



education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT

GRADE 10

MATHEMATICS P1

JUNE 2024

MARKS: 75

TIME: 1 ½ hours

This question paper consists of 6 pages.



INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of 5 questions.
2. Answer ALL the questions.
3. Number the answers correctly according to the numbering system used in this question paper.
4. Clearly show ALL calculations, diagrams, graphs, etc. that you have used in determining your answers.
5. Answers only will NOT necessarily be awarded full marks.
6. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
7. If necessary, round answers off to TWO decimal places, unless stated otherwise.
8. Diagrams are NOT necessarily drawn to scale.
9. Write neatly and legibly.



QUESTION 1

1.1 Are the following numbers rational or irrational?

1.1.1 $\frac{1}{3}\pi$ (1)

1.1.2 $\frac{6}{7} + \sqrt[3]{8}$ (1)

1.2 Without using a calculator show that **0,04** is rational. (3)

1.3 Given: $P = \frac{x(3x-2)}{(x^2-x-6)}$

For which value(s) of x is:

1.3.1 $P = 0$? (2)

1.3.2 P undefined? (2)

1.4 Determine between which two consecutive integers does $\sqrt{12}$ lie. (2)

1.5 If x is an even integer and $x > 1$, arrange the following in ascending order:

-2^x , 2^x , 2^{-x} , 2^{x^0} , 2^{x^2} (2)

[13]

QUESTION 2

2.1 Factorise the following expressions completely. Leave your answer in simplest form:

2.1.1 $3ab(a-4) - 7a(a-4)$ (2)

2.1.2 $x^4 - 16$ (4)

2.1.3 $6x^2 + 7x + 2$ (2)

2.2 Simplify the following expressions completely:

2.2.1 $\frac{x^3y^{-2} \times (y^3x^{-4})^0}{x^{-7}y^5}$ (3)

2.2.2 $\frac{3}{x^2-4} + \frac{2}{(x-2)^2}$ (4)

[15]

QUESTION 33.1 Solve for x :

$$3.1.1 \quad \frac{1}{3}x + \frac{1}{2}x - 10 = 0 \quad (3)$$

$$3.1.2 \quad 3^{x-2} = \frac{1}{3^x} \quad (3)$$

$$3.1.3 \quad -2 < -3x + 4 \leq 7 \quad (3)$$

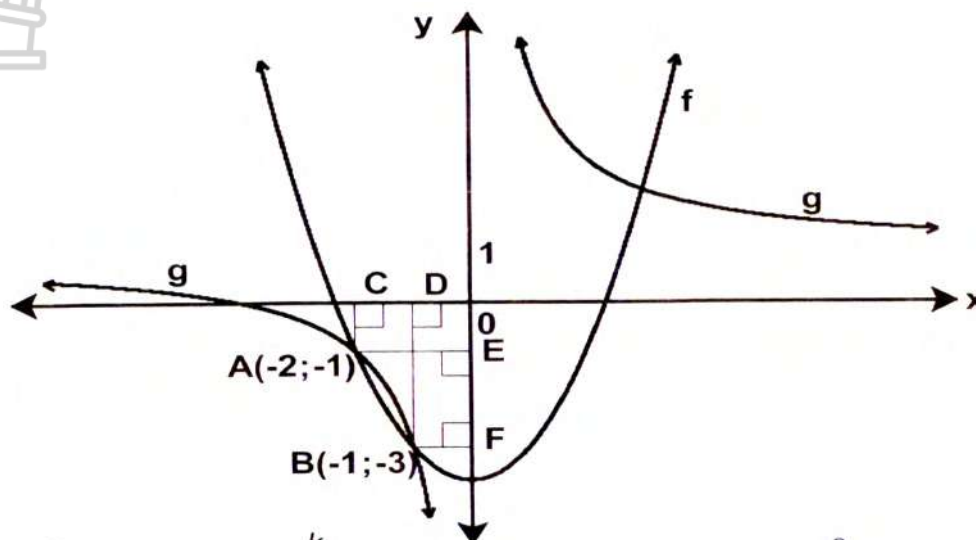
3.2 Solve simultaneously for x and y :

$$x + y = 8 \quad \text{en} \quad x + 2y = 21 \quad (4)$$

3.3 Prove that: $\sqrt[3]{x} = x^{\frac{2}{9}} \times x^{\frac{2}{18}}$ (4)**[17]**

QUESTION 4

Given: $f(x) = \frac{2}{3}x^2 + q$ and $g(x) = \frac{k}{x} + b$. A and B are the points of intersection of the two graphs. The y asymptote is 1.

