education

Department of Education
FREE STATE PROVINCE

GRADE 8

MATHEMATICS MOCK PAPER

JUNE 2024

Gr 8 MATHEMATICS

MARKS: 60

TIME: 1HOUR

This question paper consists of 15 excluding cover pages.

INSTRUCTIONS AND INFORMATION TO THE LEARNERS

1. Write neatly and legibly.
2. Clearly show ALL steps which you used in determining the answer.
3. An approved calculator (non-programmable and non-graphical) may be used unless stated otherwise.
4. Diagrams are NOT necessarily drawn to scale.
5. Round off to TWO decimal places, unless stated otherwise.
6. In the multiple-choice questions, circle only the letter for the correct answer, e.g. If the correct answer in 1 is **D**, you should only circle (**D**). There is only one correct answer in each question.

EXAMPLE

Multiple choice questions

Circle only the letter for the correct answer. If the correct answer in 1 is D, you should only circle (D).

PRACTICE QUESTION

1. $\frac{20^4}{10^4}$ is equal to

A. 20

B. 2

C. 8

D. 16

ANSWERS

A $= \frac{2 \times 10^4}{10^4}$

$= 2 \times 10^{4-4}$

$= 2 \times 10^0$

$= 20$ **incorrect**

B $= \frac{2 \times 10^4}{10^4}$

$= 2$

$= 2$ **incorrect**

C $= \frac{2^4 \times 10^{4\ 1}}{10^4}$

$= 2^4$

$= 2 \times 4$

$= 8$ **incorrect**

D $= \frac{(2 \times 10)^4}{10^4}$

$= \frac{2^4 \times 10^4}{10^4}$

$= 2^4 = 2 \times 2 \times 2 \times 2$

$= 16$ **correct**

Your answer is correct if you corcled D.

QUESTION 1

Multiple choice questions

Circle only the letter for the correct answer.

1. Express $(3a)^4$ in simplified form. (1)

A. $12a$

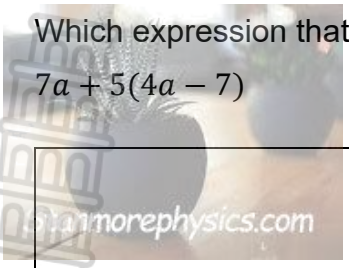
B. $16a^4$

C. $7a^4$

D. $84a^4$

2. Which expression that is equivalent to the expression shown below: (1)

$7a + 5(4a - 7)$



A. $27a - 35$

B. $27a - 7$

C. $7a - 13$

D. $-20a$

3. Simplify: $(18 \div 3) + (9 \times 2) - 6 =$ (1)

A. 18

B. 102

C. 27

D. 21

4. $\frac{1}{8} - \frac{1}{8} \times \frac{1}{8}$ is equal to (1)

A 0

B $\frac{1}{16}$

C $\frac{1}{64}$

D $\frac{7}{64}$

5. Which list is made up of multiples of 8? (1)

A 1 ; 8 ; 40

B 8 ; 16 ; 32

C 16 ; 22 ; 28

D 8 ; 14 ; 24

[5]

QUESTION 2

2.1 Complete:

$$\frac{0}{100} = \_\_\_\_\_$$ (1)

2.2 Consider the number: 240

2.2.1 Write the number as the product of its prime factors in an exponential form. (1)

2.2.2 If $A = 2^4 \times 3^2$, $B = 2^2 \times 3^2 \times 7^2$ and $C = 2^2 \times 3 \times 5^3$. Determine the LCM and HCF. (2)

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

2.4 The ratio of oranges to pears in a shop is 3 : 2. If there are 210 fruits in a shop, how many pears are there? (2)

[7]

QUESTION 3

Simplify the following **WITHOUT** the use of a calculator**. Show ALL steps.**

3.1 $\frac{3-(-8)}{-6}$ (2)

3.2 $\left(-\sqrt[3]{1}\right)^3 + 8 - 66$ (2)

3.3 $\frac{(-5)^2}{25} - (-12) - 10$ (3)

3.4 $\frac{9}{12} - 1\frac{7}{24} + \sqrt{0,36}$ (3)

[10]

QUESTION 4

4.1 Arrange the following decimal fraction in ascending order: (1)

$2.7\ ;\ 0.55\ ;\ 0.75\ ;\ 0.12\ ;\ 0.302$

4.2 This is George's monthly expenditure.

1. Spend 0,625 of his money on rent.
2. Spend 30% of his money on transport costs.
3. Spend $\frac{12}{50}$ of his money on groceries

