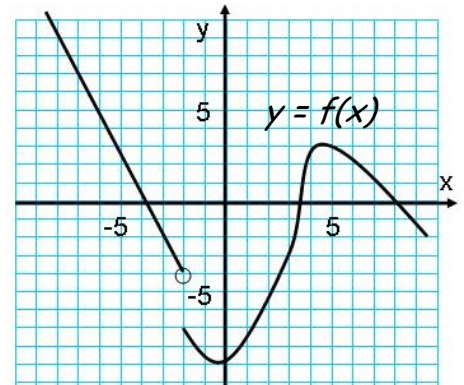


MCB4U Limits Assignment (Unit 2)

Part 1: Answer each of the following in the space provided. [6 MARKS K&U]

/30 K&U
/8 APP
/9 COM

Each of the following six questions refers to the graph shown at the right.



1. What is the value of $\lim_{x \rightarrow -2^-} f(x)$? (_____)
 - A. -7
 - B. -3
 - C. 0
 - D. does not exist
 - E. none of these
2. What is the value of $\lim_{x \rightarrow -2^+} f(x)$? (_____)
 - A. -7
 - B. -3
 - C. 0
 - D. does not exist
 - E. none of these
3. What is the value of $\lim_{x \rightarrow -2} f(x)$? (_____)
 - A. -7
 - B. -3
 - C. 0
 - D. does not exist
 - E. none of these
4. What is the value of $\lim_{x \rightarrow 3} f(x)$? (_____)
 - A. -7
 - B. -3
 - C. 0
 - D. does not exist
 - E. none of these
5. What is the value of $\lim_{x \rightarrow 3^+} f(x)$? (_____)
 - A. -7
 - B. -3
 - C. 0
 - D. does not exist
 - E. none of these
6. What is the value of $\lim_{x \rightarrow 3^-} f(x)$? (_____)
 - A. -7
 - B. -3
 - C. 0
 - D. does not exist
 - E. none of these

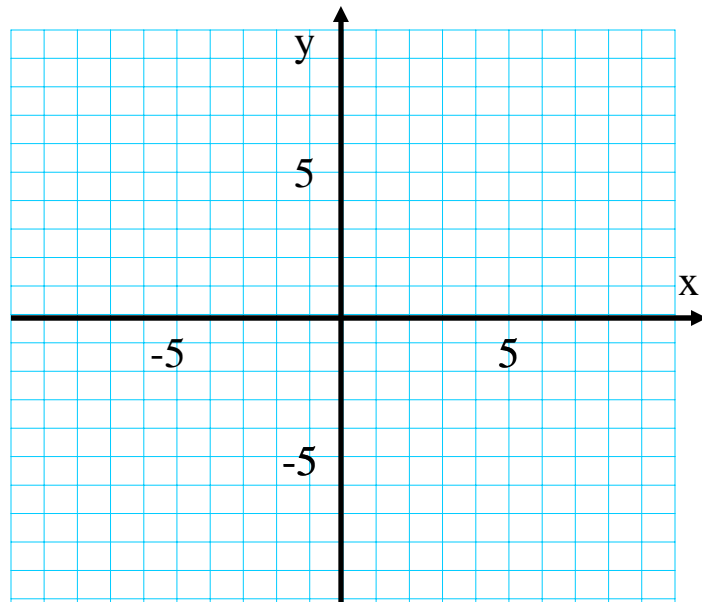
Part 2: Show all work. Do your work on this test paper in the space provided. 5 communication marks are throughout the assignment.

1. The point B(2, 12) lies on the parabola $y = 3x^2 - x + 2$.
 - a) Find the slope of the tangent to the parabola at B using the formula

$$m = \lim_{h \rightarrow 0} \frac{f(a+h) - f(a)}{h}$$
. [4 MARKS K&U]
 - b) Find an equation of the tangent to the parabola at B. [3 MARKS App]

2. Given $f(x) = \begin{cases} |x| & \text{if } x \leq 0 \\ x & \text{if } x \in (0, 2) \\ -(x-3)^2 + 4 & \text{if } x \geq 2 \end{cases}$

a) Graph the function $y = f(x)$.
[3 MARKS K&U]



b) Find each limit, if it exists.
[3 MARKS K&U]

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

iii) $\lim_{x \rightarrow 0} f(x)$ iv) $\lim_{x \rightarrow 2^-} f(x)$

v) $\lim_{x \rightarrow 2^+} f(x)$ vi) $\lim_{x \rightarrow 2} f(x)$

c) Where is f discontinuous? [1 MARKS App]

3. Find each limit, if it exists.

a) $\lim_{x \rightarrow \frac{1}{2}} \frac{2x^2 + 5x - 3}{2x^2 - 9x + 4}$ [3 MARKS K&U]

b) $\lim_{x \rightarrow 0} \frac{\sqrt{x+4} - 2}{x}$ [3 MARKS K&U]

4. Find the slope of the tangent line to $f(x) = \sqrt{10 + 3x}$ where $x = 2$ using the formula

$m = \lim_{h \rightarrow 0} \frac{f(a+h) - f(a)}{h}$ and the equation of the tangent line where $x = 2$. [5 MARKS K&U]

5. An object moves according to the formula $s(t) = \frac{3}{2}t^2 + 4t - 1$, where t is measured in seconds and $s(t)$ is measured in meters

a) How fast is the object travelling at 4 seconds? [4 MARKS App]

b) What is the velocity and position at time 0? Explain what this means about the object's position and movement at time 0? [3 MARKS K&U and 4 MARKS Com]