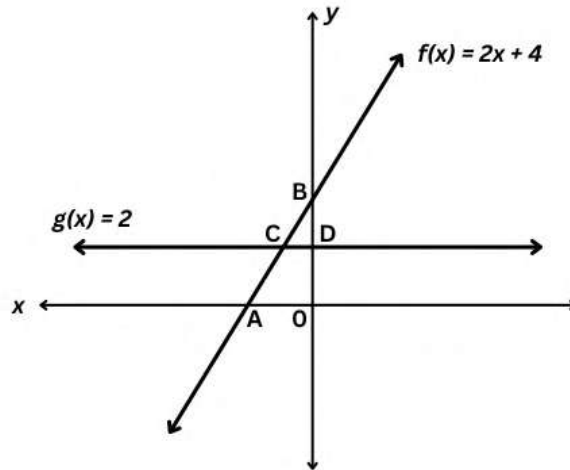
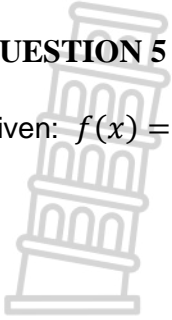


- 4.1 Give the domain of f . (1)
- 4.2 Determine the:
 - 4.2.1 equation of f . (2)
 - 4.2.2 equation of g . (3)
 - 4.2.3 length CD and EF. (2)
 - 4.2.4 length of AB. (2)
 - 4.2.5 x – intercepts of f (3)
- 4.3 For which values of x is:
 - 4.3.1 $g(x) < 1$ (2)
 - 4.3.2 $g(x) = 0$ (2)
 - 4.3.3 $f(x) \cdot x < 0$ (3)
- 4.4 Determine: $2g(x) + 1$ (2)

[22]

QUESTION 5

Given: $f(x) = 2x + 4$ and $g(x) = 2$



- 5.1 Determine the coordinates of A. (2)
 - 5.2 Calculate the area of CAOD. (6)
- [8]**

TOTAL: 75





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MARKING GUIDELINES

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These marking guidelines consist of 6 pages.

QUESTION 1		
1.1.1	$\frac{1}{3}\pi$ = Irrational	✓ answer (1)
1.1.2	$\frac{6}{7} + \sqrt[3]{8}$ = Rational	✓ answer (1)
1.2	<p>Let $x = 0,0\dot{4}$</p> $100x = 4,4\dot{4}$ $\underline{10x = 0,4\dot{4}}$ $90x = 4$ $x = \frac{4}{90}$ $x = \frac{2}{45}$	<p>✓ $100x = 4,4\dot{4}$</p> <p>✓ $90x = 4$</p> <p>✓ answer (3)</p>
1.3.1	$x = 0$ <i>of</i> $3x - 2 = 0$ <i>or</i> $x = \frac{2}{3}$	<p>✓ $x = 0$</p> <p>✓ $x = \frac{2}{3}$ (2)</p>
1.3.2	$x + 2 = 0$ <i>of</i> $x - 3 = 0$ <i>or</i> $x = -2$ <i>of</i> $x = 3$	<p>✓ -2</p> <p>✓ 3 (2)</p>
1.4	$\sqrt{9} < \sqrt{12} < \sqrt{16}$ $3 < \sqrt{12} < 4$	<p>✓ $\sqrt{9} < \sqrt{12} < \sqrt{16}$</p> <p>✓ $3 < \sqrt{12} < 4$ (2)</p>
1.5	$-2^2, 2^2, 2^{-2}, 2^{2^0}, 2^{2^2}$ $-4, 4, \frac{1}{4}, 2, 16$ $-2^x, 2^{-x}, 2^{x^0}, 2^x, 2^{x^2}$	<p>✓ method</p> <p>✓ answer (2)</p>
		[13]

QUESTION 2		
2.1.1	$3ab(a - 4) - 7a(a - 4)$ $(a - 4)(3ab - 7a)$ $a(a - 4)(3b - 7)$	✓ $(3ab - 7a)$ ✓ answer (2)
2.1.2	$x^4 - 16$ $= (x^2 - 4)(x^2 + 4)$ $= (x - 2)(x + 2)(x^2 + 4)$	✓ $(x^2 - 4)$ ✓ $(x^2 + 4)$ ✓ $(x - 2)(x + 2)$ ✓ answer (4)
2.1.3	$6x^2 + 7x + 2$ $= (2x + 1)(3x + 2)$	✓ $(2x + 1)$ ✓ $(3x + 2)$ (2)
2.2.1	$\frac{x^3y^{-2} \cdot (y^3x^{-4})^0}{x^{-7}y^5}$ $= \frac{x^3x^7 \times 1}{y^2y^5}$ $= \frac{x^{10}}{y^7}$	✓ 1 ✓ $\frac{x^3x^7}{y^2y^5}$ ✓ answer (3)
2.2.2	$\frac{3}{x^2 - 4} + \frac{2}{(x - 2)^2}$ $= \frac{3}{(x - 2)(x + 2)} + \frac{2}{(x - 2)(x - 2)}$ $= \frac{3(x - 2) + 2(x + 2)}{(x - 2)(x - 2)(x + 2)}$ $= \frac{3x - 6 + 2x + 4}{(x - 2)(x - 2)(x + 2)}$ $= \frac{5x - 2}{(x - 2)(x - 2)(x + 2)}$	✓ LCM ✓ multiplication with LCM ✓ simplification ✓ answer (4)
		[15]

