Grade 10 Mathematics: Question Paper 1

MARKS: 100   **TIME: 2 hours**

QUESTION 1

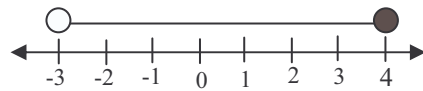1.1   Write $\dfrac{1}{11}$ as a decimal fraction.   (1)

1.2   Without the use of a calculator and showing all working, determine between which two integers $\sqrt{39}$ lies.   (2)

1.3   A set of numbers is represented on the number line below:

       1.3.1   Use inequalities to describe the set of numbers.   (2)
       1.3.2   What is the smallest integer in this set of numbers?   (1)

1.4   Factorise the following:
       1.4.1 $x^2 - 3x$ (2)
       1.4.2 $2x^2 \ 5x - 3$ (2)
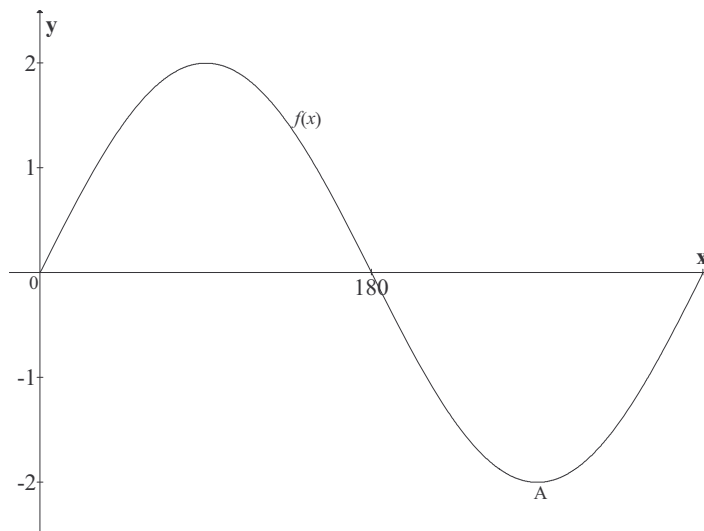   1.4.3 $x^2 \ y \ xy - 1 -$ (4)
       1.4.4 $x^3 + 8$ (2)

1.5   Alongside is the graph of the function:
$f(x) = a\sin x$

       1.5.1   What is the value of a?   (1)
       1.5.2   What are the coordinates of A, the turning point of the function $f(x)$
             shown on the graph?   (2)
       1.5.3   What is the period of $f(x)$?   (1)
       1.5.4   What will be the new equation of $g(x)$ if $g(x)$ is obtained by shifting $f(x)$
             up 1 unit?   (1)

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QUESTION 2

2.1   Simplify the following:

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

2.1.2 $\dfrac{x-3}{2} - \dfrac{2x+1}{5}$ (4)

2.1.3 $\dfrac{2^{x-1}.3^{2x-1}}{18^x}$ Answer must have positive indices only.   (4)

2.2   Solve the following equations:

2.2.1 $(x)(x-2) = -3x + 6$ (5)

2.2.2 $2^{2x+1} = 32$ (3)

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QUESTION 3

3.1   The table below shows the Currency Cross Rates for 20/08/2007.

Currency	$	R	€	£	¥
1 US ($) =	1	7,3597	0,7412	0,5036	113,7100
1 Rand =	0,1359	1	0,1007	0,0684	15,4504
1 Euro(€) =	1,3492	9,9297	1	0,6795	153,4175
1 UK(£) =	1,9857	14,6142	1,4718	1	225,7939
1 Japan(¥) =	0,0088	0,06472	0,0065	0,0044	1

3.1.1   How many South African rand will you get for 1$?   (1)

3.1.2   If an item you chose to buy while in Paris cost €30, what factor would you multiply by to get an approximate cost in rand?   (1)

3.1.3   Calculate how many Japanese Yen you would receive if you converted R600 to Yen? Answer to the nearest Yen.   (2)

3.1.4   Calculate how many pounds you would receive if you converted R600 to pounds?   (2)
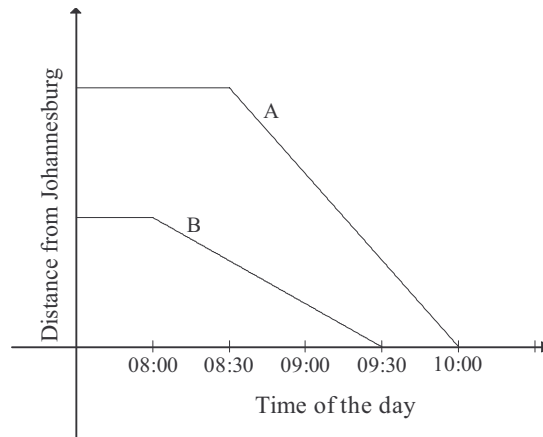
3.2   R5 000 is invested for 3 years at 5,6% p.a. compound interest. The interest is compounded monthly. Calculate the amount earned at the end of the investment period.   (6)

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QUESTION 4

Two businessmen, A and B, travel by car from their hometowns towards Johannesburg. Below is a graph showing the distance of their cars from Johannesburg and the time of day.


