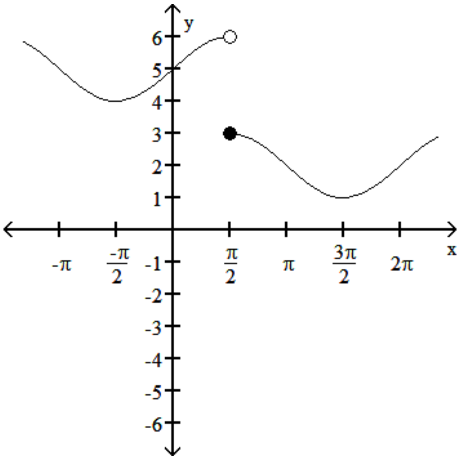
MAC2311

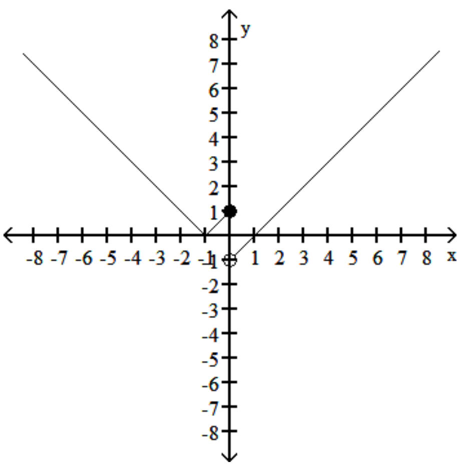
Broward College   Practice 03

Use the graph to estimate the specified limit.

1) Find $\lim\limits_{x \to (\pi/2)^-} f(x)$ and $\lim\limits_{x \to (\pi/2)^+} f(x)$



2) Find $\lim\limits_{x \to 0^-} f(x)$ and $\lim\limits_{x \to 0^+} f(x)$



Determine the limit by sketching an appropriate graph.

3) $\lim\limits_{x \to 6^-} f(x)$, where $f(x) = \begin{cases} -2x + 1 & \text{for } x < 6 \\ 3x + 2 & \text{for } x \ge 6 \end{cases}$

4) $\lim\limits_{x \to 3^-} f(x)$, where $f(x) = \begin{cases} \sqrt{9 - x^2} & 0 \le x < 3 \\ 3 & 3 \le x < 4 \\ 4 & x = 4 \end{cases}$

Find the limit.

5) $\lim\limits_{x \to 1^-} \sqrt{\dfrac{x + 4}{x + 5}}$

6) $\lim_{h \to 0^+} \frac{\sqrt{h^2 + 7h + 3} - \sqrt{3}}{h}$

Find the limit using $\lim_{x=0} \frac{\sin x}{x} = 1$.

7) $\lim_{x \to 0} \frac{\sin 5x}{x}$

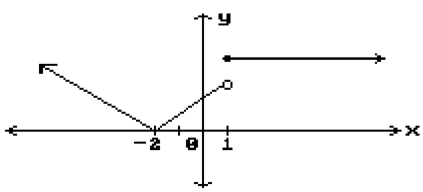
8) $\lim_{x \to 0} \frac{\sin 5x}{\sin 4x}$

9) $\lim_{x \to 0} \frac{\sin(\sin x)}{\sin x}$

10) $\lim_{x \to 0} \frac{\sin 3x \cot 4x}{\cot 5x}$

Find all points where the function is discontinuous.

11) 11) ______



A) x = -2 B) x = 1 C) None D) x = -2, x = 1

12) To what new value should f(1) be changed to remove the discontinuity?

$$f(x) = \begin{cases} x^2 + 3, & x < 1 \\ 2, & x = 1 \\ x + 3, & x > 1 \end{cases}$$

Find the intervals on which the function is continuous.

13) $y = \frac{1}{x + 5} - 3x$

14) $y = \frac{2}{(x + 2)^2 + 4}$

Find the limit and determine if the function is continuous at the point being approached.

15) $\lim_{x \to 0} \sin^{-1}\left(e^{x^9}\right)$

Provide an appropriate response.

16) Use the Intermediate Value Theorem to prove that $8x^3 - 2x^2 - 6x - 6 = 0$ has a solution between 1 and 2.

1) 6; 3
2) 1; -1
3) -11
4) 0
5) $\sqrt{\frac{5}{6}}$
6) $\frac{7}{2\sqrt{3}}$
7) 5
8) $\frac{5}{4}$
9) 1
10) 0
11) B
12) 4
13) discontinuous only when $x = -5$
14) continuous everywhere
15) $\frac{\pi}{2}$; yes
16) Let $f(x) = 8x^3 - 2x^2 - 6x - 6$ and let $y_0 = 0$. $f(1) = -6$ and $f(2) = 38$. Since f is continuous on [1, 2] and since $y_0 = 0$ is between f(1) and f(2), by the Intermediate Value Theorem, there exists a c in the interval (1 , 2) with the property that $f(c) = 0$. Such a c is a solution to the equation $8x^3 - 2x^2 - 6x - 6 = 0$.