1. Find the natural domain of the function $f(x) = \sqrt{x^2 + 2x - 8}$.

A. $(-\infty, \infty)$ B. $(0, \infty)$ C. $(-\infty, -4] \cup [2, \infty)$ D. $[-4, 2]$

2. The natural domain of the function $f(x) = \frac{x^2 - 9}{x + 3}$ is?

A. $(-\infty, -3]$ B. $(-\infty, -3) \cup (-3, \infty)$ C. $(-\infty, \infty)$ D. $[-3, \infty)$

3. Find the range of the function $f(x) = 2 - \sqrt{x - 1}$.

A. $(-\infty, 2]$ B. $(-\infty, \infty)$ C. $[0, \infty)$ D. $[2, \infty)$

4. If $f(x) = \frac{(x+2)(x-1)}{x+2}$ and $g(x) = x - 1$, then $f = g$ for all x.

A. True   B. False

5. Let $f(x) = 1 - x^2$ and $g(x) = (\sqrt{x})$, find $f(g(x))$.

A. $1 - x$ B. $\sqrt{1 - x^2}$ C. $1 - x^2 + \sqrt{x}$ D. $1 + x^2 + \sqrt{x}$

6. The graph of $y = 2\sin(3x + \pi)$ is obtained by translating the graph of $y = 2\sin 3x$ to the

A. left by $\frac{\pi}{3}$ units   B. right by $\frac{\pi}{3}$ units   C. left by π units   D. right by π units

7. Find the period of the function $y = -4\sin(3\pi x)$.

A. $\frac{2}{3}$ B. 4   C. 3π D. 2π

8. Find the amplitude of the function $y = 1 - 2\sin x$.

A. -2 B. 2   C. -1 D. 1

9. Let f^{-1} be the inverse of f. Then domain of f^{-1} = range of f.

A. True   B. False

10. The inverse of the function $f(x) = \sqrt{2x - 3}$ is

A. $f^{-1} = \frac{x^2 + 3}{2}$ B. $f^{-1} = \frac{x^2 + 3}{2}, x \geq 0$ C. $f^{-1} = \frac{x^2 + 3}{2}, x \leq 0$ D. $f^{-1} = \frac{x^2 + 3}{2}, x \neq 0$

11. Given that the function f has an inverse and that $f(-1) = 4$, find $f^{-1}(4)$.

A. 1   B. 2   C. -1 D. 4

12. Find x such that $4^x = 6$.

A. $x = \log \frac{6}{4}$ B. $x = \log_6 4$ C. $x = 24$ D. $x = \log_4 6$

13. Solve the equation $\frac{e^x - 3e^{-x}}{2} = 1$.

A. $x = \pm \ln 3$ B. $x = \ln 3$ C. $x = 0$ D. $x = -1$

14. Express $\log_3 2$ in terms of natural logarithms.

A. $\frac{\ln 2}{\ln 3}$ B. $\frac{\ln 3}{\ln 2}$ C. $\ln \frac{3}{2}$ D. $\ln \frac{2}{3}$

15. Evaluate $\lim\limits_{x \to 1} \frac{|x-1|}{x-1}$.

A. 1   B. $+\infty$ C. $-\infty$ D. does not exist

16. Let $f(x)$ be a function of x such that $\lim\limits_{x \to a^+} f(x) = 1$ and $\lim\limits_{x \to a^-} f(x) = -1$. Then $\lim\limits_{x \to a} f(x)$ equals

A. 1   B. 0   C. ± 1 D. does not exist

17. Evaluate $\lim\limits_{x \to 2^+} \frac{1}{x-2}$.

A. $-\infty$ B. $+\infty$ C. does not exist   D. 0

18. Evaluate $\lim\limits_{x \to 1} \frac{x-1}{x^2-1}$.

A. does not exist   B. $+\infty$ C. $-\infty$ D. $\frac{1}{2}$

19. Evaluate $\lim\limits_{x \to -\infty} 4$.

A. $+\infty$ B. $-\infty$ C. 4   D. -4

20. Evaluate $\lim\limits_{x \to 2} \frac{x^2-4}{x^5+7}$.

A. 0   B. does not exist   C. $\frac{4}{39}$ D. $+\infty$

21. Evaluate $\lim\limits_{x \to 1} \frac{1-x}{(x+2)(x-1)}$.

A. $+\infty$ B. $-\infty$ C. $-\frac{1}{3}$ D. does not exist

22. Evaluate $\lim\limits_{x\to 3} \frac{3x-9}{x^2-2x-3}$.

A. 1   B. $\frac{3}{4}$ C. $+\infty$ D. 0

23. Evaluate $\lim\limits_{x\to-\infty} 2 - \frac{1}{x}$.

A. 2   B. 0   C. does not exist   D. -2

24. Evaluate $\lim\limits_{x\to+\infty} (1 + \frac{1}{x})^x$.

A. 0   B. e C. $-\infty$ D $+\infty$

25. The value of $\lim\limits_{x\to+\infty} \frac{x^2}{5x^2+1}$ is?

A. $\frac{1}{5}$ B. 0   C. $+\infty$ D. 1

26. Evaluate $\lim\limits_{x\to+\infty} (x^2 - x^3)$.

A. $+\infty$ B. $-\infty$ C. 0   D. does not exist

27. The function $f(x) = \sqrt{x^2 - 4}$ is continuous on the interval

A. $[2, +\infty)$ B. $(-\infty, 2]$ C. $(-\infty, -2] \cup [2, +\infty)$ D. $[-2, 2]$

28. Find all the values of x for which there is a discontinuity in the graph of $y = \frac{(x-2)^2}{(x-2)(x+2)}$?

A. $x = 0$ B. $x = -2$ C. $x = 2$ D. $x = \pm 2$

29. The function $f(x) = |x - 1|$ is

A. discontinuous at $x = 1$ only   B. discontinuous everywhere   C. continuous everywhere

30. The value of $\lim\limits_{x\to 0} \frac{\tan 6x}{x}$ is

A. 1   B. $\frac{1}{6}$ C. 6   D. 0