KWAZULU-NATAL PROVINCE

EDUCATION

REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 10

MATHEMATICS

COMMON TEST

MARCH 2024

MARKS: 75

TIME: 1½ hours

This question paper consists of 5 pages.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of 3 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. which 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 off answers correct to TWO decimal places, unless stated otherwise.
8. Diagrams are NOT necessarily drawn to scale.
9. Write neatly and legibly.

QUESTION 1

1.1 Indicate whether each of the following numbers is rational or irrational:

1.1.1 $\sqrt{15}$ (1)

1.1.2 2,5 (1)

1.1.3 $\sqrt[3]{8}$ (1)

1.1.4 2,3333333.... (1)

1.2 Write down TWO rational numbers between $\sqrt{2}$ and $\sqrt{10}$ (Show your working). (2)

1.3 Write down 0,11111111.... as a fraction. (2)

1.4 Factorise the following expressions fully;

1.4.1 x^3-8 (2)

1.4.2 $2x^3+x^2-6x-3$ (3)

1.4.3 x^4-16 (3)

1.5 Simplify the following expressions fully;

1.5.1 $(2x-1)(x^2-2x+1)$ (2)

1.5.2 $(3x+5)^2$ (2)

1.5.3 $\dfrac{2^x-2^{x-2}}{2^{x+1}-2^x}$ (4)

1.5.4 $\dfrac{3}{a-4}+\dfrac{2}{a+3}-\dfrac{21}{a^2-a-12}$ (5)

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QUESTION 2

2.1 Solve for x:

2.1.1 $(x+3)(x-1)=0$ (2)

2.1.2 $2x^2-5x+2=0$ (3)

2.1.3 $(2)^{3x-1}=64$ (3)

2.1.4 $27^{x-2}=81^{2x+1}$ (4)

2.2 Solve the inequality $-2<4+2x\leq 6$ and represent the solution in the interval notation. (4)

2.3 Solve for x and y simultaneously if:
$x+3y-5=0$
$2x-6y+2=0$ (5)

2.4 The difference between two numbers is 5. Six times the smaller number is equal to four times the greater number. Find the numbers. (4)

2.5 If $p=1+3^x$ and $q=1+3^{-x}$, prove that $q=\dfrac{p}{p-1}$ (3)

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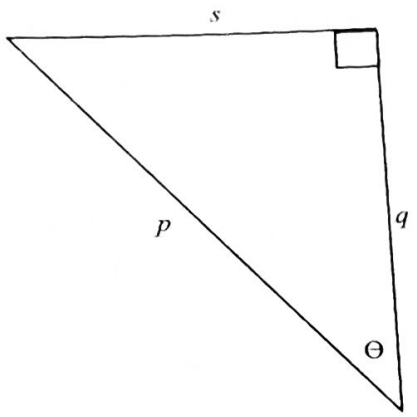
QUESTION 3

3.1 A right angles triangle with sides p, q and s and the angle θ, as shown below.



3.1.1 Write down the values of p, q and s:

(a) $\tan\theta$ (1)

(b) $-\sin\theta$ (1)

(c) $\sec^2\theta$ (2)

3.1.2 If it is given that $p=12$ and $\theta=35°$, calculate the numerical value of q. (2)

3.2 If $\hat{A}=20°$ and $\hat{B}=55°$, use your calculator to evaluate the following(correct to TWO decimal places).

3.2.1 sin(A+B) (2)

3.2.2 $\tan^2 B$ (2)

3.2.2 2cosecA + sin5B (3)

3.3 Without the use of the calculator, showing all your working, determine the value of:

$$\frac{\sin 45°.\tan^2 60°}{\cos 45°}+\sin 30°$$

(5)
[18]

TOTAL [75]