Term 3 | Assessment 1

Numeric and Geometric Patterns | Functions and Relationships
Algebraic Expressions | Algebraic Equations

Section A | Numeric and Geometric Patterns

1. Complete each sequence.

a) 35 ; 34 ; 32 ; ..... ; ..... ; 20.

b) 1 ; 8 ; 27 ; .....; 125 ; ..... .

c) $\frac{4}{5}$; $\frac{2}{5}$; $\frac{1}{5}$; ..... ; ..... .

d) $\frac{1}{2}$; $\frac{5}{12}$; $\frac{1}{3}$; ..... ; ..... ; ..... .

2. For each number sequence, determine the value of the given terms.

a) 2; 4; 6; 8; ...

6^{th} term = _____

n^{th} term = _____

20^{th} term = _____

b) 4; 16; 64; 256; ...

n^{th} term = _____

5^{th} term = _____

10^{th} term = _____

3. Study the diagram pattern below and then complete the table.

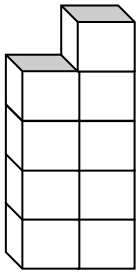


Figure 4

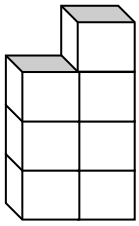


Figure 3

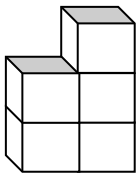


Figure 2

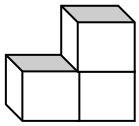


Figure 1

Figure	No. of blocks
1	
2	
3	
4	
n	
8	
	25
20	

Section B | Functions and Relationships

1. Determine the rule for each table and then use it to fill in the missing values.

a) Rule: .....

x	1	2	3	4		7	9
y	0	3	8		24		

b) Rule: .....

x	1	2	3	4	5	8	20
y	1,2	2,4	3,6				

Section C | Algebraic Expressions

1. Write in short form: a) $x \times x \times 2$ ..... b) $t \div 8 + 2$ .....

2. In the expression $x^3 + 8 \times y$,

   a) how many terms are there? .....

   b) how many variables are there? .....

   c) what is the coefficient of y? .....

   d) what is the constant? .....

3. Write an algebraic expression for each of the following.

   a) *A certain number is multiplied by 3.* .....

   b) *Double a number cubed is subtracted from 15.* .....

4. Calculate the value of each of the given expressions if $a = 5$, $b = 4$ and $c = 1$.

   a) $c^2 + \sqrt{b} =$ .....

   b) $abc - bac =$ .....

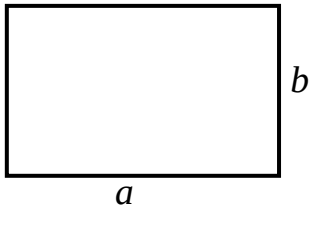
   c) $\frac{c}{a} + \frac{c}{b} =$ .....

5. Consider the rectangle with length a and breadth b.

   What is its:

   a) area? .....

   b) perimeter? .....



Section D | Algebraic Equations

1. Solve each equation for x.

a) $x - 3 = 6$ .....

b) $4x = 10$ .....

c) $\frac{x}{2} + 1 = 5$ .....

2. Write an algebraic equation for each word problem and then solve it.

a) R18 less than triple times a certain amount is R90.

What is the amount? .....

b) Sam is 8 years older than Thato who is x years old.
In 5 years their combined ages will be 30 years.
Calculate how old Thato is now.

.....

.....

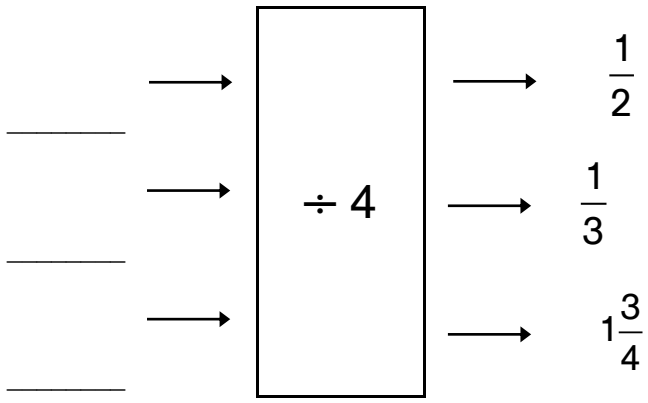
Section E | Mixed Questions

1. True or False? ***If false, give the correct answer.***

a) $2 \times 2 \times x \times y$ is written $22xy$. .....

b) If $x = 2$ and $y = 0{,}4$ then $xy = 2{,}4$. .....