QUESTION 3		
3.1.1	$\frac{1}{3}x + \frac{1}{2}x - 10 = 0$ $\frac{2x}{6} + \frac{3x}{6} = 10$ $5x = 60$ $x = 12$	<ul style="list-style-type: none"> ✓ LCM ✓ simplification ✓ answer <p style="text-align: right;">(3)</p>
3.1.2	$3^{x-2} = \frac{1}{3^x}$ $3^{x-2} = 3^{-x}$ $x - 2 = -x$ $x = 1$	<ul style="list-style-type: none"> ✓ 3^{-x} ✓ $x - 2 = -x$ ✓ answer <p style="text-align: right;">(3)</p>
3.1.3	$-2 < -3x + 4 \leq 7$ $-2 - 4 < -3x \leq 7 - 4$ $-6 < -3x \leq 3$ $-1 \leq x < 2$	<ul style="list-style-type: none"> ✓ subtract 4 ✓ divide by 3 ✓ answer <p style="text-align: right;">(3)</p>
3.2	$y = 8 - x \dots \dots (1) \quad \text{and} \quad x + 2y = 21 \dots \dots \dots (2)$ <p><i>Substitute</i> <i>vervang</i> (1) in (2)</p> $x + 2(8 - x) = 21$ $x + 16 - 2x = 21$ $\underline{x = -5}$ <p><i>Substitute</i> <i>vervang</i> $x = -5$ in (1)</p> $y = 8 - (-5)$ $\underline{y = 13}$	<ul style="list-style-type: none"> ✓ $y = 8 - x$ ✓ substitute ✓ $x = -5$ ✓ $y = 13$ <p style="text-align: right;">(4)</p>
3.3	$\text{LHS} = x^{\frac{2}{9}} \times x^{\frac{2}{18}}$ $= x^{\frac{4+2}{18}}$ $= x^{\frac{6}{18}}$ $= x^{\frac{1}{3}}$ $= \text{RHS}$	<ul style="list-style-type: none"> ✓ LCM ✓ add exponents ✓ simplify ✓ = RHS <p style="text-align: right;">(4)</p>
		[17]

QUESTION 4		
4.1	$x \in R$	✓ answer (1)
4.2.1	$f(x) = \frac{2}{3}x^2 + q$ <i>Substitute</i> <i>vervang</i> $(-2; -1)$ $-1 = \frac{2}{3}(-2)^2 + q$ <i>of</i> $-3 = \frac{2}{3}(-1)^2 + q$ $-1 = \frac{8}{3} + q$ <i>or</i> $-3 - \frac{2}{3} = q$ $-\frac{11}{3} = q$	✓ formula ✓ substitution (2)
4.2.2	$g(x) = \frac{k}{x} + 1$ <i>Vervang</i> <i>substitute</i> $(-2; -1)$ $-1 = \frac{k}{-2} + 1$ $-2 = \frac{k}{-2}$ $k = 4$	✓ substitution ✓ simplification ✓ answer (3)
4.2.3	CD = 1 unit EF = 2 units	✓ CD ✓ EF (2)
4.2.4	$AB^2 = 1^2 + 2^2$ $= 5$ $AB = 2,24$	✓ Pythagoras ✓ answer (2)
4.2.5	$0 = \frac{2}{3}x^2 - \frac{11}{3}$ $0 = 2x^2 - 11$ $11 = 2x^2$ $\pm\sqrt{5,5} = x$ $\pm 3,35 = x$	✓ $y=0$ ✓ simplification ✓ answer (3)

4.3.1	$x \in (-\infty; 0)$ <i>of</i> $\frac{or}{or} x < 0$	✓ ✓ $(-\infty; 0)$ (2)
4.3.2	x – <i>intercept, let</i> $y = 0$ $0 = \frac{4}{x} + 1$ $-1 = \frac{4}{x}$ $x = -4$	✓ $y = 0$ ✓ answer (2)
4.3.3	$x < -3,35$ or $0 < x < 3,35$	✓ $x < -3,35$ ✓✓ $0 < x < 3,35$ (3)
4.4	$2g(x) + 1 = 2\left(\frac{4}{x} + 1\right) + 1$ $= \frac{8}{x} + 2 + 1$ $= \frac{8}{x} + 3$	✓ substitution ✓ answer (2)
		[22]
QUESTION 5		
5.1	$2x + 4 = 0$ $2x = -4$ $x = -2$	✓ $2x + 4 = 0$ $2x = -4$ ✓ $x = -2$ (2)
5.2	B (0;4) D (0;2) Coordinate of C: $2x + 4 = 2$ $2x = -2$ $x = -1$ C (-1;2) Area of CAOD = $\frac{1}{2}(2 + 1)2$ $= 3$ square units Or Area of CAOD = Area of AOB – Area of CBD $= \frac{1}{2}(2)(4) - \frac{1}{2}(1)(2)$ $= 3$ Square units	✓ B (0;4) ✓ D (0;2) ✓ $2x + 4 = 2$ ✓ C (-1;2) ✓ $\frac{1}{2}(2 + 1)2$ ✓ 3 square units (6)
		[8]
TOTAL: [75]		