4.2.1 If George earns R15 500 per month, calculate the total amount of money George spends on rent, transport, and groceries. (1)

4.2.2 On what item does George spend the most money? (1)

_____

_____

_____

_____

4.2.3 If George saves the rest of his money, what percentage of money does he save? (2)

_____

_____

_____

_____

[5]

QUESTION 5

5.1 Simplify the following expressions **WITHOUT** the use of a calculator. Show ALL steps.

5.1.1 $\frac{k^8}{k^6}$ (1)

_____

_____

_____

_____

5.1.2 $\frac{(4^2)^4}{4^8}$ (2)

5.1.3 $-3ab^3 \times -5a^3b^3$ (1)

5.2 Write 683 000 000 in scientific notation. (2)

[6]

QUESTION 6

6.1 Write down the next term of the following pattern:

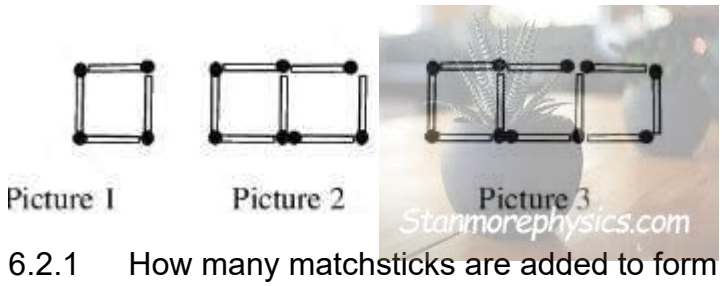
6.1.1 1 ; 4 ; 16 ; ... (1)

6.1.2 5; 10 ; 15 ; ... (1)

_____

_____

6.2 Study the diagram below and answer the questions that follows.



6.2.1 How many matchsticks are added to form subsequent pattern? (1)

_____

_____

6.2.2 Describe the pattern formed by the matchsticks in words. (2)

_____

_____

_____

6.2.3 Determine the number of matchsticks required in the n^{th} pattern in the form $T_n = \cdots$ (1)

_____

_____

6.2.4 How any matchsticks will be in the 15th picture? (2)

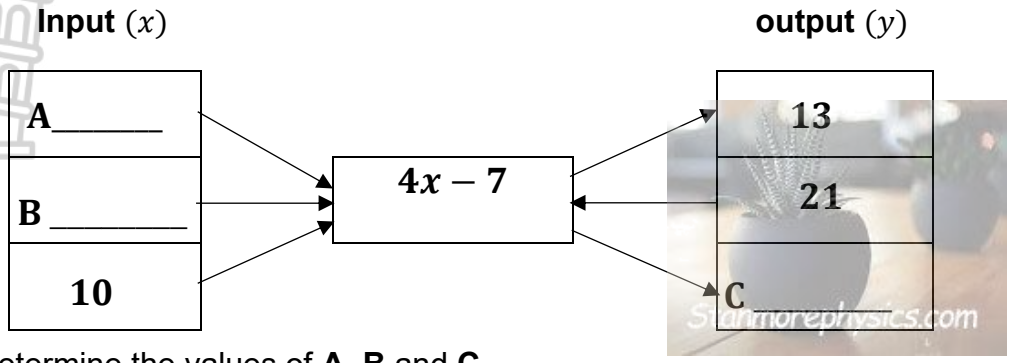
_____

_____

[8]

QUESTION 7

7.1 Study the flow diagram below.



(3)

Determine the values of **A, B** and **C.**

A _____

B _____

C _____

7.2 Use the table below to answer the questions that follows

x	0	-1	2		5	n
y	$\frac{13}{4}$	$2\frac{3}{4}$	$\frac{17}{4}$		m	8

7.2.1 Write down the relationship between x *and* y in the form $y =\ldots$ (1)

$y =$ _____

7.2.2 Calculate the values of m and n. (1)

m: _____

_____

_____

_____

n: (1)

_____

_____

_____

_____

[6]

QUESTION 8

8.1 Express the following statement as an algebraic expression: (2)

"The difference between 5 and twice a number"

