NAME

CHEGUTU HIGH SCHOOL

LOWER 6th A1 TERM 2 2017

19 June 2017

Functions

50 MARKS ***1HOUR*** ANSWER ALL QUESTIONS

PRESENT YOUR WORK NEATLY

1. Sketch the graph of $f(x) = (x-1)(x+4), x \in \mathbb{R}$, showing the coordinates where the graph crosses the $axis$. **[No need to show the coordinates of the turning points]** **[3]**

   Hence on separate diagrams, sketch the graphs of:

   i. $2f(x)$, showing the coordinates where the graph crosses the $y\ axis$. **[2]**

   ii. $f\left(\frac{1}{3}x\right) - 2$, showing the coordinates where the graph crosses the $x\ axis$. **[3]**

   iii. $f(x) + 1$, showing the coordinates where the graph crosses the $y\ axis$. **[3]**

   iv. $f(-x)$, showing the coordinates where the graph crosses the $y\ axis$. **[2]**

   v. $f(x+3)$, showing the coordinates where the graph crosses the $x\ axis$. **[2]**

   vi. $f(2x)$, showing the coordinates where the graph crosses the $x\ axis$. **[2]**

   vii. $-f(x)$, showing the coordinates where the graph crosses the $y\ axis$. **[2]**

   viii. $-2f\left(-\frac{1}{2}x - 2\right)$, showing the coordinates where the graph crosses the $axis$. **[6]**

2. Given that $f(x) = x^2 - 2x + 4$, describe the geometric transformations required to obtain the graph of $f(x)$ from the graph of $f(x) = x^2$. **[4]**

3. a) Given that $f(x) = \frac{x+1}{x-4}$, describe the geometric transformations required to obtain the graph of $f(x)$ from the graph of $y = \frac{1}{x}$. **[4]**

   Hence sketch the graph of the function $f(x) = \frac{x+1}{x-4}$. **[3]**

   b) Find $f^{-1}(x)$ stating clearly its domain. **[4]**

   c) Given that $h(x) = x^2$, find $fh(x)$ leaving your answer in the form $A + \frac{B}{x-2} + \frac{C}{x+2}$ **[7]**

4. The graph of $y = x^2$ is first stretched in the positive x direction by a scale factor of 2. It is then translated by 4 units in the negative x direction. Write the equation of the resulting graph. **[3]**