

Exam exemplar (November): Additional

Paper I: Algebra

(Marks: 120)

Instructions:

Answer all questions.

Show all your workings.

Work neatly and write legibly.

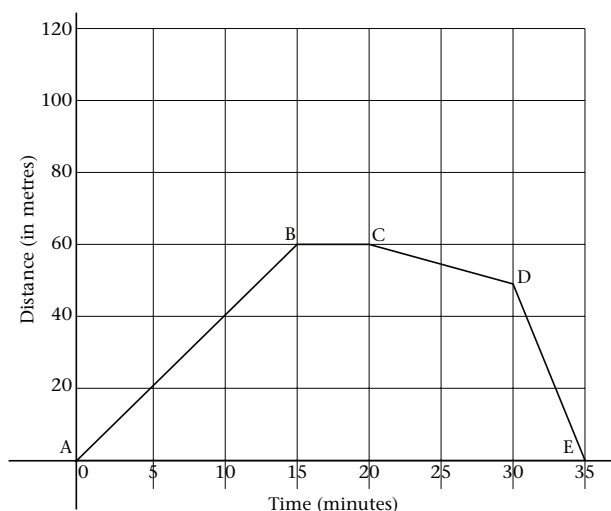
Question 1

- 1.1 a and b are integers not equal to zero. Answer the following questions:
- 1.1.1 Write two ways of expressing the rational number, n , in terms of a and b . (4)
- 1.1.2 Show that any integer a can be written as a rational number. (2)
- 1.1.3 Write 0,45 as a rational number in its simplest form. (3)
- 1.1.4 Write $0,\overline{12}$ in the form $\frac{a}{b}$, where $a, b \in \mathbb{Z}$ en $b \neq 0$ (4)
- 1.2 Simplify the following expressions:
- 1.2.1 $(1\frac{3}{7} + 2) \div \frac{8}{3}$ (3)
- 1.2.2 $(1,82 \times 10^{-3}) \times (1,15 \times 10^3)$ (2)
- 1.3 Terms of a number pattern are connected by the following rule:
 $T_n = \frac{1}{n^2}$, where n is a natural number.
- 1.3.1 Calculate the first term of the pattern. (2)
- 1.3.2 Write down the first four terms of the pattern. (3)
- 1.3.3 Which term of the pattern is $\frac{201}{100}$? (2)
- [25]

Question 2

- 2 Bella goes to the shop to buy milk and bread every Saturday morning. The graph alongside shows a typical trip from Bella's home to the shop and back. Use the graph to answer the following questions:

- 2.1.1 How far is the shop from Bella's home? (2)
- 2.1.2 Calculate Bella's average speed from home to the shop. (4)
- 2.1.3 Describe briefly what might be happening to Bella between points B and C. (2)



- 2.1.4** How many hours did Bella take to complete her trip? (3)
2.1.5 Between which two consecutive points was Bella's speed the fastest? (2)
2.2 Kamve and Vuyo each decided to invest R2 000 with different banks for a period of 24 months. Kamve's bank offers an interest rate of 8% compounded annually. Vuyo's bank offers simple interest values only. They both have the same amount in their accounts at the end of the investment period
2.2.1 Calculate the amount in Kamve's account after 24 months. (4)
2.2.2 Determine the simple interest rate that Vuyo received from his bank. (4)

[21]

Question 3

- 3.1** Consider the following polynomial:
 $4px^5 + 10x^3 - qx^2 - (r-s)x^6 + 3x - 2$
3.1.1 How many terms does the polynomial have? (2)
3.1.2 Write down the degree of the polynomial. (2)
3.1.3 Write down the numerical coefficient of x^6 . (2)
3.2 Simplify the following expressions and write all terms with positive exponents:
3.2.1 $\frac{-tp^4q^3r^2}{4p^2q^{-2}r^8}$ (3)
3.2.2 $4x(x-y) - 5x(2x-y)$ (3)
3.2.3 $2x^2(xy - 3y + 4x) - (x^2y + 2x^3 - x^3y) + 4x^2y$ (4)
3.2.4 $(5p + 2q)(-2q + 5p)$ (3)
3.2.5 $(4x - 3y)^2$ (4)
3.2.6 $\frac{2b+c}{3} + \frac{5b-c}{4}$ (4)

