



Form (8)

Grade

8

6 Marks

**Question I: Determine whether the statement is (TRUE) or (FALSE).**

1. If  $f(x) = \begin{cases} |x-1|, & x \geq 1 \\ 2x, & x < 1 \end{cases}$ , then  $f(2) = 2$

(F)

2. If  $h(x) = 3x - 1$ ,  $g(x) = |x|$ ,  $f(x) = |3x - 1|$ , then we can write  $f = g \circ h$

(I)

3. The function  $f(x) = |x - 3|$  is even function.

(T)

4.  $\lim_{x \rightarrow 0} \frac{\sin 4x}{x} = 4$

(T)

5.  $\lim_{x \rightarrow \infty} (2 - x + x^3) = \infty$

(T)

6. The function  $f(x) = 3x^2 + 1$  is continuous everywhere.

(I)

**Question II: Choose the correct answer:**

7 Marks

1. The domain of  $f(x) = \sqrt{x-2}$  is:

a)  $(-\infty, 2]$

b)  $(-2, \infty)$

c)  $[2, \infty)$

2.  $\lim_{x \rightarrow -7} 4 =$

a) 4

b) -7

c) 7

3. If a curve is symmetric about y-axis, and  $(-5, 3)$  is point on the curve, then one of the following points must be on the curve:

a)  $(5, 3)$

b)  $(-5, -3)$

c)  $(5, -3)$

4.  $\lim_{x \rightarrow \infty} \frac{-x+1}{3x^2+6} =$

a) 0

b)  $-\infty$

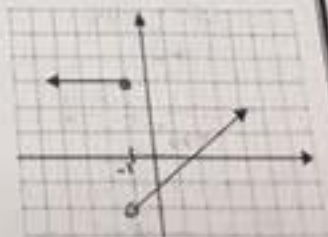
c)  $\infty$

5. From the graph:  $\lim_{x \rightarrow -1} f(x)$

a) -2

b) 3

c) does not exist



6. On which of the following value is  $f(x) = \frac{3}{\sqrt{x+4}}$  Continuous:

a)  $[-4, \infty)$

b)  $(-4, \infty)$

c)  $(-\infty, -4)$

$x+4 > 0$   
 $x > -4$

- 7) The range of the function  $f(x) = \frac{1}{x-5}$  is
- a)  $\mathbb{R} - \{5\}$       b)  $\mathbb{R} - \{0\}$

$$y = \frac{1}{x-5}$$

$$1 = y(x-5)$$

$$x-5y = \frac{1}{y}$$

$$x = \frac{1+5y}{y}$$

c)  $\mathbb{R}$

7 Marks

Question III:

- 1) If  $f(x) = \sqrt{3x-5}$ , find the formula of  $f^{-1}(x)$

$$y = \sqrt{3x-5}$$

$$y^2 = 3x-5$$

$$3x-5 = y^2$$

$$3x = y^2 + 5$$

$$x = \frac{y^2 + 5}{3}$$

$$f^{-1}(x) = \frac{x^2 + 5}{3}$$

(2 marks)

- et  $f(x) = 2x+1$  and  $g(x) = \sqrt{x}$ . Find the formula of:

•  $(g \circ f)(x)$

$$g(2x+1) = \sqrt{2x+1}$$

- 3) Compute  $\lim_{x \rightarrow 3} \frac{x^2-9}{x-3}$

(1.5 marks)

$$\lim_{x \rightarrow 3} \frac{(x+3)(x-3)}{(x-3)}$$

$$\lim_{x \rightarrow 3} x+3 = 6$$

$$\lim_{x \rightarrow 3} (x+3)$$

- 4) Let  $f(x) = \begin{cases} 2x-1 & x < 1 \\ x+4 & 1 < x \leq 3 \\ x^2-2 & x > 3 \end{cases}$  Find (explain your answer)

(2 marks)

•  $\lim_{x \rightarrow 3} f(x)$

$$\lim_{x \rightarrow 3^+} f(x)$$

$$\lim_{x \rightarrow 3^+} x^2 - 2 = 7$$

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

$$= \lim_{x \rightarrow 3^-} x+4 = 7$$

$$\lim_{x \rightarrow 3} f(x) = 7$$

because the limits from both sides are equal

- Determine whether the function  $f(x)$  is continuous at  $x=3$  or not? explain your answer

$$f(3) = 8 \cdot 3 + 4$$

$$f(3) = 28$$

$$\lim_{x \rightarrow 3} f(x)$$

$$\lim_{x \rightarrow 3} x^2 - 2 = 7$$

$$\lim_{x \rightarrow 3} x+4 = 7$$

$f(x)$  is cont at  $x=3$  because

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

التكافؤ = التعريف