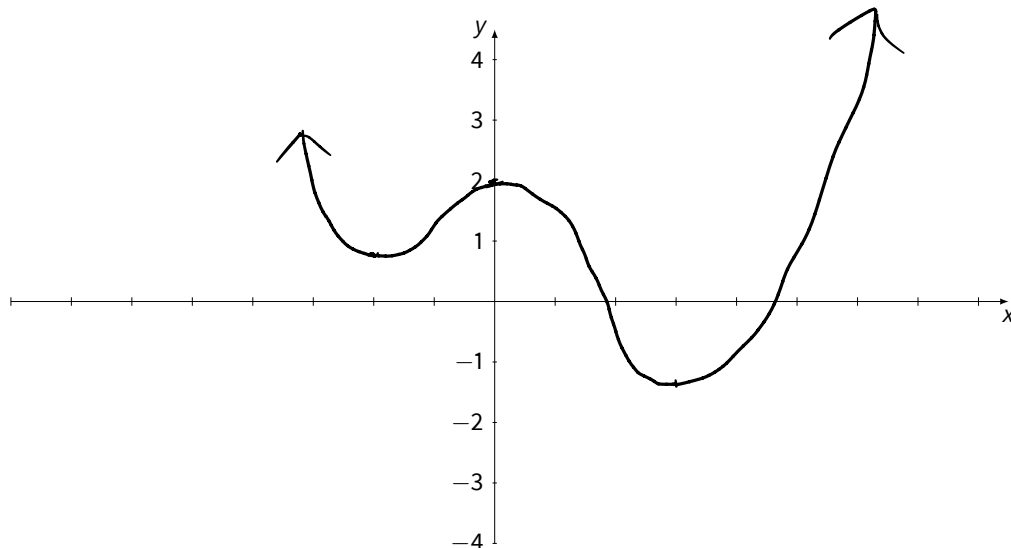# MATH 118: Quiz 4

Name: *Key*

Directions:

* Show your thought process (commonly said as "show your work") when solving each problem for full credit.
* If you do not know how to solve a problem, try your best and/or explain in English what you would do.
* Good luck!

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1. Draw a graph that has

    * Local minima at $x = -2, x = 3$
    * Local maxima at $x = 0$
    * $f(0) = 2$

    Answers may vary.

2. Find the net change and average rate of change for $f(x) = x^2 - x$ on the interval $(3, 3+h)$. Make sure to fully simplify.

   Hint: the h's will cancel in the average rate of change.

$$for \quad (\underset{\underset{a}{\uparrow}}{3}, \underset{\underset{b}{\uparrow}}{3+h})$$

$$Net \; change: \quad f(b) - f(a) = f(3+h) - f(3)$$

$$= (3+h)^2 - (3+h) - (3^2 - 3)$$

$$= 9 + 6h + h^2 - 3 - h - 6$$

$$= \boxed{5h + h^2}$$

$$AROC: \quad \frac{f(b) - f(a)}{b - a} = \frac{f(3+h) - f(3)}{3+h - 3}$$

$$= \frac{5h + h^2}{h}$$

$$= \frac{h \cdot (5 + h)}{h} = \boxed{5 + h}$$