MATH 2010B Advanced Calculus I, 2014-15
QUIZ 1

Honesty in Academic Work: *The Chinese University of Hong Kong places very high importance on honesty in academic work submitted by students, and adopts a policy of zero tolerance on cheating and plagiarism. Any related offence will lead to disciplinary action including termination of studies at the University.*

NAME:_____ ID:_____

Instruction: Answer ALL TWO questions and show your work with explanation.

Question 1: (10 points) Show that for any $\mathbf{x}, \mathbf{y}$ in $\mathbb{R}^n$,

$$2\|\mathbf{x}\|^2 + 2\|\mathbf{y}\|^2 = \|\mathbf{x} + \mathbf{y}\|^2 + \|\mathbf{x} - \mathbf{y}\|^2.$$

Here, $\|\cdot\|$ denotes the standard Euclidean metric. What does the identity mean geometrically (You may take $n = 2$)? Draw a parallelogram and label the vectors to illustrate this.

Answer:

Question 2: (10 points) Find a parametric form of the line L in $\mathbb{R}^3$ defined by

$$L : \begin{cases} 2x + y - 3z & = & 3 \\ x + 2y + 3z & = & 6 \end{cases}.$$

Answer: