

## Practice In-Class Exam 1

Problem	Points	Score
1	20	
2A	20	
2B	20	
3	20	
4	20	
TOTAL	100	

**Problem 1:** Let  $f$  and  $g$  be the functions defined by

$$f(x) = x^2 - 1$$

$$g(x) = \frac{1}{\sqrt{x}}$$

CIRCLE THE CORRECT ANSWER using the functions  $f$  and  $g$  defined above.

**(I)** The domain of  $f$  is

- (A) all positive real numbers      (B) all real numbers bigger than 1      (C) all real numbers  
 (D) all real numbers different than 1  
 (E) None of the above.

**(II)** The value of  $f(1.1)$  is

- (A) 1      (B) 1.0201      (C) 1.21      (D) 0  
 (E) None of the above.

**(III)** The value of  $g(a+h)$  is

- (A)  $\sqrt{a+h}$       (B)  $\frac{1}{\sqrt{a+h}}$       (C)  $\sqrt{a+h}$ ;      (D)  $\frac{1}{\sqrt{a+h}}$   
 (E) None of the above.

**(IV)** The function  $f(g(x))$  is

- (A)  $\frac{1}{x-1}$       (B)  $\frac{1}{\sqrt{x^2-1}}$       (C)  $\frac{1}{x} - 1$       (D)  $|x| - 1$   
 (E) None of the above.

**Problem 2:**

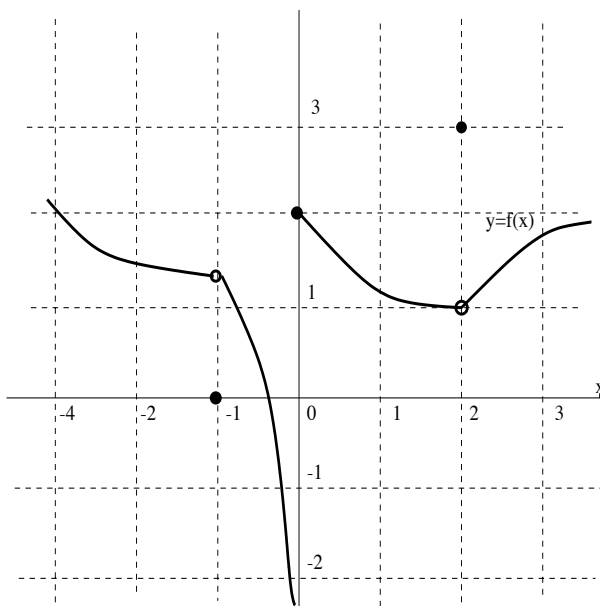


FIGURE 1

**A)** Use the graph of the given function in FIGURE 1 above to determine whether the limits exists or not.

i)  $\lim_{x \rightarrow -1} f(x) =$

ii)  $\lim_{x \rightarrow 0^+} f(x) =$

iii)  $\lim_{x \rightarrow -3} f(x) =$

D)  $\lim_{x \rightarrow 2^-} f(x) =$

**B)** From the graph of function in FIGURE 1 above, complete the following table.

$x$	$f(x)$	Is $f$ continuous at $x$ ?
2		
0		
-1		
-3		

**Problem 3.** Find the indicated limits.

**A)**  $\lim_{x \rightarrow 0} 2x^2 - 1 =$

**B)**  $\lim_{x \rightarrow -3} \frac{x^2 - 9}{x + 3}$

**C)**  $\lim_{x \rightarrow 2} 1.732 =$

**D)** Complete the table by computing  $f(x)$  at the given values of  $x$  and compute the corresponding limit.

x	10	50	100	500	1000
$f(x) = \frac{x^2 + 1}{2x^2}$					

$\lim_{x \rightarrow \infty} \frac{x^2 + 1}{2x^2} =$

**Problem 4.**

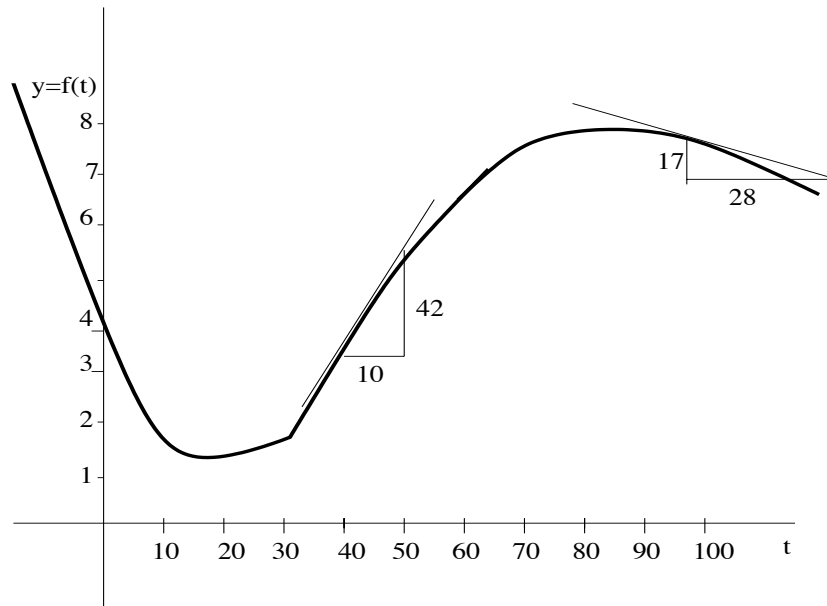


FIGURE 2

The graph in FIGURE 2 represents the position of a particle moving along a line given by the function  $y = f(t)$  where  $t$  is measured in seconds and  $y$  is measured in feet. Answer the following questions from the information in the graph.

**A)** Estimate the slope of the tangent line to the graph of  $y = f(t)$  at  $t = 20$ .

Answer:

**B)** By computing the slope of the tangent line, estimate the instantaneous rate of change of the position of the particle at  $t = 40$  seconds.

Answer:

**C)** By computing the slope of the tangent line, estimate the instantaneous rate of change of the position of the particle at  $t = 95$  seconds.

Answer:

**D)** At  $t = 95$  seconds, is the particle moving in the direction of positive  $y$ -axis or negative  $y$ -axis. Why?

Answer: