|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | |
|  | | | | | | | |
|  | | **NATIONAL**  **SENIOR CERTIFICATE** | | | | |  |
|  | | | | | | | |
|  | | | | **GRADE 10** |  | | |
|  | | | | | | | |
| **NOVEMBER 2019** | | | | | | | |
|  | | | | | | | |
| **MATHEMATICS P1 (EXEMPLAR)** | | | | | | | |
|  | | | | | | | |
| **MARKS:** | **100** | | | | | | |
|  |  | | | | | | |
| **TIME:** | **2 hours** | | | | | | |
|  | | | | | | | |
|  | | | This question paper consists of 8 pages. | | |  | |

|  |  |  |
| --- | --- | --- |
| **INSTRUCTIONS AND INFORMATION** | |  |
|  | |  |
| Read the following instructions carefully before answering the questions. | |  |
|  | |  |
| 1. | This paper consists of SEVEN questions. |  |
|  |  |  |
| 2. | Answer ALL the questions. |  |
|  |  |  |
| 3. | Clearly show ALL calculations, diagrams, graphs, etc. that you have used in determining your answers. |  |
|  |  |  |
| 4. | Answers only will NOT necessarily be awarded full marks. |  |
|  |  |  |
| 5. | You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise. |  |
|  |  |  |
| 6. | If necessary, round answers off 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 the expression: . For which values of *x* will P be: | |  |
|  |  | |  |
|  | 1.1.1 | Undefined | (1) |
|  |  |  |  |
|  | 1.1.2 | Real | (2) |
|  |  | |  |
| 1.2 | Simplify the following expressions fully. Leave your answers with a positive exponent where necessary. | |  |
|  |  | |  |
|  | 1.2.1 |  | (2) |
|  |  |  |  |
|  | 1.2.2 |  | (2) |
|  |  | |  |
| 1.3 | Factorise the following expressions fully: | |  |
|  |  | |  |
|  | 1.3.1 |  | (2) |
|  |  |  |  |
|  | 1.3.2 | *a*2 – 2ab + *b*2 – 100*c*2 | (3) |
|  |  |  | **[12]** |
|  | | |  |
| **QUESTION 2** | | |  |
|  | | |  |
| 2.1 | Solve for *x*: | |  |
|  |  | |  |
|  | *x*2 = –5*x* | | (3) |
|  |  | |  |
| 2.2 | Given: *V* = Make *r*  the subject of the formula. | | (5) |
|  |  | |  |
| 2.3 | Solve for *x* if 2 | | (3) |
|  |  | |  |
| 2.4 | Solve the following equations simultaneously for *a* and *b*: | |  |
|  |  | |  |
|  | and | | (5) |
|  |  | |  |
| 2.5 | Sipho is 7 times older than his son. In 25 years’ time, he will be twice as old as his son. By formulating and solving an equation in *x*, calculate his son’s present age. | | (5) |
|  |  | | **[21]** |

|  |  |  |  |
| --- | --- | --- | --- |
| **QUESTION 3** | | |  |
|  | | |  |
| 3.1 | Consider the pattern: – 1; 2; 5; 8; ………….. ;116 | |  |
|  |  | |  |
|  | 3.1.1 | Write down *T4* and *T5* of the number pattern. | (2) |
|  |  |  |  |
|  | 3.1.2 | Write down the general formula for the *nth*term of the sequence. | (2) |
|  |  |  |  |
|  | 3.1.3 | Determine the value of the 33rd term of the sequence. | (2) |
|  |  |  |  |
|  | 3.1.4 | How many terms are there in the sequence if the last term is equal to 116? | (3) |
|  |  | |  |
| 3.2 | A linear number pattern with a constant difference can be represented by the terms:   . Determine the numerical value *x* AND the numerical value of the 3rd term. | | (5) |
|  |  | | **[14]** |
|  | | |  |
| **QUESTION 4** | | |  |
|  | | |  |
| 4.1 | In June 2019, the pound to rand exchange rate was ₤1 = R18,18. Zola, travelled to the United Kingdom to watch some WWE wrestling matches. The total cost needed for the trip was ₤3 569. Convert this amount into rands. | | (1) |
|  |  | |  |
| 4.2 | Sipho bought a brand-new Ford Ranger in April 2015 on hire purchase at a cost of R379 000. He agreed on paying 15% deposit and took out a loan for the remaining balance at an interest rate of 22,5%. | |  |
|  |  | |  |
|  | 4.2.1 | How much deposit did Sipho pay? | (1) |
|  |  |  |  |
|  | 4.2.2 | Hence, calculate the initial value of the loan. | (1) |
|  |  |  |  |
|  | 4.2.3 | Calculate the value of the loan with interest in April 2019. | (3) |
|  |  |  |  |
|  | 4.2.4 | Calculate the monthly instalments if he paid off the loan after the four-year period. | (2) |
|  |  | |  |
| 4.3 | A sum of money was invested 6 years ago, earning interest at a rate of 6,7% p.a. compounded annually. The investment is currently worth R 96 714,02. Calculate how much was originally invested 6 years ago. | | (3) |
|  |  | | **[11]** |

