education

Department of Education
FREE STATE PROVINCE

GRADE 10

MATHEMATICS

JUNE EXAMINATION

PAPER 1

Marks: 50

Time: 1 Hours

This question paper consists of 5 pages.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering questions.

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

QUESTION 1

1.1 Given: $q = \sqrt{b^2 - 4ac}$

1.1.1 Determine the value of q if $a = 2$; $b = -1$ and $c = -4$.
Leave your answer in the simplest root. (2)

1.1.2 Is q a rational or irrational number? (1)

1.1.3 Determine between which TWO consecutive integers will q lies. (2)

1.2 Represent $x \in [-3;4)$ graphically. (2)

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

For which values of x will P be undefined. (1)

[08]

QUESTION 2

2.1 Simplify each of the following expressions:

2.1.1 $(2x-3)(4x^2+6x+9)$ (3)

2.1.2 $\left(\dfrac{x}{2}-\dfrac{y}{3}\right)\left(\dfrac{x}{2}+\dfrac{y}{3}\right)$ (2)

2.2 Factorize the following expressions:

2.2.1 $x^2 - x - 20$ (2)

2.2.2 $2a^2(a-b)+8b^2(b-a)$ (4)

2.3 Simplify: $\dfrac{3.2^m - 4.2^{m-2}}{2^m - 2^{m-1}}$ (3)

[14]

QUESTION 3

3.1 Solve for x:

3.1.1 $\frac{2x}{3}-\frac{3x}{8}=7$ (3)

3.1.2 $x(x-1)=6$ (4)

3.1.3 $-1<-2x+3\leq 5$ (3)

3.1.4 $2^{x}.2^{x+1}=32$ (3)

3.2 Solve simultaneously for x and y if:

$3x+5y=8$ and $x-2y=-1$ (4)

[17]

QUESTION 4

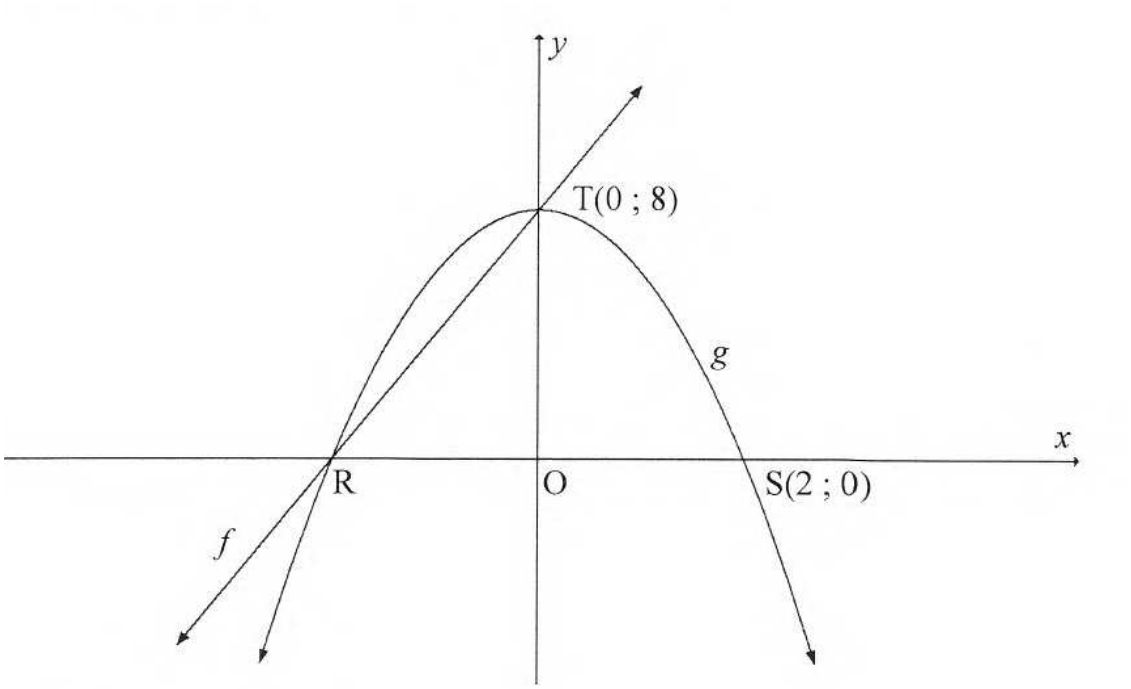
4.1 Consider: $f(x)=\frac{2}{x}-1$

4.1.1 Write down the equations of the asymptotes of f. (2)

4.1.2 Determine $y-$intercept of f. (2)

4.1.3 Sketch f on a Cartesian plane. Show all the intercepts with the axes and the asymptotes. (3)

4.2 The diagram shows the graphs of $g(x)=-2x^2+8$ and $f(x)=mx+c$.
R and S(2;0) are the x-intercepts of g and T(0;8) is the y-intercept of g and f.
Graph f intersects R and T.