_____

_____

8.2 Given the expression: $-4\boldsymbol{a^5} + \boldsymbol{2a^4b} - \boldsymbol{a^3y^2} + \boldsymbol{2a^2b^2} - \frac{\boldsymbol{ab^4}}{\boldsymbol{3}} - \boldsymbol{10}$

8.2.1 How many terms are there in the expression? (1)

_____

_____

8.2.2 What is the value of the constant term? (1)

_____

_____

8.2.3 Write down the coefficient of $\boldsymbol{a^3y^2}$ term. (1)

_____

_____

8.3 Simplify the following expression:

8.3.1 $2x - 4y - b + y - 4x + 3b$ (2)

8.3.2 $\sqrt{100k^8l^{16}} + \sqrt[3]{729k^{12}l^{12}}$ (3)

8.4 Subtract $3a - b - c$ from $a^2 - 3b + 2c$ (3)

[13]

GRAND TOTAL **[60]**

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EXAMPLE

Multiple choice questions

Circle only the letter for the correct answer. If the correct answer in 1 is D, you should only circle (D).

PRACTICE QUESTION

1. $\frac{20^4}{10^4}$ is equal to

- ◯ **A.** 20
- ◯ **B.** 2
- ◯ **C.** 8
- ● **D.** 16

ANSWERS

◯ **A**

$= \frac{2 \times 10^4}{10^4}$

$= 2 \times 10^{4-4}$

$= 2 \times 10^0$

$= 20$ **incorrect**

◯ **B**

$= \frac{2 \times 10^4}{10^4}$

$= 2$

$= 2$ **incorrect**

◯ **C**

$= \frac{2^4 \times 10^{4^1}}{10^4}$

$= 2^4$

$= 2 \times 4$

$= 8$ **incorrect**

● **D**

$= \frac{(2 \times 10)^4}{10^4}$

$= \frac{2^4 \times 10^4}{10^4}$

$= 2^4 = 2 \times 2 \times 2 \times 2$

$= 16$ **correct**

Your answer is correct if you corcled D.

QUESTION 1

Multiple choice questions

Circle only the letter for the correct answer.

1. Express $(3a)^4$ in simplified form. (1)

$= 3^4a^4$
$= 81a^4$

OR

$= 3a \times 3a \times 3a \times 3a$
$= 81x^4$

A. $12a$

B. $16a^4$

C. $7a^4$

D. $81a^4$ ✓

2. Which expression that is equivalent to the expression shown below: (1)

$7a + 5(4a - 7)$

$= 7a + 5(4a - 7)$
$= 7a + 20a - 35$
$= 27a - 35$

- A. $27a - 35$ ✓
- B. $27a - 7$
- C. $7a - 13$
- D. $-20a$

3. Simplify: $(18 \div 3) + (9 \times 2) - 6 =$ (1)

$= (18 \div 3) + (9 \times 2) - 6$
$= \mathbf{6} + 18 \mathbf{- 6}$
$= 18$

- A. 18 ✓
- B. 102
- C. 27
- D. 21

4. $\frac{1}{8} - \frac{1}{8} \times \frac{1}{8}$ is equal to (1)

$= \frac{1}{8} - \left(\frac{1}{8} \times \frac{1}{8}\right)$
$= \frac{1}{8} - \frac{1}{64}$
$= \left(\frac{1}{8} \times \frac{8}{8}\right) - \frac{1}{64}$
$= \frac{8}{64} - \frac{1}{64}$
$= \frac{7}{64}$

A 0
B $\frac{1}{16}$
C $\frac{1}{64}$
D $\frac{7}{64}$ ✓

5. Which list is made up of multiples of 8? (1)

8 ; **16** ; 24 ; **32** ; **40** ; 48 ; ...

All these numbers are made up of multiples of 8

A 1 ; 8 ; 40
B 8 ; 16 ; 32 ✓
C 16 ; 22 ; 28
D 8 ; 14 ; 24

[5]

