

AMERICAN UNIVERSITY OF BEIRUT  
Mathematics Department  
Math 101 – Quiz 2  
Fall 2010 – 2011

Name:.....

ID:.....

Please circle your section number:

**Instructor: Silvana Jaber**

**Section 1**  
F @ 9:00

**Section 2**  
F @ 10:00

**Section 3**  
F @ 11:00

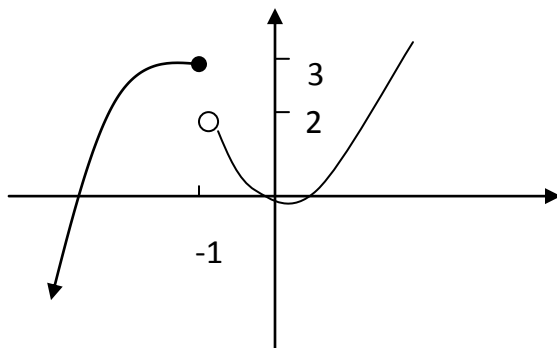
**Section 4**  
F @ 12:00

**Instructions:**

1. Write your **NAME** and **AUB ID** number above.
2. Solve the problems on the white sheets at the appropriate place. Use the pink booklet for scratch work only.
3. You may use the back pages of the white sheet to solve or complete the solution of a problem.

**PART I: Fill in the blanks.**

1. If  $(x) = \frac{1}{\sqrt{x-2}}$ , then the domain of  $g$  is \_\_\_\_\_. The value of  $g(11)$  is \_\_\_\_\_.
2. The graph of the function  $y = 3 - x^2$  is symmetric about the \_\_\_\_\_.
3. If  $f(-x) = -f(x)$ , the function  $y = f(x)$  is said to be an \_\_\_\_\_ function. The graph of an odd function is symmetric about the \_\_\_\_\_.
4. To shift the graph of the line  $y = -2x + 1$  horizontally 3 units to the right, we rewrite its equation as \_\_\_\_\_.
5. If  $f(x) = \sqrt{x-1}$  and  $(x) = x + 1$ , then  $(f \circ g)(x) =$  \_\_\_\_\_. The domain of the composite is \_\_\_\_\_.
6. Evaluate:  $\cos\left(-\frac{\pi}{6}\right) =$  \_\_\_\_\_,  $\sec\left(\frac{\pi}{3}\right) =$  \_\_\_\_\_,  $\csc\left(-\frac{\pi}{3}\right) =$  \_\_\_\_\_.
7. Consider the graph of the function  $f(x)$  below,



$\lim_{x \rightarrow -1^+} f(x) =$  \_\_\_\_\_ and  $\lim_{x \rightarrow -1^-} f(x) =$  \_\_\_\_\_.

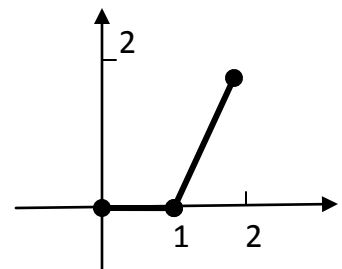
8. Suppose  $\lim_{x \rightarrow c} f(x) = 7$  and  $\lim_{x \rightarrow c} g(x) = -3$ . Then  $\lim_{x \rightarrow c} \frac{g(x)}{f(x)-g(x)} =$  \_\_\_\_\_.

**PART II:**

1.a) Find the domain and range of the function  $f(x) = 2 - \sqrt{x - 1}$ .

1.b) Say whether the function  $f(x) = \frac{x}{x^2+1}$  is even, odd, or neither. Give reasons for your answer.

2. Find a formula for the function graphed below.



3.a) Express  $\cos\left(\frac{\pi}{6} + x\right) - \sin\left(\frac{3\pi}{2} - x\right)$  in terms of  $\sin(x)$  and  $\cos(x)$ .

3.b) A triangle has sides  $a = 2$  and  $b = 3$  and angle  $C = 45^\circ$ . Find the length of side  $c$  facing angle  $C$ .

4. For  $-\frac{\pi}{2} < x < \frac{\pi}{2}$  it is known that  $1 \leq \frac{\tan x}{x} \leq \frac{1}{\cos x}$ . Find  $\lim_{x \rightarrow 0} \frac{\tan x}{x}$ .

5.a) Find  $\lim_{x \rightarrow 3} \frac{x-3}{x^2-9}$

5.b) Find  $\lim_{x \rightarrow -1} \frac{\sqrt{x^2+8} - 3}{x+1}$

6. Consider the function  $f(x) = \begin{cases} x^2, & 0 \leq x < 1 \\ 3, & x = 1 \\ -2x + 3, & 1 < x < 2 \end{cases}$ .

Does  $\lim_{x \rightarrow 1} f(x)$  exist? Justify.

7. Let  $f$  be the function with domain  $\left(-\frac{\pi}{2}, \infty\right)$  be given by

$$f(x) = \begin{cases} x^2 - x + \frac{\sin(3x)}{x}, & x > 0 \\ r + \frac{\tan x}{x} - \frac{1}{2}, & -\frac{\pi}{2} < x \leq 0 \end{cases}$$

a) Calculate  $\lim_{x \rightarrow 0^+} f(x)$  and  $\lim_{x \rightarrow 0^-} f(x)$ .

b) Find the value of  $r$  which makes  $\lim_{x \rightarrow 0} f(x)$  exists.