9. What is $\lim\limits_{x \to \infty} \dfrac{\sqrt{9x^2 + 2}}{4x + 3}$?

(A) $\dfrac{3}{2}$ (B) $\dfrac{3}{4}$ (C) $\dfrac{\sqrt{2}}{3}$ (D) 1   (E) The limit does not exist.

12. What is $\lim\limits_{x \to \infty} \dfrac{3x^2 + 1}{(3 - x)(3 + x)}$?

(A) −9   (B) −3   (C) 1   (D) 3   (E) The limit does not exist.

9. What is $\lim\limits_{x \to \infty} \dfrac{x^2 - 6}{2 + x - 3x^2}$?

(A) -3 (B) $-\dfrac{1}{3}$ (C) $\dfrac{1}{3}$ (D) 2 (E) The limit does not exist.

8. $\displaystyle \lim_{x \to 1}\left(\frac{\sqrt{x+3}-2}{1-x}\right)$

   (A) 0.5

   (B) 0.25

   (C) 0

   (D) −0.25

   (E) −0.5

   Ans

1. What is $\lim\limits_{x \to 0} \left(\dfrac{\dfrac{1}{x-1} + 1}{x} \right)$?

(A) -1 (B) 0   (C) 1   (D) 2   (E) the limit does not exist

16. $\lim_{x \to 1} \dfrac{x^2 + 2x - 3}{x^2 - 1} =$

(A) –2

(B) –1

(C) 10

(D) 1

(E) 2

15. What is $\displaystyle\lim_{x \to 1} \frac{\sqrt{x} - 1}{x - 1}$?

   (A) 0

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

   (C) 1

   (D) $\frac{3}{2}$

   (E) The limit does not exist.

8. If $k \neq 0$, then $\lim\limits_{x \to k} \dfrac{x^2 - k^2}{x^2 - kx} =$
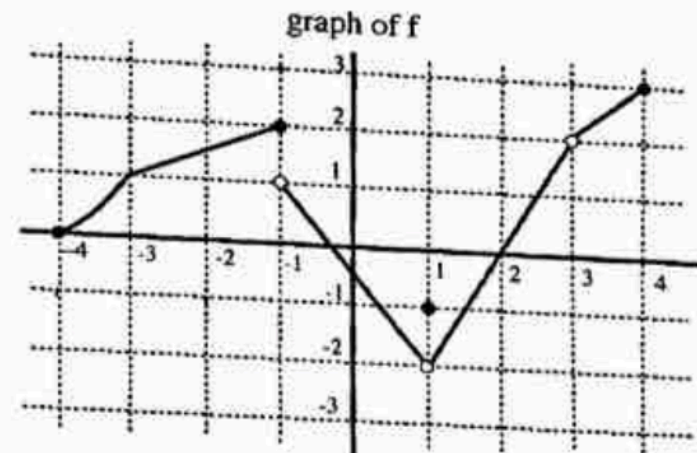
(A) 0

(B) 2

(C) $2k$

(D) $4k$

(E) nonexistent

1. The function f is defined on the interval $[-4, 4]$ and its graph is shown to the right. Which of the following statements are true?

graph of f

I. $\lim\limits_{x \to 1} f(x) = -1$

II. $\lim\limits_{h \to 0} \dfrac{f(2+h) - f(2)}{h} = 2$

III. $\lim\limits_{x \to -1^+} f(x) = f(-3)$

(A) I only   (B) II only   (C) I and II only   (D) II and III only   (E) I, II, III

5.   If $g(x) = x + \cos x$, then $\lim\limits_{h \to 0} \dfrac{g(x + h) - g(x)}{h} =$

(A) $\sin x + \cos x$

(B) $\sin x - \cos x$

(C) $1 - \sin x$

(D) $1 - \cos x$

(E) $x^2 - \sin x$

3. $\lim\limits_{h \to 0} \left(\dfrac{\cos(x + h) - \cos x}{h} \right) =$

(A) $\sin x$

(B) $-\sin x$

(C) $\cos x$

(D) $-\cos x$

(E) does not exist

Ans

□

6. $\displaystyle \lim_{h \to 0} \frac{3\left(\frac{1}{2} + h\right)^5 - 3\left(\frac{1}{2}\right)^5}{h} =$

(A) 0

(B) 1

(C) $\dfrac{15}{16}$

(D) the limit does not exist

(E) the limit can not be determined

Ans

12. If the function f is differentiable at the point $(a, f(a))$, then which of the following are true?

I. $f'(a) = \lim\limits_{h \to 0} \dfrac{f(a+h) - f(a)}{h}$

II. $f'(a) = \lim\limits_{h \to 0} \dfrac{f(a) - f(a-h)}{h}$

III. $f'(a) = \lim\limits_{h \to 0} \dfrac{f(a+h) - f(a-h)}{2h}$

(A) I only

(B) I and II only

(C) I and III only

(D) II and III only

(E) I, II, III