a remote-control car fanatic. He saw the advert below on a website on the internet and decides to import this truck from America.



- **HAIBOXING 1:18 Scale All Terrain RC Car 18859,**
- **36 KPH High Speed 4WD Electric Remote-controlled vehicle**

LIMITED DEAL:

- Discounted price: $66,39
- Shipping & Import Charges to South Africa: $33,45

4.1 Show that Katlego will pay $R1\,848{,}89$, if he should import this truck from America. The current rand-dollar exchange rate is $R1 = \$0{,}054$. (3)

4.2 Katlego decides to enter into a hire purchase agreement. The financial institution provided the following terms and conditions:

Hire purchase agreement between Katlego and ABC financial institution:

Date:2024/06/30

- Cost Price: R1 848,89
- Deposit: 10% of cost price.
- Duration of hire purchase agreement: Two years
- Interest rate: 11% p.a

Signed: Katlego

Analyse the hire purchase agreement and answer the following questions:

4.2.1 Calculate the deposit that Katlego needs to pay. (2)

4.2.2 Calculate the outstanding balance, after the deposit is paid. (1)

Complex procedure

4.2.3 Calculate Katlego's monthly instalments. (5)

Routine Procedure

4.2.4 What is the total amount that Katlego will pay for this imported truck. (2)

Exchange rate

1. A new brand of shoes selling in the UK is £140. If you buy the shoes online, and the current exchange rate is £1 = R19,24, calculate the cost of the shoes in rands. (2)

2. The current US dollar-rand exchange rate is $1 = R14,62. How many US dollars will you get for R20 000? (3)

3. Mandla has $4 USD. The computer game he wants to buy costs $10 AUD. $1 USD = $1,48 AUD. Does he have enough money to buy the game? (3)

4. Tshepo checks the newspaper and sees that the exchange rate between the South African rand (R) and the euro (€) is $1€ = R14$. How much in rands will be equal to 2€? (2)

5. You want to buy an item from America. The cost is $120. You know that $1 = R16. How much does the item cost in rands? (2)

6. Mpho wants to buy a good quality baseball bat and decides to buy one online from America. The online price of the baseball bat is $\$350$. If the exchange rate is $\$\ 1 = R18{,}57$, determine the price of the baseball bat in rand (R). (2)

7. 2 tonnes of avocados are exported to Mauritius. If the Rand : Rupee exchange rate is R1:2,5 rupees, how many Rupees are paid if 1 tonne of avocados costs R3 200? (3)