QUESTION 2

2.1 Complete: (1)

$\frac{0}{100} = 0$ ✓ **answer**

2.2 Consider the number: 240

2.2.1 Write the number as the product of its prime factors in an exponential form. (1)

$240 = 2^4 \times 3 \times 5$ ✓ **answer**

2.2.2 If $A = 2^4 \times 3^2$, $B = 2^2 \times 7^2$ and 3×5^3. Determine the LCM and HCF. (2)

	Factors
	2 2 2 2 3 3
	2 2 7 7
	3 5 5 5
LCM	2 2 2 2 3 3 5 5 5 7 7

$= 882\,000$ ✓ **answer**

HCF 2 2 3

$= 12$ ✓ **answer**

OR

LCM $= 2^4 \times 3^2 \times 5^3 \times 7^2$

$= 882\,000$ ✓

HCF $= 2^2 \times 3$

$= 12$ ✓

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

$0{,}5\ m = 50\ cm$

$50\ cm : 20\ cm$

$= 5 : 2$ ✓ **answer**

2.4 The ratio of oranges to pears in a shop is 3 : 2. If there are 210 fruits in a shop, how many pears are there? (2)

$3 + 2 = 5$

$\therefore$ Oranges: $\frac{3}{5} \times 210$

$= 126$ ✓ **answer**

Pears: $210 - 126$

$= 84$ ✓ **answer**

OR

Pears: $\frac{2}{5} \times 210$

$= 84$ ✓

[7]

QUESTION 3

Simplify the following **WITHOUT** the use of a calculator**. Show ALL steps.**

3.1 $\frac{(-3)-(-8)}{-6}$ (2)

$= \frac{-3+8}{-6}$ ✓ **simplify**

$= \frac{5}{-6}$ ✓ **answer**

3.2 $\left(-\sqrt[3]{1}\right)^3 + 8 - 66$ (2)

$= -1 - 66 + 8$ ✓ **associative**

$= -59$ ✓ **answer**

3.3 $\frac{(-5)^2}{25} - (-12) - 10$ (3)

$= \frac{25}{25} + 12 - 10$ ✓ **method**

$= 1 + 12 - 10$ ✓ **associative**

$= 3$ ✓ **answer**

3.5 $\frac{9}{12} - 1\frac{7}{24} + \sqrt{0{,}25}$ (3)

$= \frac{18}{24} - \frac{31}{24} + \frac{6}{24}$ ✓ **simplify**

$= \frac{18}{24} + \frac{6}{24} - \frac{31}{24}$ ✓ **associative**

$= \frac{24}{24} - \frac{31}{24}$

$= -\frac{7}{24}$ ✓ **answer**

[10]

QUESTION 4

4.1 Arrange the following decimal fraction in ascending order: (1)

$2.7\ ;\ 0.55\ ;\ 0.75\ ;\ 0.12\ ;\ 0.302$

$0.12; 0.302; 0.55; 0.75; 2.7$ ✓ **answer**

4.2 This is George's monthly expenditure.

1. Spend 0,625 of his money on rent.
2. Spend 30% of his money on transport costs.
3. Spend $\frac{12}{50}$ of his money on groceries

4.2.1 If George earns R15 500 per month, calculate the total amount of money George spends on rent, transport, and groceries. (1)

Rent: $15\,500 \times 0{,}625 = \text{R}9\,687.50$
Transport: $\frac{30}{100} \times 15500 = R4\,650$
Groceries: $\frac{13}{50} \times 15500 = \text{R}4\,030$
Total $= 9\,687{,}50 + 4\,650 + 4\,030 = \text{R}18\,367.50$ ✓ **answer**

4.2.2 On what item does George spend the most money? (1)

On rent ✓ **answer**

4.2.3 If George saves the rest of his money, what percentage of money does he save? (2)

$\frac{18\,367{,}50}{15500} \times 100 = 118{,}5\%$ ✓ **answer**

He is overspent by 18,5%. ✓ **answer**

[5]

QUESTION 5

5.1 Simplify the following expressions **WITHOUT** the use of a calculator. Show ALL steps.

5.1.1 $\frac{k^8}{k^6}$ (1)

k^2 ✓ **answer**

5.1.2 $\frac{(4^2)^4}{4^8}$ (2)

$= \frac{4^8}{4^8}$ ✓ **method**

$= 1$ ✓ **answer**

5.1.3 $-3ab^3 \times -5a^3b^3$ (1)

$= 15a^4b^6$ ✓ **answer**

5.2 Write 683 000 000 in scientific notation. (2)

6,83 ✓ × $\mathbf{10^8}$ ✓ **6,83** ✓

10^8 ✓

[6]

QUESTION 6

6.1 Write down the next term of the following pattern:

6.1.1 $1 ; 4 ; 16 ; \ldots$ (1)

25 ✓ **answer**

6.1.2 $5; 10 ; 15 ; \ldots$ (1)

