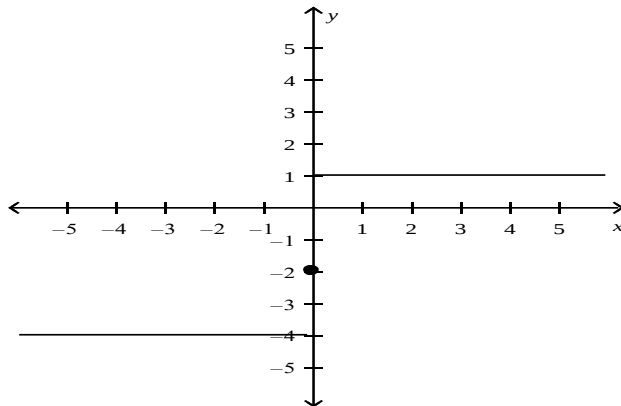


- _____ 6. Does the following graph represent a function that satisfies the following conditions:
 $f(0) = -2$, $\lim_{x \rightarrow 0} f(x) = -4$?

[A – 1]



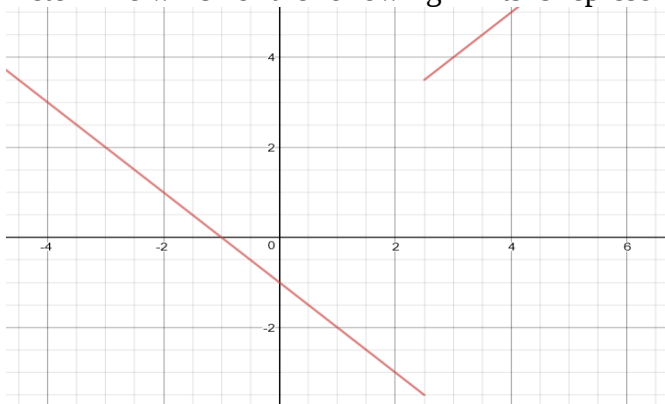
- Yes.
- No.
- Only if $f(1) = 1$.
- There is not enough given information.

- _____ 7. If $\lim_{x \rightarrow 2} f(x) = 3$, what is the value of $\lim_{x \rightarrow 2} \frac{3f(x) + x^3}{f(x) - 2}$?
- 15
 - 16
 - 17
 - 18

[T – 1]

- _____ 8. Determine which of the following limits is represented by the following graph.

[A – 1]



- $\lim_{x \rightarrow -2.5} \frac{|5x - 2|(x + 1)}{5x - 2}$
- $\lim_{x \rightarrow 2.5} \frac{|2x - 5|(x + 1)}{2x - 5}$
- $\lim_{x \rightarrow -2.5} \frac{|2x - 5|(x + 1)}{2x - 5}$
- $\lim_{x \rightarrow 2.5} \frac{|5x - 2|(x + 1)}{5x - 2}$

9. Consider the following position function $s(t) = 3t^4 + 7t^2$

[K – 4]

a. Find the average velocity over the interval $[1, 2]$.

b. Find the instantaneous velocity at $t = 2$.

10. Consider the function $f(x) = \frac{6}{3-x}$.

[K – 6]

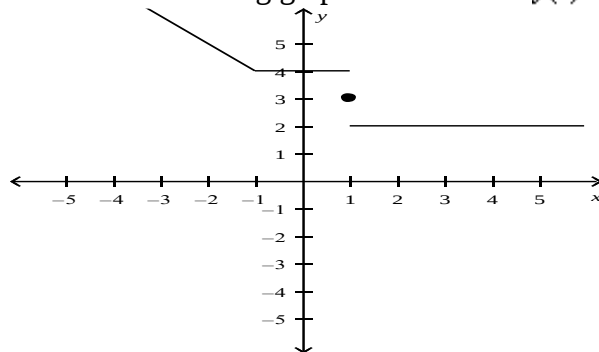
a) Determine the slope of the tangent at any point x using algebraic methods.

b) Determine the slope of the tangent at the point with x -coordinate 2.

c) Determine the equation of the tangent to the curve $f(x)$ at the point with x -coordinate 2.

11. Consider the following graph of a function $f(x)$.

[K – 5]



Determine the following:

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

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

c) $\lim_{x \rightarrow 1^+} f(x)$

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

e) $f(1)$

12. Sketch the graph of any function that satisfies the following conditions:

[A – 3]

$$f(3) = 2, \lim_{x \rightarrow 3} f(x) = 5 \text{ and } \lim_{x \rightarrow 3^+} f(x) = 5$$

13. Evaluate the following limits using appropriate techniques.

[A – 9]

a) $\lim_{x \rightarrow 1296} \frac{\sqrt[4]{x} - 6}{\sqrt{x} - 36}$

b) $\lim_{x \rightarrow 0} \frac{\sqrt{x+5} - \sqrt{5-x}}{x}$

c) $\lim_{x \rightarrow 0} \frac{4}{x} \left(\frac{2}{x+2} + \frac{2}{x-2} \right)$

14. Let $f(x) = mx + b$ where m and b are constants. If $\lim_{x \rightarrow 3} f(x) = -2$ and $\lim_{x \rightarrow 4} f(x) = 2$, determine m and b . [T – 3]

15. Determine, using the properties of limits, $\lim_{x \rightarrow -10} \frac{2f(x) - x^2}{\sqrt{f(x)}}$ given $\lim_{x \rightarrow -10} f(x) = 16$. [T – 2]

16. If the limit of a function exists at a given point, does the value of the function have to be defined at that point? Explain. [C – 2]

17. Without graphing, explain whether the function $g(x) = \begin{cases} x^2 + 2, & \text{if } x < 1 \\ x + 2, & \text{if } x \geq 1 \end{cases}$ is continuous? [C – 3]

18. Sketch the graph of any function that satisfies the following conditions:
 $f(5) = 3$, $\lim_{x \rightarrow 5^-} f(x) = -5$ and $\lim_{x \rightarrow 5^+} f(x) = -2$. Is your graph the only possible graph? If not then sketch another one that also satisfies the given conditions. [C – 4]