MATH 2250 Calculus I
Eric Perkerson

Name:
Date: August 24, 2015

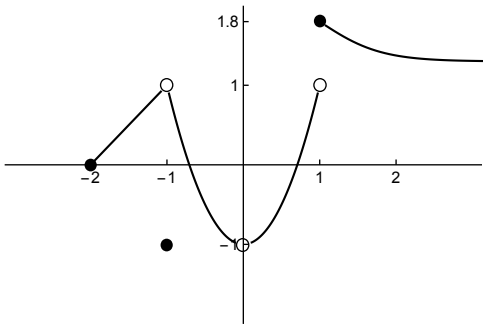
Practice Quiz No. 2

Show all of your work, label your answers clearly, and do not use a calculator.

Problem 1 State the (informal) definition of a limit. (Careful, it's surprising easy to make a logical mistake when rephrasing this definition.)

Problem 2 Find the average rate of change of the function $f(x) = 2x + 4$ on the interval $[-1, 3]$.

Problem 3 Use the below graph to answer this question:



a *Find* $\lim_{x \to -1} f(x)$.

b *Find* $\lim_{x \to 1^+} f(x)$.

c *Find* $\lim_{x \to 1^-} f(x)$.

d *Find* $\lim_{x \to 1} f(x)$.

e *Is* $f(x)$ *continuous at* $x = 0$*? Why or why not?*

f *Is* $f(x)$ *continuous at* $x = -1$*? Why or why not?*

g *Is* $f(x)$ *continuous at* $x = -2$*? Why or why not?*

h *Is* $f(x)$ *continuous? Why or why not?*

Problem 4 Evaluate:

$$\lim_{x \to 0} 5x^2 + 10x + \sin(x) + e^x$$

Problem 5 Evaluate:

$$\lim_{x \to -2} \frac{x - 3}{x^2 - x - 6}$$

Problem 6 Find the slope of the tangent line (i.e. the instantaneous rate of change) for the function $f(x) = x + 1$ at the point $a = 2$, i.e. find

$$\lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$

Problem 7 Find the slope of the tangent line (i.e. the instantaneous rate of change) for the function $f(x) = \sqrt{2x + 4}$ at the point $a = 1$, i.e. find

$$\lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$

Problem 8 Find the slope of the tangent line (i.e. the instantaneous rate of change) for the function $f(x) = \frac{1}{-5x+2}$ at the point $a = 0$, i.e. find

$$\lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$

Problem 9 Find the slope of the tangent line (i.e. the instantaneous rate of change) for the function $f(x) = \sqrt{3x^2 + 1}$ at the point $a = 1$, i.e. find

$$\lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$

Problem 10 Evaluate:

$$\lim_{x \to 3^+} \frac{|x-3|}{x-3}$$

Problem 9 Evaluate:

$$\lim_{x \to 0} \frac{\sin(5x)}{3x}$$