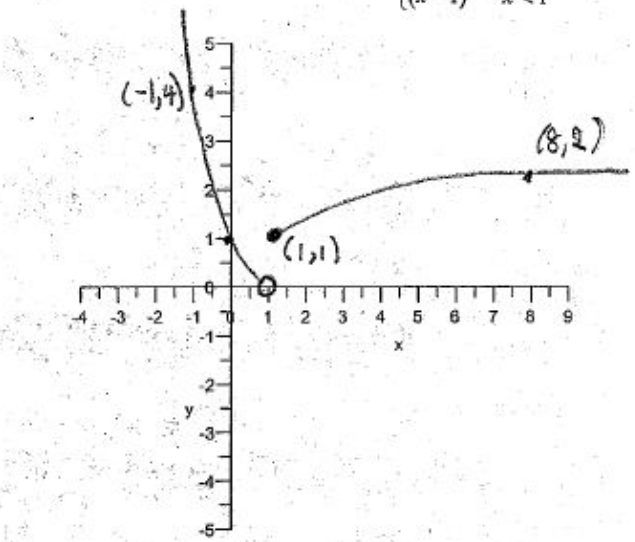
MATH 1712 D1-D3 **Test #1** **Full Name** Key (Print)

Page 1 of 4 **Version A** **January 28, 2009**

Circle your TA's name: D1 – Lacy Hardcastle D2 – Kyla Hewell D3 – Kelly Robinson

1. Sketch the graph of the piecewise function $f(x) = \begin{cases} x^{1/3} & x \geq 1 \\ (x-1)^2 & x < 1 \end{cases}$

(10 pts.)



2. Let $g(x) = \sqrt{2x-3}$ and $h(x) = \dfrac{1}{x+4}$.

(a) Find the domain of g.

(6 pts.)

$2x - 3 \geq 0$

$x \geq \frac{3}{2}$

(b) Evaluate $h(g(x))$.

(6 pts.)

$h(g(x)) = \dfrac{1}{g(x)+4}$

$= \dfrac{1}{\sqrt{2x-3}+4}$

Circle your TA's name: D1 7 Lacy Hardcastle l D2 — Kyla Hewell D3 — Kelly Robinson

3. A manufacturer has a monthly fixed cost of \$10,000 and a production cost of \$5 for each unit produced. The product sells for \$7 per unit.

(a) Let x be the number of units produced. Write an expression for $C(x)$, the cost function.

(5 pts.)

$C(x) = 10000 + 5x$ dollars

(b) Find the number of units of production requires to break even. (The break-even point is the point at which the revenue equals the cost.)

(7 pts.)

$R(x) = 7x$

$C(x) = R(x)$

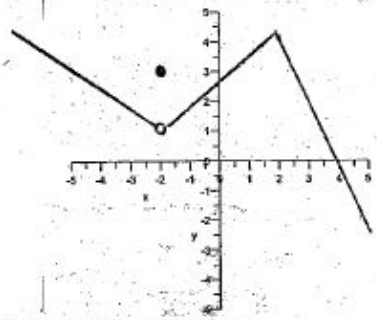
$10000 + 5x = 7x$

$10000 = 2x$

$x = \frac{10000}{2} = 5000$ units

4. Determine $\lim_{x \to -2} f(x)$ for the function f in the sketch below.

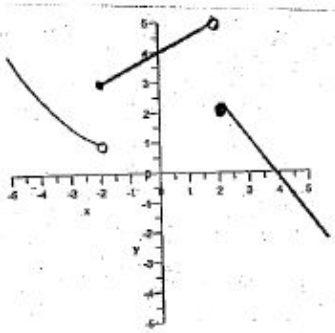
(6 pts.)



$\lim_{x \to -2} f(x) =$ 1

5. Determine $\lim_{x \to 2^-} g(x)$ for the function g in the sketch below.

(6 pts.)



$\lim_{x \to 2^-} g(x) =$ 5

Circle your TA's name} D1 - Lacy Hardcastle D2 ~ Kyla Hewell D3 — Kelly Robinson

3. A manufacturer has a monthly fixed cost of $10,000 and a production cost (of $5 for each unit produced. The product sells for $7 per unit. '0 -

Fi_nd_ of of produetion requires break even, (The break-even point is . e the point zit Which.-. the ruevemie eqtials the cost.) = t ' t t ' .

