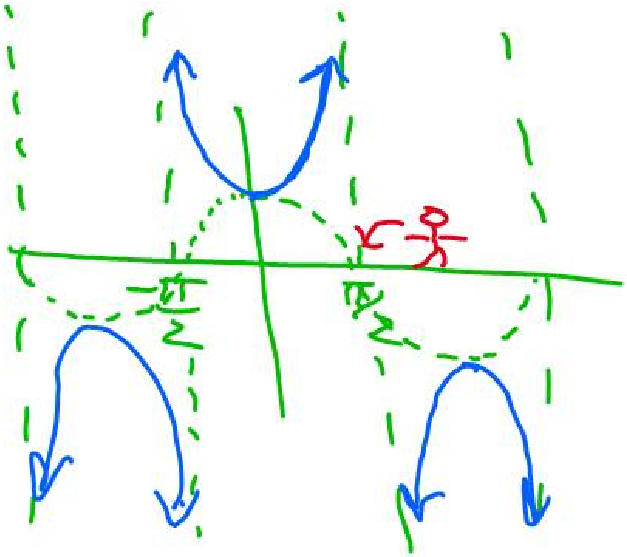
TEST REVIEW

2.2

In Exercises 13–20, use graphs and tables to find the limits.

20. $\lim\limits_{x \to (\pi/2)^+} \sec x$ $= -\infty$



In Exercises 9–12, find the limit and confirm your answer using the Sandwich Theorem.

12. $\lim_{x \to \infty} \frac{\sin(x^2)}{x}$

$$-1 \le \sin(x^2) \le 1$$

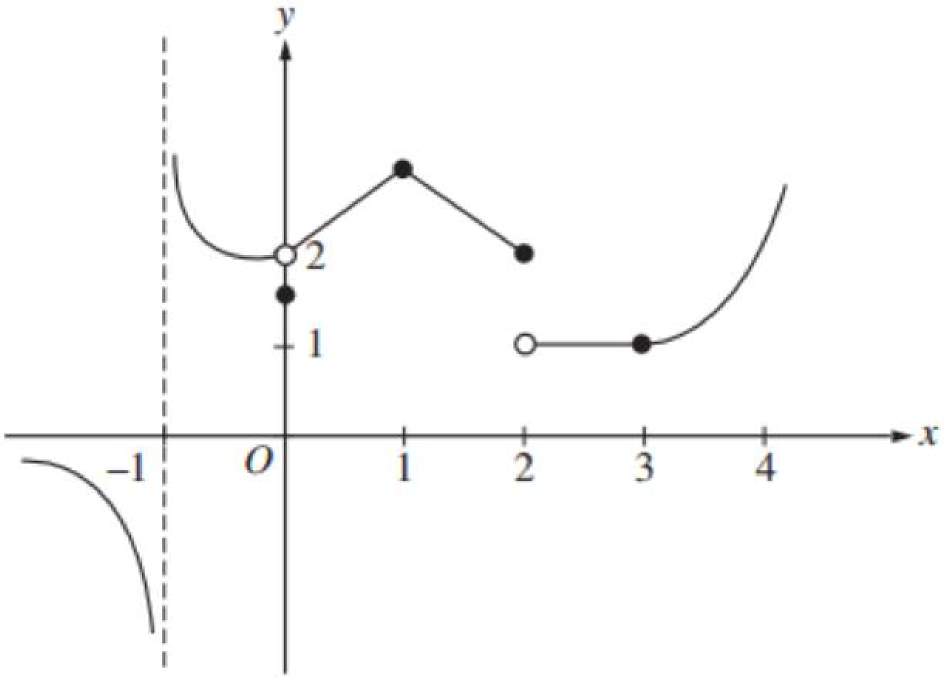
$$\frac{-1}{x} \le \frac{\sin(x^2)}{x} \le \frac{1}{x} \; ; \; x > 0$$

$$\lim_{x \to \infty} -\frac{1}{x} = 0$$

$$\lim_{x \to \infty} \frac{1}{x} = 0$$

$\therefore$

$$\lim_{x \to \infty} \frac{\sin(x^2)}{x} = 0$$



The graph of a function f is shown above. If $\lim_{x \to b} f(x)$ exists and f is not continuous at b, then $b =$

(A) –1
(B) 0
(C) 1
(D) 2
(E) 3

What is $\lim_{h \to 0} \frac{\cos\left(\frac{3\pi}{2} + h\right) - \cos\left(\frac{3\pi}{2}\right)}{h}$?