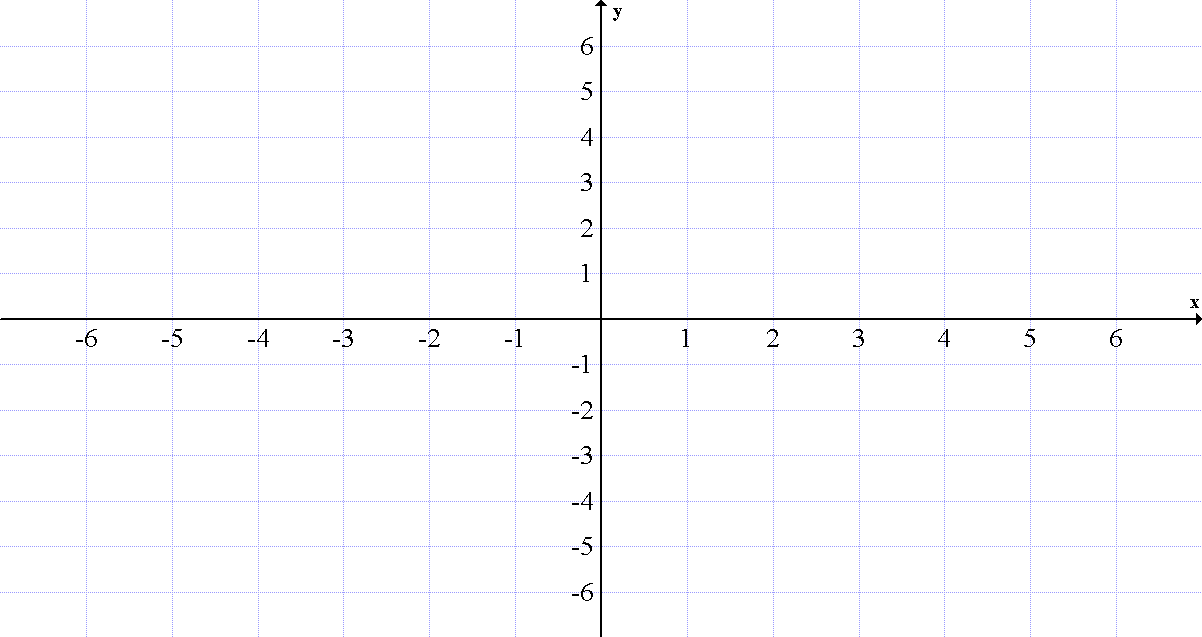
|  |  |  |  |
| --- | --- | --- | --- |
| **QUESTION 5** | | |  |
|  | | |  |
| 5.1 | Given: en | |  |
|  |  |  |  |
|  | 5.1.1 | Write down the equation of the asymptote of *g*. | (1) |
|  |  |  |  |
|  | 5.1.2 | Sketch the graph of *f* and *g* on the same set of axes, using the diagram sheet on the last page. Label all relevant points | (4) |
|  |  |  |  |
|  | 5.1.3 | Using your graph, write down the coordinates of ONE point of intersection of *f* en *g* in the first quadrant. | (2) |
|  |  |  |  |
|  | 5.1.4 | Write down the equation of *h(x)* if *h(x)* is a reflection of *g(x)* along the  *y*-axis. | (1) |
|  |  |  |  |
|  | 5.1.5 | What is the range of *f(x*)? | (1) |
|  |  |  |  |
|  | 5.1.6 | Determine the value(s) of *x* for which *f(x).g(x)* | (2) |
|  |  |  |  |
| 5.2 | In the figure below, the sketch graphs of *f* and *g* are given. is a point on the graph of *f* and A is a point where *f* and *g* intersect. The angle between line *g* and the *x*-axis is 45º. | |  |
|  |  | |  |
|  |  | |  |
|  | 5.2.1 | Write down the gradient of *g.* | (1) |
|  |  |  |  |
|  | 5.2.2 | What is the equation of *g*? | (1) |
|  |  |  |  |
|  | 5.2.3 | Determine the equation of *f.* | (2) |
|  |  |  |  |
|  | 5.2.4 | Determine the coordinates of A, if A is the closest point to the origin. | (2) |
|  |  |  | **[17]** |

|  |  |  |
| --- | --- | --- |
| **QUESTION 6** | |  |
|  | |  |
| Given the following diagram. | |  |
|  | |  |
|  | |  |
| 6.1 | Determine the equations of the graphs of *f* and *g* shown above. | (5) |
|  |  |  |
| 6.2 | FG is parallel to the *y*-axis. Determine the length of the vertical line FG. | (3) |
|  |  |  |
| 6.3 | Write down the range of *f*. | (2) |
|  |  |  |
| 6.4 | Determine the value(s) of *x* for which . | (2) |
|  |  | **[12]** |

|  |  |  |  |
| --- | --- | --- | --- |
| **QUESTION 7** | | |  |
|  | | |  |
| 7.1 | A letter is chosen at random from the word ALGEBRA. What is the probability that the chosen letter is: | |  |
|  |  | |  |
|  | 7.1.1 | The letter A? | (1) |
|  |  |  |  |
|  | 7.1.2 | A consonant? | (1) |
|  |  | |  |
| 7.2 | In a class of 30 learners in Grade 10, the following information is given:   * 5 learners are right-handed. * 12 learners play soccer * 3 learners play soccer and are right-handed   Let R be the set of all right-handed learners and S be the set of all learners who play soccer. | |  |
|  |  | |  |
|  | 7.2.1 | Draw a Venn diagram to represent the above information. | (5) |
|  |  |  |  |
|  | 7.2.2 | Are the events ‘Plays soccer’ and ‘Right-handed’ mutually exclusive?  Give a reason for your answer. | (2) |
|  |  |  |  |
|  | 7.2.3 | How many learners in the class are left-handed and do not play soccer? | (2) |
|  |  |  |  |
|  | 7.2.4 | Determine the probability that a learner is left-handed and plays soccer. | (2) |
|  |  |  | **[13]** |
|  |  |  |  |
|  |  | **TOTAL:** | **100** |

**DIAGRAM SHEET FOR QUESTION 5.1.2**

**NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ CLASS: \_\_\_\_\_\_\_\_**

****