20 ✓ **answer**

6.2 Study the diagram below and answer the questions that follows.

Picture 1 Picture 2 Picture 3

6.2.1 How many matchsticks are added to form subsequent pattern? (1)

3 matchsticks ✓ **answer**

6.2.2 Describe the pattern formed by the matchsticks in words. (2)

From picture 1 add 3 matchsticks ✓ to get the next picture ✓

6.2.3 Determine the number of matchsticks required in the n^{th} pattern in the form $T_n = \cdots$ (1)

$T_n = 3x + 1$ ✓ **answer**

6.2.4 How any matchsticks will be in the 15th picture? (2)

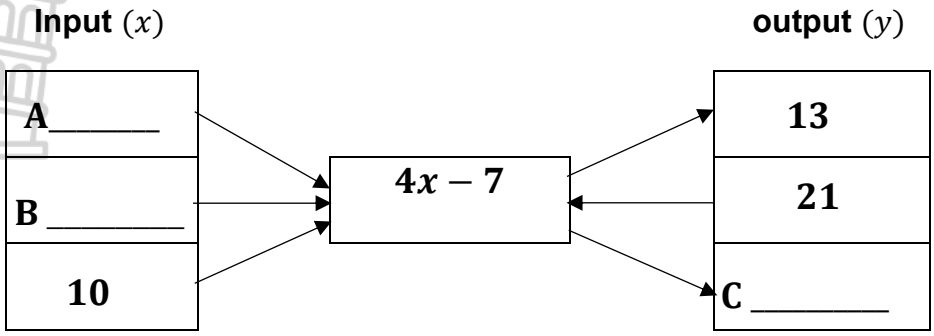
$T_{15} = (3 \times 15) + 1$ ✓ **substitution**

$= 46$ ✓ **answer**

[8]

QUESTION 7

7.1 Study the flow diagram below.



(3)

Determine the values of **A, B** and **C.**

A 5 ✓ **B** 7 ✓ **C** 33 ✓ **answer**

7.2 Use the table below to answer the questions that follows

x	0	-1	2		5	n
y	$\frac{13}{4}$	$2\frac{3}{4}$	$\frac{17}{4}$		m	8

7.2.1 Write down the relationship between x *and* y in the form $y =\ldots$ (1)

$y = \frac{1}{2}x + \frac{13}{4}$ ✓ **answer**

7.2.2 Calculate the values of m and n. (1)

$m = \frac{1}{2}(5) + \frac{13}{4}$ (1)
$= \frac{10}{4} + \frac{13}{4}$
$= \frac{23}{4}$ ✓ **answer**

$8 = \frac{1}{2}n + \frac{13}{4}$

$8 - \frac{13}{4} = \frac{n}{2}$

$\therefore\ n = \frac{19}{4}$ ✓ **answer**

[6]

QUESTION 8

8.1 Express the following statement as an algebraic expression: (2)

"The difference between 5 and twice a number"

$2x - 5$ ✓

8.2 Given the expression: $-4a^5 + 2a^4b - a^3y^2 + 2a^2b^2 - \frac{ab^4}{3} - 10$

8.2.1 How many terms are there in the expression? (1)

6 terms ✓

8.2.2 What is the value of the constant term? (1)

-10

8.2.3 Write down the coefficient of $\frac{ab^2}{3}$ term. (1)

$-\frac{1}{3}$ ✓

8.3 Simplify the following expression:

8.3.1 $2x - 4y - b + y - 4x + 3b$ (2)

$= 2x - 4x - b + 3b - 4y + y$ ✓

$= -2x + 2b - 3y$ ✓

8.3.2 $\sqrt{100k^8l^{16}} + \sqrt[3]{729k^{12}l^{24}}$ (3)

$= 10k^4l^8 + 9k^4l^8$ ✓ ✓

$= 19k^4l^8$ ✓

8.4 Subtract $3a^2 - b - c$ from $a^2 - 3b + 2c$ (3)

Horizontally:

$a^2 - 3b + 2c - (3a^2 - b - c)$

$= a^2 - 3b + 2c - 3a + b + c$ ✓

$= a^2 - 3a^2 - 3b + b + 2c + c$ ✓

$= -2a^2 - 2b + 3c$ ✓

VERTICALLY

$a^2 - 3b + 2c$

$3a^2 - b - c$

$\mathbf{-2a^2 - 2b + 2c}$ ✓ ✓ ✓

[13]

GRAND TOTAL **[60]**