2. Fill in the missing input values in the flow diagram.



3. Consider the following number sequence: $\frac{1}{4}$; $\frac{1}{2}$; $\frac{3}{4}$; 1; …

Determine the value of the:

a) 5th term = ...

b) n^{th} term = ...

c) 13th term = ...

4. *Amy weighs p kg less than James who weighs 40kg.*
How much will they weigh together if Amy gains 2kg?

.....

.....

.....

Term 3 | Assessment 1 | Answers

Numeric and Geometric Patterns | Functions and Relationships
Algebraic Expressions | Algebraic Equations

Section A | Numeric and Geometric Patterns

1. Complete each sequence.

a) 35 ; 34 ; 32 ; 29 ; 25 ; 20. Rule: -1, -2, -3, -4, -5 etc.

b) 1 ; 8 ; 27 ; 64 ; 125 ; 216. Rule: cubic numbers

c) $\frac{4}{5}$; $\frac{2}{5}$; $\frac{1}{5}$; $\frac{1}{10}$; $\frac{1}{20}$. Rule: ÷2

d) $\frac{1}{2}$; $\frac{5}{12}$; $\frac{1}{3}$; $\frac{1}{4}$; $\frac{1}{6}$; $\frac{1}{12}$. Rule: $-\frac{1}{12}$

$\frac{6}{12}$; $\frac{5}{12}$; $\frac{4}{12}$; $\frac{3}{12}$; $\frac{2}{12}$; $\frac{1}{12}$.

2. For each number sequence, determine the value of the given terms.

a) 2; 4; 6; 8; ...

6^{th} term = 12

n^{th} term = $2 \times n$ *(constant diff. of 2)*

20^{th} term = $2 \times 20 = 40$

b) 4; 16; 64; 256; ...

4^1 ; 4^2 ; 4^3 ; 4^4...

n^{th} term = 4^n

5^{th} term = 4^5 $(256 \times 4 = 1024)$

10^{th} term = 4^{10}

3. Study the diagram pattern below and then complete the table.

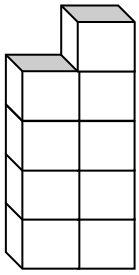


Figure 4

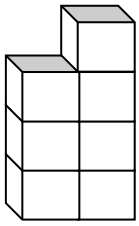


Figure 3

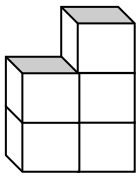


Figure 2

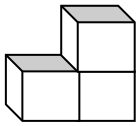


Figure 1

Figure	No. of blocks
1	3
2	5
3	7
4	9
n	$2 \times n + 1$
8	17
12	25
20	41

Section B | Functions and Relationships

1. Determine the rule for each table and then use it to fill in the missing values.

a) Rule: $y = x^2 - 1$

x	1	2	3	4	5	7	9
y	0	3	8	15	24	48	80

b) Rule: $y = 1{,}2 \times x$

x	1	2	3	4	5	8	20
y	1,2	2,4	3,6	4,8	6,0	9,6	24

Section C | Algebraic Expressions

1. Write in short form: a) $x \times x \times 2$ $2x^2$ b) $t \div 8 + 2$ $\frac{t}{8} + 2$

2. In the expression $x^3 + 8 \times y$, $x^3 + 8y$

   a) how many terms are there? 2

   b) how many variables are there? 2 (x and y)

   c) what is the coefficient of y? 8

   d) what is the constant? There is none/ 0.

