Quiz 3
MTH 13 Section E01
9 March 2017

Your name:

Instructions: Please answer the following and be sure to show your work or support your answer. You are not allowed to use the textbook, workbook, or notes. You cannot talk to other sudents. You may use your calculator.

1.

    (1) Let $f(x) = x^2$. What is
$$\frac{f(x+h) - f(x)}{h}$$
    if $x = 1$?

    (2) How does the answer of (1) become when $h \to 0$?
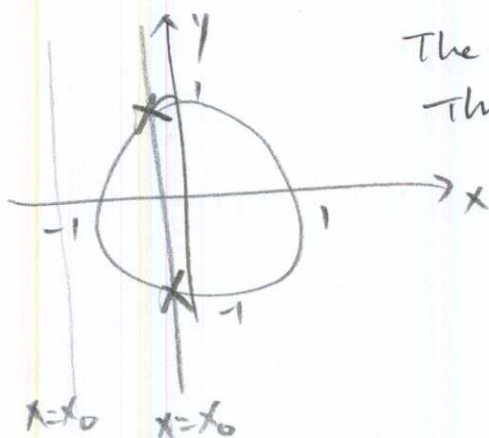
(1)

$f(1+h) = (1+h)^2 = 1^2 + 2 \cdot 1 \cdot h + h^2 = 1 + 2h + h^2$

$f(1) = 1^2 = 1$

$\dfrac{f(1+h) - f(1)}{h} = \dfrac{2h + h^2}{h} = 2 + h.$

(2) As h approaches to 0, $\dfrac{f(1+h) - f(1)}{h}$ approaches to 2. This is the slope of the tangent line to the graph of $f(x) = x^2$ at $(1, 1)$.

2. Draw any circle in the xy-plane and explain why it is not a graph of a function.

The unit circle.

This is <u>not</u> a graph of a function

because the vertical line $x = x_o$

has no crossings when $x_o < -1$ or $x_o > 1$

and has 2 crossings when $-1 < x_o < 1$.

By the vertical line test, this is not a graph of a function