4.2.1 Write down the range of g. (1)

4.2.2 Write down the coordinates of R. (1)

4.2.3 Use the graphs to determine the value(s) of x for which:
$f(x)<g(x)$ (2)

[**11**]

TOTAL 50

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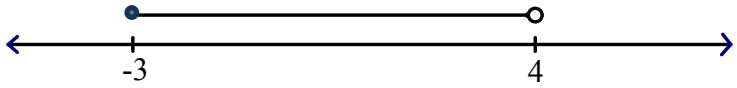
GRADE 10

MATHEMATICS MARKING GUIDELINE
JUNE 2024

This question paper consists of 4 pages

MEMO`

QUESTION 1

1.1.1	$q=\sqrt{(-1)^2-4(2)(-4)}$ $=\sqrt{33}$	✓ subst. ✓ answer (2)
1.1.2	Irrational	✓answer (1)
1.1.3	$25<33<36$ $\sqrt{25}<\sqrt{33}<\sqrt{36}$ $\therefore 5<\sqrt{33}<6$	✓ ✓ answer (2)
1.2		✓ ✓ answer (2)
1.3	$x-3=0$ $\therefore x=3$	✓ answer (1)
		[08]

QUESTION 2

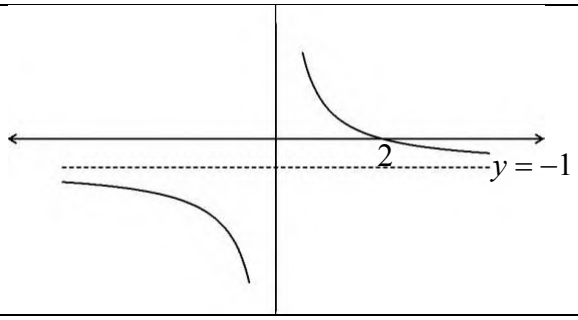
2.1.1	$(2x-3)(4x^2+6x+9)$ $=8x^3+12x^2+18x-12x^2-18x-27$ $=8x^3-27$	✓ $8x^3+12x^2+18x$ ✓ $-12x^2-18x-27$ ✓ answer (3)
2.1.2	$\frac{x^2}{4}-\frac{y^2}{9}$	✓✓ $\frac{x^2}{4}-\frac{y^2}{9}$ (1)
2.2.1	$(x-5)(x+4)$	✓✓factors (4)
2.2.2	$2a^2(a-b)-8b^2(a-b)$ $=(a-b)(2a^2-8b^2)$ $=2(a-b)(a-2b)(a+2b)$	✓ change of sign ✓ common factor ✓ $2(a-b)$ ✓ difference of two squares (4)

2.2.3	$\dfrac{3.2^m - 4.2^m.2^{-2}}{2^m - 2^m.2^{-1}}$ $= \dfrac{2^m\left(3 - 4.\dfrac{1}{4}\right)}{2^m\left(1 - \dfrac{1}{2}\right)}$ $= \dfrac{2}{\dfrac{1}{2}}$ $= 4$	✓ common factor ✓ simplification ✓ answer (3)
		[14]

QUESTION 3

3.1.1	$8(2x) - 3(3x) = 7(24)$ $16x - 9x = 168$ $7x = 168$ $\therefore x = 24$	✓ Multiply by 24 ✓ simplification ✓ answer (3)
3.1.2	$x^2 - x - 6 = 0$ $(x-3)(x+2) = 0$ $\therefore x = 3$ or $x = -2$	✓ standard form ✓ factors ✓ $x = 3$ ✓ $x = -2$ (4)
3.1.3	$-1 - 3 < -2x \leq 5 - 3$ $\dfrac{-4}{-2} > x \geq \dfrac{2}{-2}$ $-1 \leq x < 2$	✓simplification ✓✓ answer (3)
3.1.4	$2^x.2^{x+1} = 32$ $2^{x+x+1} = 2^5$ $2x + 1 = 5$ $x = 2$	✓ base 2 ✓ equating exponents ✓ answer (3)
3.2	$x = 2y - 1$ $3(2y-1) + 5y = 8$ $6y - 3 + 5y = 8$ $11y = 11$ $y = 1$ $x = 2(1) - 1$ $x = 1$	✓ $x = 2y - 1$ ✓ $3(2y-1) + 5y = 8$ ✓ $y = 1$ ✓ $x = 1$ (4)
		[17]

QUESTION 4

4.1	$x=0$ $y=-1$	✓ $x=0$ ✓ $y=-1$ (2)
4.2	$0=\frac{2}{x}-1$ $1=\frac{2}{x}$ $x=2$	✓ $0=\frac{2}{x}-1$ ✓ answer (2)
4.3		✓ asymptotes ✓ intercept ✓ shape (3)
4.4	$y\varepsilon(-\infty;8]$	✓ $y\varepsilon(-\infty;8]$ (1)
4.5	$\mathrm{R}(-2;0)$	✓ answer (3)
4.6	$x\varepsilon(-2;0)$	✓✓ answer (2)
		[11]