3. Write an algebraic expression for each of the following.

   a) *A certain number is multiplied by 3.* $3x$

   b) *Double a number cubed is subtracted from 15.* $15 - 2x^3$

4. Calculate the value of each of the given expressions if $a = 5$, $b = 4$ and $c = 1$.

   a) $c^2 + \sqrt{b} =$ $1 + 2 = 3$ because $1^2 = 1$ and $\sqrt{4} = 2$.

   b) $abc - bac =$ $5 \times 4 \times 1 - 4 \times 5 \times 1 = 20 - 20 = 0$

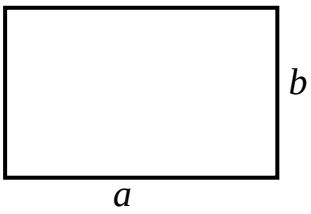
   c) $\frac{c}{a} + \frac{c}{b} =$ $\frac{1}{5} + \frac{1}{4} = \frac{4+5}{20} = \frac{9}{20}$

5. Consider the rectangle with length a and breadth b.

   What is its:

   a) area? $a \times b = ab$

   b) perimeter? $2a + 2b$ or $2(a + b)$



Section D | Algebraic Equations

1. Solve each equation for x.

a) $x - 3 = 6$ $x = 6 + 3 = 9$

b) $4x = 10$ $x = \frac{10}{4} = 2\frac{2}{4} = 2\frac{1}{2}$ or 2,5

c) $\frac{x}{2} + 1 = 5$ $\frac{x}{2} = 4$ → $x = 8$

2. Write an algebraic equation for each word problem and then solve it.

a) R18 less than triple times a certain amount is R90.

What is the amount? $3x - 18 = 90$ → $3x = 108$ → $x =$ R36

b) Sam is 8 years older than Thato who is x years old.

In 5 years their combined ages will be 30 years.

Calculate how old Thato is now. Thato is 6 now.

Sam's age: $x + 8$

Sam's age in 5 years: $x + 8 + 5 = x + 13$

Thato's age in 5 years: $x + 5$

Combined age in 5 years: $x + 13 + x + 5 = 30$

$x + x + 18 = 30$

$x + x = 12$

$x = 6$

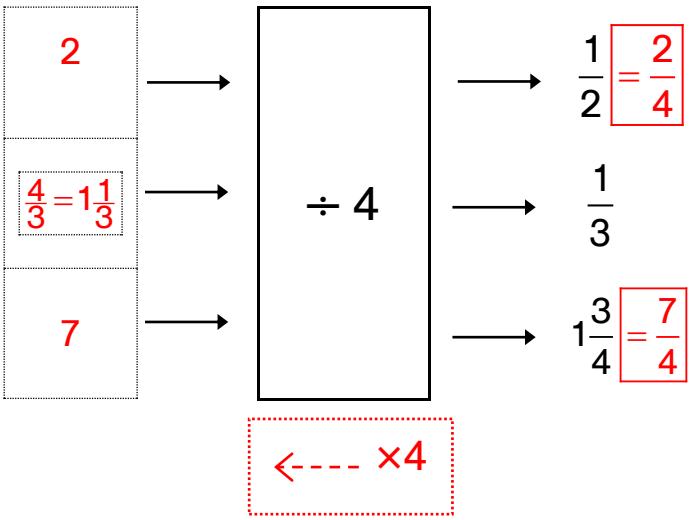
Section E | Mixed Questions

1. True or False? ***If false, give the correct answer.***

a) $2 \times 2 \times x \times y$ is written $22xy$. False. $4xy$

b) If $x = 2$ and $y = 0{,}4$ then $xy = 2{,}4$. False $xy = 2(0{,}4) = 0{,}8$

2. Fill in the missing input values in the flow diagram.



3. Consider the following number sequence: $\frac{1}{4}$; $\frac{1}{2}$; $\frac{3}{4}$; 1; … $\frac{1}{4}; \frac{2}{4}; \frac{3}{4}; \frac{4}{4}; \frac{5}{4}\ldots$

Determine the value of the:

a) 5th term = $1\frac{1}{4}$ / $\frac{5}{4}$

b) n^{th} term = $\frac{n}{4}$

c) 13th term = $\frac{13}{4} = 3\frac{1}{4}$

4. *Amy weighs p kg less than James who weighs 40kg.*

How much will they weigh together if Amy gains 2kg?

Amy weight originally: $40 - p$ kg

Amy weight + 3kg: $40 - p + 2$ kg $= 42 - p$ kg

Combined mass $= 40 + 42 - p$ kg $=$ **$82 - p$ kg**