Name and Surname : .....

Grade/Class : 10/..... **Mathematics Teacher** : SLT /file

Hudson Park High School

GRADE 10

MATHEMATICS

June Exammination

Marks : 100

Time : 2 hour

Examiner : VNT

Date : 28 ~~June~~ May 2025

Moderator(s) : SLT; PHL; SBL; VPT

INSTRUCTIONS

1. Illegible work, in the opinion of the marker, will earn zero marks.
2. Number your answers clearly and accurately, exactly as they appear on the question paper.
3. **NB** ∘ **Leave *2 lines* open between each of your answers.**
   ∘ **Start each new Question at the top of a page.**
4. **NB** ∘ **Hand in your submission in the following manner :**
   - **Answer on lined paper. Answer pages MUST be stapled together.**
   - **PLEASE staple your question paper behind your answer script.**
5. Employ relevant formulae and show all working out.
   Answers alone *may* not be awarded full marks.
6. (Non-programmable and non-graphical) Calculators may be used, unless their usage is specifically prohibited.
7. Round off answers to 2 decimal places, where necessary, unless instructed otherwise.
8. If (Euclidean) GEOMETRIC statements are made, REASONS must be stated appropriately.
9. Answer in blue or black ink. Work that is done in pencil will not be eligible for queries.

QUESTION 1

CALCULATORS MAY NOT BE USED IN THIS QUESTION

1.1 Between which two consecutive integers does $\sqrt{72}$ lie? Show all your relevant working out. (2)

1.2 Convert $3,1\dot{7}$ into an improper fraction in its simplest form. All of your working out must be shown. (3)

1.3 Given : $\sqrt{\frac{1}{2x+5}}$

For which value(s) of x will the given expression be

1.3.1 Undefined (1)

1.3.2 Non – Real (2)

1.4 If $3x - \frac{1}{x} = 5$, determine the value of $9x^2 + \frac{1}{x^2}$ (2)

[10]

QUESTION 2

2.1 Simplify the following as far as possible :

2.1.1. $\left(x^{\frac{1}{y}} + y^{\frac{1}{x}}\right)^2$ (2)

2.1.2 $\frac{3^{2n}.2^n}{18^{n+2}+18^{n-2}}$ (4)

2.2 Show that $(2x-1)^2 - (x-3)^2$ can be simplified to $(ax+b)(cx-d)$ (3)

2.3 Simplify fully : $\frac{\frac{3y}{x+y}}{\frac{3}{x+y} - \frac{3}{x-y}}$ (4)

2.4 Factorise fully:

2.4.1 $-4x^2 + 10x + 6$ (2)

2.4.2 $x(x-1) - y(y-1)$ (4)

2.4.3 $8x^4 - \frac{1}{2}y^4$ (3)

2.4.4 $2(a-2b)x^3 - 54(2b-a)y^3$ (3)

[25]

QUESTION 3

3.1 Solve for x :

3.1.1. $3x - 7 = 3x + 2$ (1)

3.1.2 $x^2 = 5x$ (3)

3.1.3 $(x - 2)^2 - 10 = 0$ (4)

3.1.4 $2.3^{x-4} - 12 = 0$ (3)

3.1.5 $14x^{\frac{3}{7}} + 8x^{\frac{6}{7}} = 15$ (4)

3.2 Given: $-\frac{1}{3} \leq \frac{-1-3x}{2} < 7$ (where $x \in \mathbb{R}$)

3.2.1 Solve the given inequality for x. (3)

3.2.2 Write your answer to 3.2.1 in interval notation. (1)

3.3 Solve for x and y:

$2x + 3y = -10$ and $5x - y = 43$ (4)

[23]

QUESTION 4

4.1 Consider the following number sequence

-111; -104; -97; -90 ....

