Education and Sport Development

Department of Education and Sport Development
Departement van Onderwys en Sport Ontwikkeling
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NORTH WEST PROVINCE

GRADE 10

MATHEMATICS PAPER 1

MID YEAR EXAMINATION 2019

MARKS: 75

TIME: 1 hour 30 minutes

This question paper consists of 5 pages

INSTRUCTIONS AND INFORMATION

 1.   This question paper consists of 6 questions, answer ALL the questions.

 2.   Clearly show ALL calculations, diagrams, graphs, et cetera that you have used in
           determining the answers.

 3.   An approved scientific calculator (non-programmable and non-graphical) may be
           used, unless stated otherwise.

 4.   If necessary, answers should be rounded off to TWO decimal places, unless stated
           otherwise.

 5.   Number the answers correctly according to the numbering system used in this
           question paper.

 6.   It is in your own interest to write legibly and to present the work neatly.

QUESTION 1

1.1   Given that $v = \sqrt{\dfrac{2E}{m}}$.

      1.1.1   If $m = 12$ and $E = 132$, determine the value of v. Leave answer in surd
            form   (2)

      1.1.2   State whether v is rational or irrational.   (1)

      1.1.3   Determine between which two consecutive integers does v lie?   (2)

1.2   Write the recurring decimal $0,5\dot{2}$ as a fraction   (4)

                                                        [9]

QUESTION 2

2.1   Factorise fully:

      2.1.1 $a^2 - 2a - ax + 2x$ (3)

      2.1.2 $\dfrac{x^3 - 27}{x^2 + 3x + 9}$ (3)

2.2   Simplify the following:

      2.2.1 $(2y - 3)(6y^2 + 4y - 8)$ (3)

      2.2.2 $\dfrac{2^{2n} \times 4^n \times 2}{16^n}$ (3)

      2.2.3 $\dfrac{3x^3 - 7x^2 - 6x}{x^2 - 9} \div \dfrac{3x^2 + 2x}{3x + 9}$ (6)

                                                      [18]

QUESTION 3

3.1   Solve for x:

      3.1.1 $9x = 4 - 5(2x - 3)$ (3)

      3.1.2 $4^x = \dfrac{1}{256}$ (2)

3.2   Solve the following inequality and represent it graphically:

      $10 < x + 4 < 12$ (4)

3.3   Make r the subject of the formula if $A = \pi R^2 - \pi r^2$ (2)

3.4   Given: $x^2 - 9y^2 = 99$ and $x - 3y = 3$

   3.4.1   Determine the value of $x + 3y$ (2)

   3.4.2   Hence, solve for x and y simultaneously   (4)
                                                                          [17]

QUESTION 4

4.1   Given the number pattern: $4;\ -1;\ -6;...$

   4.1.1   Write down the next two terms of the pattern   (2)

   4.1.2   Determine the nth term of the sequence.   (3)

    4.1.3   Calculate T_{27}, the twenty seventh term of the pattern.   (2)

   4.1.4   Which term of the pattern is equal to -71 (2)

4.2   Study the following illustration:

$$1 \times 1 = 1$$
$$11 \times 11 = 121$$
$$111 \times 111 = 12321$$

   Express 12345654321 as per the illustration above.   (1)
                                                                          [10]

QUESTION 5

$f(x) = 2x^2 - 2$ and $g(x) = 2^x - 1$ are the defining equations of the graphs of f and g respectively.

5.1   Write down the equation of the asymptote of g.   (1)

5.2   Sketch the graphs of f and g on the same set of axes, clearly show the intercepts
       with the axes, the turning points as well as the asymptotes.   (6)

5.3   Write down the range of the graph of g.   (1)

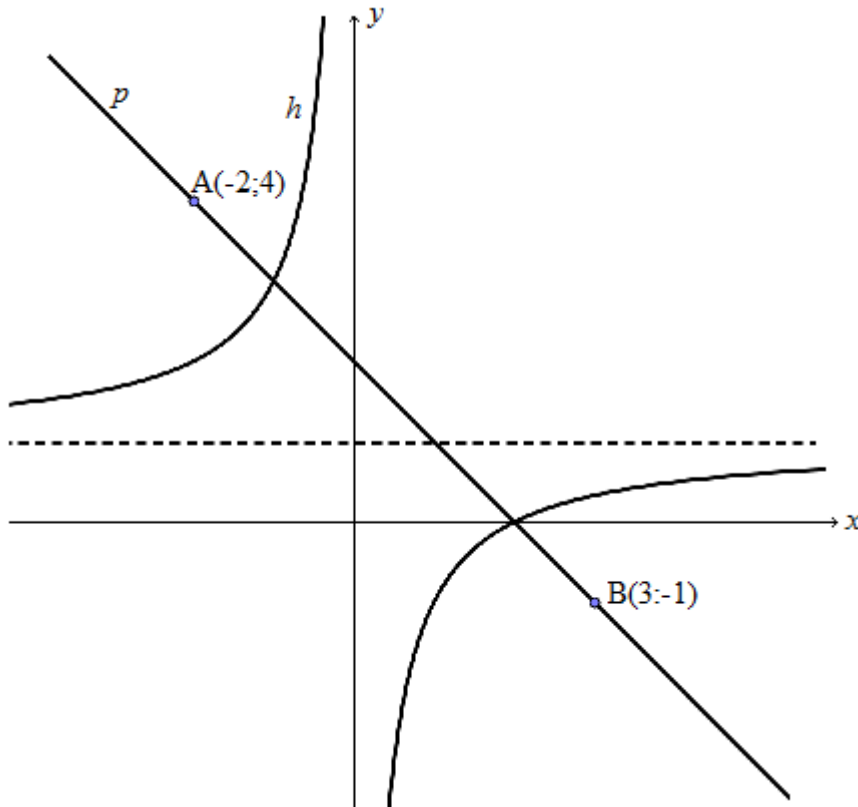5.4   What transformation does the graph of $y = f(x)$ undergo in order to obtain the

       graph of $y = -2x^2 + 2$ (2)
                                                                          [10]

QUESTION 6

Sketched below are the graphs of: $h(x) = -\dfrac{2}{x} + 1$ and $p(x) = ax + q$.

A(-2;4) and B(3;-1) are points on the graph of p.

6.1   Show that $a = -1$ and $q = 2$ (4)

6.2   Determine the values of x for which $h(x) = p(x)$ (4)

6.3   Determine the values of x for which $h(x) \geq p(x)$ (3)

                                                                                                                                [11]

                                                                                                GRAND TOTAL: 75 MARKS