[27]

Question 4

- 4.1** Factorise the following expressions:
4.1.1 $(a-b) + 3(b-a)$ (2)
4.1.2 $27x^2 - 12$ (4)
4.1.3 $a^2 - 5a + 6$ (3)
4.2 Simplify: $\frac{x^2-9}{x^2-x-6}$ (4)
4.3 Solve:
4.3.1 $2x + 9 = 5 - 2x$ (3)
4.3.2 $4(3k - 1) + 3(k - 4) = -11k$ (4)
4.3.3 $(2x - 3)(x + 1) = 0$ (3)
4.3.4 $\frac{x+1}{2} = \frac{2x-3}{3}$ (4)
4.3.5 $3^x - \frac{1}{27} = 0$ (3)

[30]

Question 5

- 5.1** The incomplete table below shows output values for certain input values for f and g .

x	-3	-2	-1	0	1	2	3	4
$f(x) = 2x - 3$	-9	...	...	-3	...	...	...	5
$g(x) = -2x + 1$	...	-3	...	...	-1	...	-5	...

- 5.1.1** Copy and complete the table in your answer book. (5)
5.1.2 On the same set of axes draw graphs of f and g . (6)
5.1.3 On your graphs mark the point of intersection with X and write down the x-coordinate of point X. (2)
5.1.4 Solve for x in the equation: $2x - 3 = -2x + 1$ (3)
5.1.5 How do your answers to **5.1.3** and **5.1.4** compare? (1)

[17]

[Total: 120]

Paper 2: Geometry

(Marks: 100)

Instructions

Answer all the questions.

Show all your working.

Work neatly and write legibly.

Use $\pi = 3,14$ where appropriate, and round all answers to two decimal places.

Question 1

1 State whether each of the following statements is true or false. If a statement is false, give an example to justify.

1.1 Any two equilateral triangles are similar. (2)

1.2 Right-angled triangles have one internal angle equal to 90° . (2)

1.3 A trapezium is a parallelogram. (2)

1.4 The sum of interior angles of a hexagon is 540° . (2)

1.5 All polyhedrons are prisms. (2)

[10]

Question 2

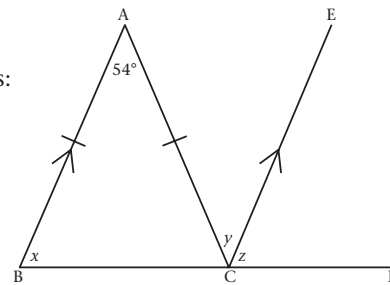
2.1 In the diagram alongside $\triangle ABC$ is isosceles with $\angle A = 54^\circ$. $AB \parallel EC$. Calculate, with reasons:

2.1.1 the value of x (3)

2.1.2 the value of y (3)

2.1.3 the value of z (3)

2.1.4 Show that: $y + z = \angle A + x$ (3)



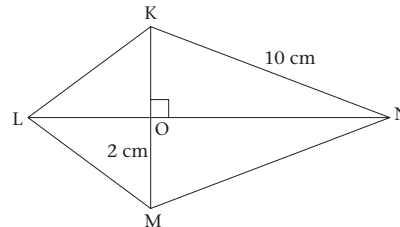
2.2 In the figure alongside, KLMN is a kite. The diagonals LN and KM intersect at O.

2.2.1 Write down the length of KO. (2)

2.2.2 Calculate the length of ON. (5)

2.2.3 Prove that $\triangle LKN \cong \triangle LMN$. (7)

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Question 3

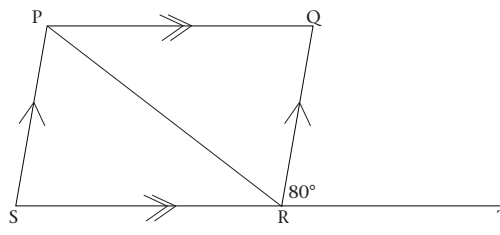
3.1 In the diagram alongside, PQRS is a parallelogram. SR is produced to T such that $PQ \parallel ST$ and $\angle QRT = 80^\circ$.