4.1.1 Write down the next term in the sequence (1)

4.1.2 Determine an expression for the general term of the sequence, T_n. Simplify your answer fully. (2)

4.1.3 In what position will you find the term whose value is 3788. (2)

4.1.4 Determine the 80th term in the following sequence

$\sqrt{2}; \pi; -111; -104; -97; -90; ...$ (2)

4.2 Calculate the value(s) of x for which

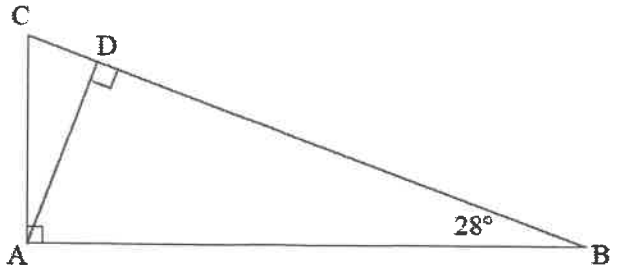
$x^2 - 2x; 2x^2 + 4x; 4x^2 - 24$

Will be an arithmetic sequence. (4)

[11]

QUESTION 5

5.1 Consider the following figure where $CA \perp AB$ and $AD \perp CB$



5.1.1 In terms of AC, CB, CD, DB, AD and/or AB, write down TWO ratios for $\sin 28°$ (2)

5.1.2 Determine the size of angle $A\hat{C}B$ (1)

5.1.3 Hence, calculate the length of CD if $AD = 15cm$ (2)

5.2 **CALCULATORS MAY NOT BE USED IN THIS QUESTION**

Given $3\cos\theta + 2 = 0$ and $180° < \theta < 360°$

5.2.1 Sketch a driagam for the above equation in the correct quadrant. Show all relevant details in the diagram (3)

5.2.2 Hence, calculate the value of $\sin\theta$ (1)

5.3 Given : $\tan 28° = k$, $(k > 0)$

Use a diagram to determine

5.3.1 $\sec 28°$ (3)

5.3.2 $\sin 62°$ (1)

5.4 **CALCULATORS MAY NOT BE USED IN THIS QUESTION**

5.4.1 Draw the special triangles used for dealing with angles of

(a) $30°$ and $60°$ (1)

(b) $45°$ (1)

5.4.2 Hence, evaluate

(a) $\tan 30°$ (1)

(b) $\text{cosec}\, 45°$ (1)

5.5 If $\theta = 55°$, determine

$$\frac{2\tan^2\theta}{\sec\theta+2}$$ (2)

5.6 Solve for θ:

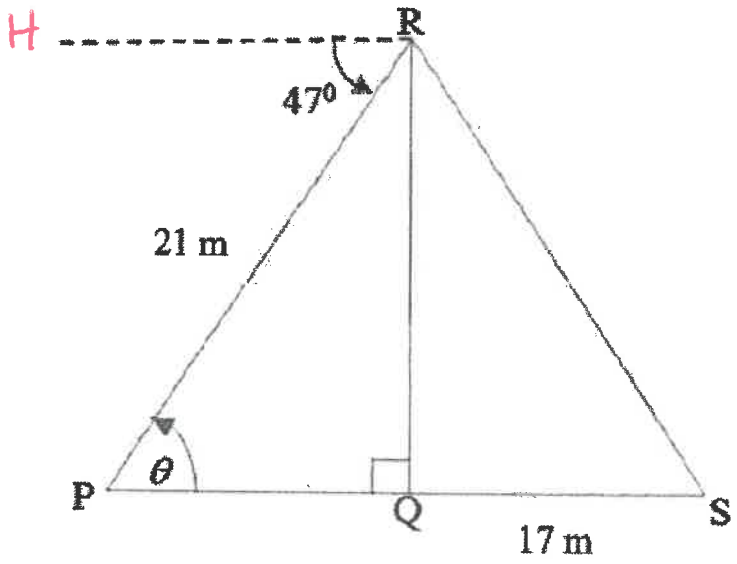
5.6.1 $8\sin\left(\frac{\theta}{3}-10°\right)-3=0 \quad \{0° < \left(\frac{\theta}{3}-10°\right) < 90°\}$ (3)

5.6.2 $3\cot\theta = \sin 87{,}7° \quad \{0° < \theta < 90°\}$ (3)

[25]

QUESTION 6

6.1 RQ is a vertical pole. The foot of the pole Q is on the same horizontal plane as P and S The pole is anchored to the floor by ropes RP and RS where the angle of depression from R down to P is 47°. QS = 17m and RP =21m



6.1.1 Write down, with a reason the size of θ (2)

6.1.2 Calculate the height of the pole (2)

6.1.3 Hence, the size of the angle $P\hat{S}R$ (2)

[6]

TOTAL 100 MARKS