(A) 1

(B) $\frac{\sqrt{2}}{2}$

(C) 0

(D) -1

(E) The limit does not exist.

$$= \lim_{h \to 0} \frac{\cancel{\cos\frac{3\pi}{2}}^{\,0} \cosh - \overset{(-1)}{\sin\frac{3\pi}{2}} \sin h - \cancel{\cos\frac{3\pi}{2}}^{\,0}}{h} = \lim_{h \to 0} \frac{\sin h}{h} = 1$$

What is $\lim_{x\to\infty} \frac{x^2 - 4}{2 + x - 4x^2}$? $\rightarrow \frac{x^2}{-4x^2} \rightarrow \frac{1}{-4}$

(A) -2

(B) $-\frac{1}{4}$

(C) $\frac{1}{2}$

(D) 1

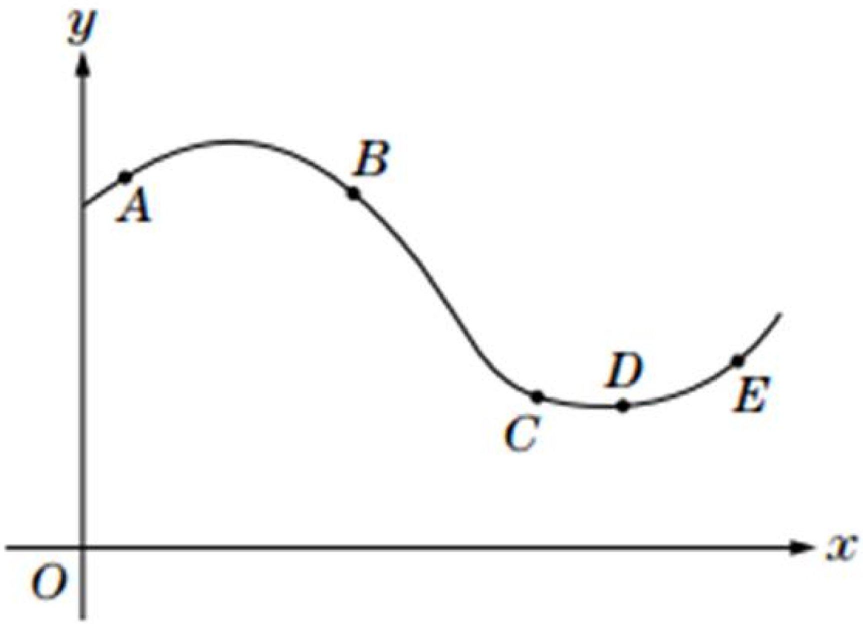
(E) The limit does not exist.

II. Use the graph below to identify the labeled points at which the rate of change is:

a. $\frac{dy}{dx} > 0$ A, E

b. $\frac{dy}{dx} < 0$ B, C

c. $\frac{dy}{dx} = 0$ D



Find the limits if they exist, using tables, graphs or algebraic manipulations.

a. $\lim_{x \to \frac{1}{2}} \frac{6x-3}{x(1-2x)}$ $\Rightarrow$ $\lim_{x \to 1/2} \frac{-3\cancel{(-2x+1)}}{x\cancel{(1-2x)}} = \frac{-3}{1/2} = -6$

$\lim_{x \to 2^+} \frac{|x-2|}{2-x}$ $\Rightarrow$ $\lim_{x \to 2^+} \frac{x-2}{2-x}$ $\Rightarrow$ $\lim_{x \to 2^+} \frac{\cancel{x-2}}{-1\cancel{(-2+x)}} = \frac{1}{-1} = -1$

$x = 2.1$

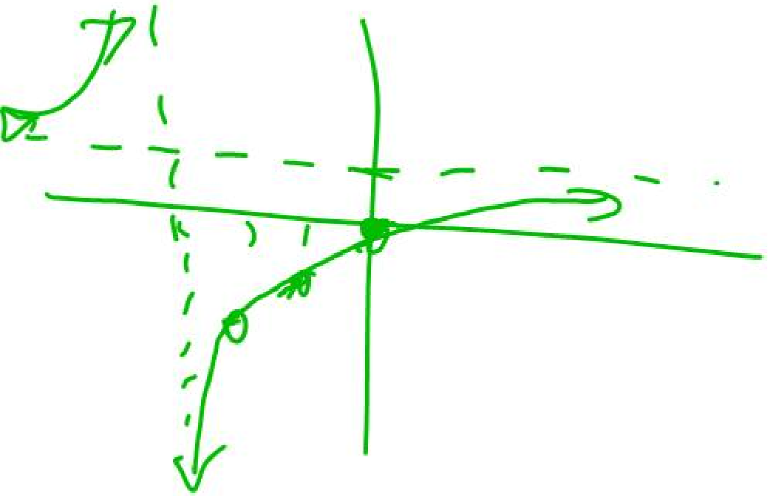
$\frac{|2.1-2|}{2-2.1} = \frac{.1}{-.1} = -1$

In Exercises 13–20, use graphs and tables to find the limits.

16. $\lim\limits_{x \to -3^+} \dfrac{x}{x+3} = -\infty$

V.A. $x = -3$

H.A. $y = 1$



x	$\dfrac{x}{x+3}$
0	0
-1	$-1/2$
-2	$-2/1$

$$\lim_{x\to 0}\frac{\tan 3x}{2x}$$

$$\Rightarrow \lim_{x\to 0}\frac{(3)\sin 3x}{(2)\cos 3x\,(3)(x)}$$

$$\Rightarrow \lim_{x\to 0}\left(\frac{3}{2\cos 3x}\right)\left(\frac{\sin 3x}{3x}\right)$$

$$\left(\frac{3}{2}\right)(1) = \frac{3}{2}$$