

King Fahd University of Petroleum and Minerals
Diploma Math Program
Math 011- Term 043
Worksheet (Ch. 11)

Question1

Find the limit. If it does not exist, so state that, or use ∞ and $-\infty$ where appropriate

1) $\lim_{x \rightarrow 1} \frac{x^2 - 2x + 1}{x^2 - 1}$

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

3) $\lim_{x \rightarrow 1^-} \left[1 + \frac{1}{x-1} \right]$

4) $\lim_{x \rightarrow 0^-} \frac{|x| - x}{x}$

5) $\lim_{x \rightarrow +\infty} \sqrt{\frac{(x-1)(x-3)}{(1-x^2)(x-3)}}$

6) $\lim_{x \rightarrow 0} \frac{\sqrt{x+9} - 3}{x}$

7) $\lim_{x \rightarrow 0^+} \frac{|x|}{\sqrt{x}}$

8) $\lim_{x \rightarrow +\infty} \sqrt{\frac{x^3}{(x+4)(2x^2+1)}}$

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

10) $\lim_{h \rightarrow 0} \frac{\frac{1}{2+h} - \frac{1}{2}}{h}$

$$11) \lim_{h \rightarrow 2} \frac{x^3 - 8}{x^2 - 4}$$

$$12) \lim_{h \rightarrow 0} \frac{h}{h^2 - 3h + 1}$$

$$13) \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}, \text{ where } f(x) = x^2 - 2$$

Question2

$$\text{Let } f(x) = \begin{cases} \frac{x^2 - 1}{x - 1}, & x \leq 1 \\ kx^2 + 3, & x > 1 \end{cases} . \text{ Find the value of } k \text{ so that } \lim_{x \rightarrow 1} f(x) \text{ exists.}$$

Question3

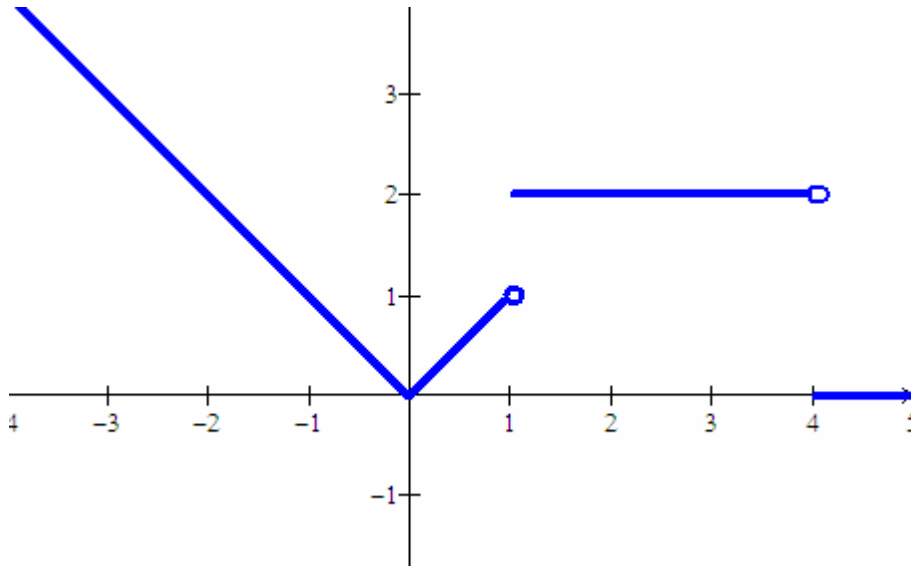
$$\text{If } f(x) = \begin{cases} 1 + x^2 & \text{if } x < -1 \\ 2 & \text{if } x = -1 \\ -2x & \text{if } -1 < x < 1, \text{ then determine all points of discontinuity.} \\ 0 & \text{if } x = 0 \\ \frac{2}{x} & \text{if } x > 1 \end{cases}$$

Question4

$$\text{Let } f(x) = \begin{cases} \frac{x^2 - 9}{x - 3}, & x < 3 \\ kx - 3, & x \geq 3 \end{cases} . \text{ Find the value of } k \text{ that makes } f(x) \text{ cont at } x = 3 .$$

Question6

Use the graph of $f(x)$ given below to find the following



a) $\lim_{x \rightarrow 0} f(x)$

b) $\lim_{x \rightarrow 1} f(x)$

c) $\lim_{x \rightarrow 4} f(x)$

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

e) $\lim_{x \rightarrow 4} f(x)$

f) $\lim_{x \rightarrow -\infty} f(x)$

g) $\lim_{x \rightarrow +\infty} f(x)$

h) $f(1), f(4), f(-2)$