DO NOT TURN OVER UNTIL INSTRUCTED TO DO SO.

NO CALCULATORS PERMITTED.

EXAM TIME IS 50 MINUTES.

THE EXAM CONSISTS OF 5 QUESTIONS.

Your name: _____

Your SID: _____

Question 1	/ 20
Question 2	/ 20
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Total	/ 100

1. Solve the following inequality. Express your answer as an interval.

$$\frac{x-1}{x+1} > 0$$

2. Give an example of two functions $f, g : X \to X$, where X is a set you may choose, such that

$$f \circ g \neq g \circ f \tag{1}$$

3. (a) If a line L has slope $m \neq 0$, what is the slope of a line L'
   i. perpendicular to L
   ii. parallel to L
   (b) Sketch the line $L : y = 2x + 1$ and point $P : (2, 0)$
   (c) Write down the equation for the line L' perpendicular to L passing through P
   (d) Find the coordinates of the point of intersection of L with L'

4. Let $f(x) = |x + 1| - |x - 1|$

   (a) Plot the graph of $f(x)$

   (b) Is $f(x)$ a one-to-one function? Justify your answer.

   (c) Is $f(x)$ an even or odd function? Justify your answer.

   (d) Plot the graph of $\frac{1}{2}f(x + 2) + 2$ using simple transformations of $f(x)$

5. (a) Complete the square of $x^2 + 2(a-1)x + a^2$ and find the coordinates of the vertex of the parabola, when $x^2 + 2(a-1)x + a^2$ is viewed as a function in x

   (b) By (a) or another method find all real numbers a such that the quadratic equation $x^2 + 2(a-1)x + a^2 = 0$ in x has

      i. No solution in x

      ii. One solution in x

      iii. Two solutions in x

END OF EXAM

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