3.1.1 Calculate, with reasons, the size of $\angle Q$. (3)

3.1.2 Write down the size of $\angle S$. (2)

3.1.3 Determine the size of $\angle SPQ$. (4)

3.1.4 Show that $\triangle PQR \parallel \triangle RSP$. (4)



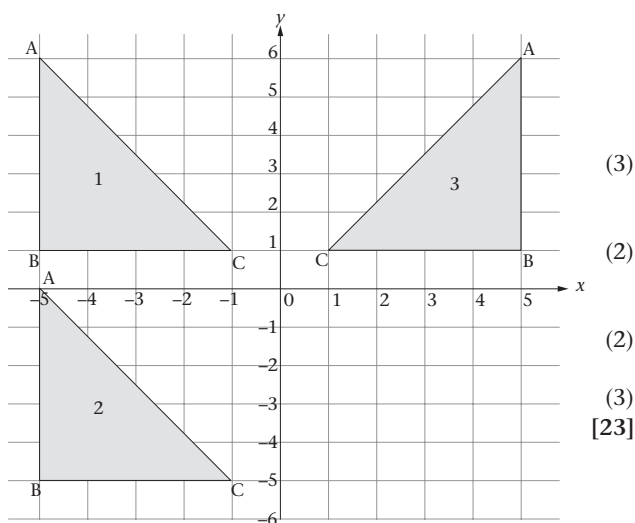
3.2 The diagram alongside shows transformation of $\triangle ABC$ on a Cartesian plane. Answer the following questions.

3.2.1 Write down the coordinates of the vertices A, B and C.

3.2.2 Describe the transformation that produced triangle 2 from triangle 1.

3.2.3 Describe the transformation that produced triangle 3 from triangle 1.

3.2.4 Write down the coordinates of the vertices of triangle 3.



(3)

(2)

(2)

(3)

[23]

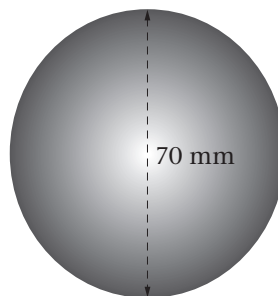
Question 4

4.1 The sphere alongside has a diameter of 70 mm.

4.1.1 Calculate the circumference of the sphere in cm.

4.1.2 Determine the surface area of the sphere in mm^2 .

4.1.3 Determine the volume of the sphere to the nearest litre.



(4)

(4)

(5)

4.2 A certain Platonic shape is a pyramid.

4.2.1 Write down the name of the shape.

4.2.2 How many faces does the shape have?

4.2.3 Determine the number of vertices of the shape.

(2)

(2)

(2)

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Question 5

5.1 The following are final Mathematics results for the Grade 9 class of 2011 at Sitholeni Junior School.

34	45	30	55	70	45	40	44	38	66
50	58	63	80	64	77	66	85	50	52
66	13	28	37	86	38	24	49	55	57

5.1.1 How many Grade 9 learners were registered at the school in 2011?

5.1.2 Arrange the learners' marks in ascending order.

5.1.3 Determine the range of the scores.

5.1.4 Calculate the mean, median and mode for the learners' results.

(2)

(3)

(2)

(5)

- 5.2** Learners whose final marks in Maths are less than 40% are advised to take Maths Literacy in Grade 10. To advise parents on subject choices, Mr Scotch, the Maths teacher, used the data in 5.1 and prepared the following frequency table, but couldn't finish it.

Code	Interval	Tally	Frequency
1	0–29		3
2	30–39	...	...
3	40–49		5
4	50–59	...	...
5	60–69	...	...
6	70–79	...	...
7	80–100		

- 5.2.1** Copy and complete Mr Scotch's frequency table. (6)
5.2.2 How many learners will be advised to take Maths Literacy in Grade 10? (1)
5.2.3 Determine the probability of randomly choosing a learner with a score of 80% and above in the Grade 9 class. (3)

[22]

[Total: 100]