MATH 1712 D1-D3 **Test #1** **Full Name** key
(Print)

Page 3 of 4 **Version A** **January 28, 2009**

Circle your TA's name: D1 – Lacy Hardcastle D2 – Kyla Hewell D3 – Kelly Robinson

6. Evaluate $\lim_{x\to 3}\frac{x-3}{x^2-9}$.

(10 pts.)

$$\lim_{x\to 3}\frac{x-3}{x^2-9} = \lim_{x\to 3}\frac{x-3}{(x-3)(x+3)}$$

$$= \lim_{x\to 3}\frac{1}{x+3}$$

$$= \frac{1}{3+3}$$

$$= \boxed{\frac{1}{6}}$$

7. Let $f(x)=x^2-5x$. Find $f'(x)$ using the formula $f'(x)=\lim_{h\to 0}\frac{f(x+h)-f(x)}{h}$ (or the four-step process as described in Section 2.6).

(12 pts.)

$$f'(x) = \lim_{h\to 0}\frac{[(x+h)^2-5(x+h)]-[x^2-5x]}{h}$$

$$= \lim_{h\to 0}\frac{x^2+2xh+h^2-5x-5h-x^2+5x}{h}$$

$$= \lim_{h\to 0}\frac{2xh+h^2-5h}{h}$$

$$= \lim_{h\to 0}\frac{h(2x+h-5)}{h}$$

$$= \lim_{h\to 0} 2x+h-5$$

$$= 2x+0-5$$

$$= \boxed{2x-5}$$

MATH 1712 D1-D3 **Test #1** **Full Name**_____

Circle your TA's name: D1 — Lacy Hardcastle D2 — Kyla Hewell D3 — Kelly Robinson

Version A January 28, 2009

(10 pm.)

Key

(Print)

Circle your TA's name: D1 – Lacy Hardcastle D2 – Kyla Hewell D3 – Kelly Robinson

8. Determine whether each statement is true or false. Justify the answers.

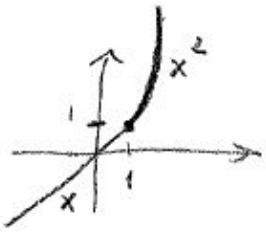
(a) *All piecewise functions are not continuous.*

(6 pts.)

False

A counterexample

$$f(x) = \begin{cases} x^2, & x \geq 1 \\ x, & x < 1 \end{cases}$$



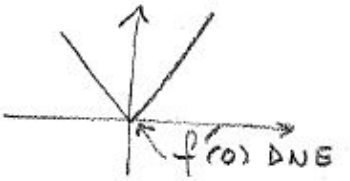
(b) *If a function is continuous, it is also differentiable.*

(6 pts.)

False

a counterexample

$$f(x) = |x| = \begin{cases} x, & x \geq 0 \\ -x, & x < 0 \end{cases}$$

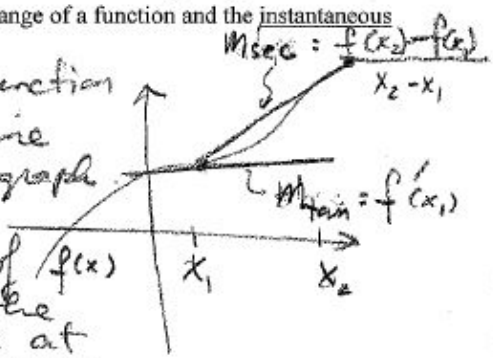


9. Describe the difference between the average rate of change of a function and the instantaneous rate of change of a function in terms of slope.

(10 pts.)

The average change of a function is the slope of the secant line joining two points on the graph.

The instantaneous rate of change of a function is the slope of the tangent line at a particular point on the graph.



10. Describe the market equilibrium concept in a competitive market.

(10 pts.)

See p. 82

Market equilibrium corresponds to the point at which the supply of a commodity is equal to the demand for it.

Circle your TA's name: DI — Lacy Hardcastie D2 -- Kyla Hewell D3 Kelly Robinson

8. Determine whether each statement is true or false. J ustifi the answers.

(21) All piecewise fimctions are not continuous.

(6 PIS-J - X Z1 Q

1; 1'3 fix

X", X

9. Describe the difference between the average rate of change of a function and the jnstantaneous