

# Simon Fraser University

## Math 100

**Midterm 1**  
**Instructor : Sue Haberman**

**Date: February 7, 2007**  
**Time: 11:30 - 12:20am**

**Last Name (print):** \_\_\_\_\_ **First Name:** \_\_\_\_\_

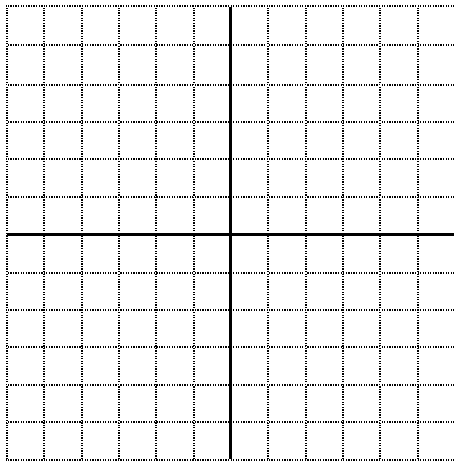
**Signature:** \_\_\_\_\_ **SFU Email ID:** \_\_\_\_\_

### **Instructions:**

- 1. Do not open this exam until instructed to do so.**
- 2. Ensure that you have 5 pages of questions numbered page 2 to page 6.**
- 3. No calculators, notes or books are allowed.**
- 4. Give all final numerical answers exactly, simplify all final expressions.**
- 5. For full marks, show all steps leading to your final answer.**
- 6. Answer each question in the space provided. Continue on the back of the previous page if necessary.**

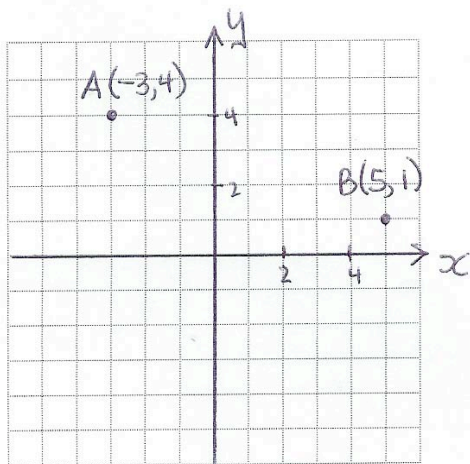
Question	Mark	Maximum
1		5
2		6
3		6
4		8
5		5
<b>TOTAL</b>		<b>30</b>

1. a) (3 marks) Draw a careful graph of the function:  $y = -\sqrt{x+4} + 3$



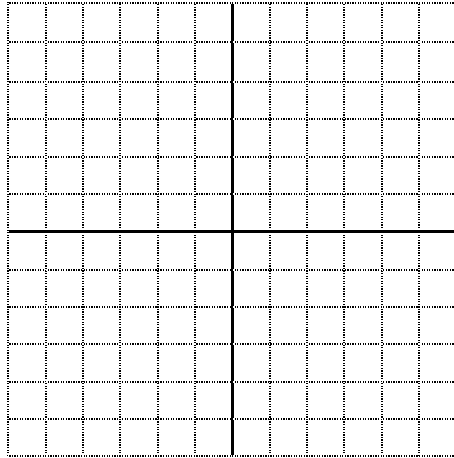
b) (2 marks) State the Domain and Range of the function

2. Given two points:  $A(-3,4)$  and  $B(5,1)$  as shown on the graph:



- a) (1 mark) Determine the co-ordinates of the midpoint of  $\overline{AB}$
- b) (1 mark) Determine the slope of  $\overrightarrow{AB}$
- c) (1 mark) Determine the equation of the line containing  $A$  and  $B$
- d) (1 mark) Determine the equation of the vertical line through  $B$
- e) (2 marks) Determine the equation of a circle, centre  $A$ , passing through  $B$

3.



a) ( 2 marks) Draw a careful graph of the linear function:

$$f(x) = \frac{2}{3}x - 4$$

b) (2 marks) Determine the equation of a line perpendicular to the graph of  $f(x)$  passing through the point  $(7, -5)$

c) (2 marks) Determine a formula for  $f^{-1}(x)$  , the inverse of  $f(x)$

4. Given two functions:  $f(x) = \frac{\sqrt{1+x}}{2-x}$  and  $g(x) = 3 - x^2$

a) (1 mark) Evaluate  $f(8)$

b) (1 mark) Evaluate  $(fg)(0)$

c) (1 mark) Give a simplified expression for  $g(x+h)$

d) (2 marks) Give a simplified expression for  $(f \circ g)(x)$

e) (3 marks) Solve for  $x$  :  $f(x) = \frac{1}{2}$

5) (5 marks – one mark per answer)

The graph of a function:  $f(x)$  is shown on the grid at right.

Use this graph to determine each of the following:

a) The value of  $f(5)$

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b) The intervals on which  $f$  is decreasing

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c) The co-ordinates of any relative maximum points for  $f(x)$

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d) The value(s) of  $x$  for which  $f(x) = 0$

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e) The range of  $f(x)$  (answer in interval notation)

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