SAT PREP

Assignment : AP CALCULUS BC TEST (Limit and Continuity)

Part A. Directions: Answer these questions *without* using your calculator.

1. $\lim_{x\to 2}\frac{x^2-4}{x^2+4}$ is

(A) 1 **(B)** 0 **(C)** $-\frac{1}{2}$ **(D)** –1 **(E)** ∞

2. $\lim_{x\to \infty}\frac{4-x^2}{x^2-1}$ is

(A) 1 **(B)** 0 **(C)** –4 **(D)** –1 **(E)** ∞

3. $\lim_{x\to 3}\frac{x-3}{x^2-2x-3}$ is

(A) 0 **(B)** 1 **(C)** $\frac{1}{4}$ **(D)** ∞ **(E)** none of these

4. $\lim_{x\to 0}\frac{x}{x}$ is

(A) 1 **(B)** 0 **(C)** ∞ **(D)** –1 **(E)** nonexistent

5. $\lim_{x\to 2}\frac{x^3-8}{x^2-4}$ is

(A) 4 **(B)** 0 **(C)** 1 **(D)** 3 **(E)** ∞

6. $\lim_{x\to \infty}\frac{4-x^2}{4x^2-x-2}$ is

(A) –2 **(B)** $-\frac{1}{4}$ **(C)** 1 **(D)** 2 **(E)** nonexistent

7. $\lim_{x\to -\infty}\frac{5x^3+27}{20x^2+10x+9}$ is

(A) $-\infty$ **(B)** –1 **(C)** 0 **(D)** 3 **(E)** ∞

8. $\lim_{x\to \infty}\frac{3x^2+27}{x^3-27}$ is

(A) 3 **(B)** ∞ **(C)** 1 **(D)** –1 **(E)** 0

9. $\lim_{x\to \infty}\frac{2^{-x}}{2^x}$ is

(A) –1 **(B)** 1 **(C)** 0 **(D)** ∞ **(E)** none of these

10. $\lim_{x\to -\infty}\frac{2^{-x}}{2^x}$ is

(A) –1 **(B)** 1 **(C)** 0 **(D)** ∞ **(E)** none of these

11. $\lim_{x\to 0} \frac{\sin 5x}{x}$

(A) $= 0$ **(B)** $= \frac{1}{5}$ **(C)** $= 1$ **(D)** $= 5$ **(E)** does not exist

12. $\lim_{x\to 0} \frac{\sin 2x}{3x}$

(A) $= 0$ **(B)** $= \frac{2}{3}$ **(C)** $= 1$ **(D)** $= \frac{3}{2}$ **(E)** does not exist

13. The graph of $y = \arctan x$ has

(A) vertical asymptotes at $x = 0$ and $x = \pi$
(B) horizontal asymptotes at $y = \pm\frac{\pi}{2}$
(C) horizontal asymptotes at $y = 0$ and $y = \pi$
(D) vertical asymptotes at $x = \pm\frac{\pi}{2}$
(E) none of these

14. The graph of $y = \frac{x^2 - 9}{3x - 9}$ has

(A) a vertical asymptote at $x = 3$ **(B)** a horizontal asymptote at $y = \frac{1}{3}$
(C) a removable discontinuity at $x = 3$ **(D)** an infinite discontinuity at $x = 3$
(E) none of these

15. $\lim_{x\to 0} \frac{\sin x}{x^2 + 3x}$ is

(A) 1 **(B)** $\frac{1}{3}$ **(C)** 3 **(D)** ∞ **(E)** $\frac{1}{4}$

Part B. Directions: Some of the following questions require the use of a graphing calculator.

1. The function $f(x) = \begin{cases} x^2/x & (x \neq 0) \\ 0 & (x = 0) \end{cases}$

(A) is continuous everywhere
(B) is continuous except at $x = 0$
(C) has a removable discontinuity at $x = 0$
(D) has an infinite discontinuity at $x = 0$
(E) has $x = 0$ as a vertical asymptote

Q2 and **Q6** are based on the function f shown in the graph and defined below:

2. $\lim_{x \to 2} f(x)$

(A) equals 0 **(B)** equals 1 **(C)** equals 2
(D) does not exist **(E)** none of these

3. The function f is defined on $[-1,3]$

(A) if $x \neq 0$ **(B)** if $x \neq 1$ **(C)** if $x \neq 2$
(D) if $x \neq 3$ **(E)** at each x in $[-1,3]$

4. The function f has a removable discontinuity at

(A) $x = 0$ **(B)** $x = 1$ **(C)** $x = 2$ **(D)** $x = 3$ **(E)** none of these

5. On which of the following intervals is f continuous?

(A) $-1 \leq x \leq 0$ **(B)** $0 < x < 1$ **(C)** $1 \leq x \leq 2$
(D) $2 \leq x \leq 3$ **(E)** none of these

6. The function f has a jump discontinuity at

(A) $x = -1$ **(B)** $x = 1$ **(C)** $x = 2$
(D) $x = 3$ **(E)** none of these

Answer

Part A

1. B
2. D
3. C
4. A
5. D
6. B
7. A
8. E
9. C
10. D
11. D
12. B
13. B
14. C
15. B

Part B

1. A
2. A
3. E
4. C
5. B
6. B