4.1   Who lives closer to Johannesburg A or B? Give a reason for your answer.   (2)

4.2   Who drove faster A or B? Explain your answer in two different ways.   (3)

[5]

QUESTION 5

5.1   Given the functions: $f(x) = x^2 + 9$ and $g(x) = 6 - 2x$

   5.1.1   Draw f and g on the same system of axes. Label all intercepts with the axes.   (6)

   5.1.2   Use your graph to determine for which values of x; $f(x) \geq 0$ (2)

   5.1.3 $f(x)$ is reflected in the x-axis. This reflection is given a new name $h(x)$. Draw $h(x)$ on the same system of axes as f and g. Make sure you have labeled each graph carefully.   (2)

   5.1.4   Give the equation of $h(x)$.   (2)

5.2   The graphs of $f(x) = a^x$ and $g(x) = \dfrac{2}{x}$; $x > 0$ are represented in the diagram below. The line $y = x$ is also shown in the diagram
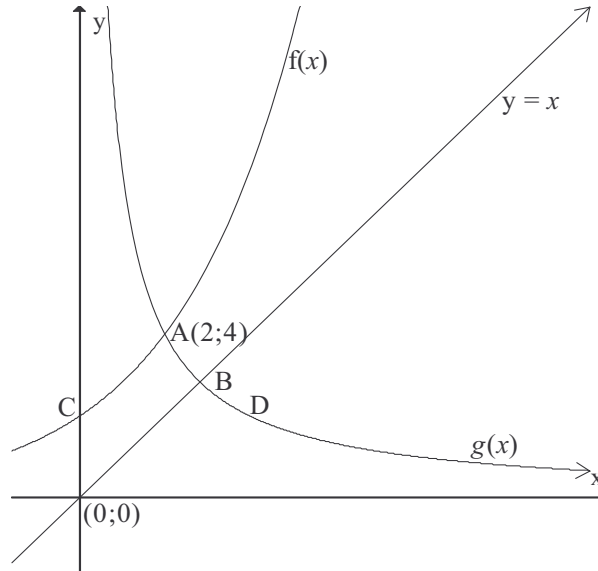

5.2.1   Determine the value of a in the equation $f(x) = a^x$.   (2)

5.2.2   Determine the coordinates of B, the point of intersection of $g(x)$ and the line $y = x$ (2)

5.2.3   Determine the coordinates of C, the point of intersection of $f(x)$ and the y-axis.   (2)

5.2.4   Determine the coordinates of D, the reflection of the point A in the $y = x$ line.   (2)

5.2.5   What will the coordinates of A become if the graph of $f(x)$ is moved 2 units down.   (2)

5.2.6   What is the range of $f(x)$?   (1)

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QUESTION 6

6.1   Solve for x by trial and error: $5^x = 80$ (to at least 1 decimal place)   (3)

6.2   Matches are used to make the figures below.
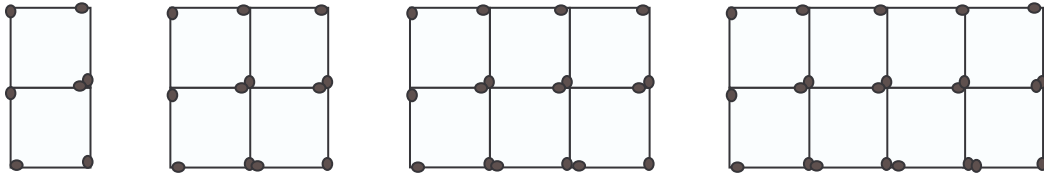
6.2.1   Copy and complete the following table: (4)

Area	2	4	6	8	20	
Number of matches						207

6.2.2   Determine how many matches you will need if the area is $2n$.   (2)

[9]

QUESTION 7

7.1   Use a calculator to calculate the following:
       7.1.1 11×24
       7.1.2 11×52
       7.1.3 11×63 (1)

7.2   Explain in words any pattern that you notice. (A conjecture)   (3)

7.3   Check if your conjecture works for another 3 examples.   (3)

7.4   Use algebra to prove your conjecture for multiplying eleven by a two digit
       number.   (4)

[11]

– End of Paper –