Form B : **Instructions**: (**33 points**). **Solve each of the following problems and choose the correct answer** :

1. $\log_2 8 - \log_2 4 =$

(**a**) 1 *
(**b**) 2
(**c**) 0
(**d**) -1

2. If $\ln(2x-9) = 0$, then $x =$

(**a**) $\frac{9}{2}$
(**b**) 4
(**c**) -5
(**d**) 5 *

3. $\sin\left(\cos^{-1}\frac{3}{x}\right) =$

(**a**) $\frac{x}{\sqrt{x^2-9}}$
(**b**) $\frac{x}{\sqrt{9-x^2}}$
(**c**) $\frac{\sqrt{x^2-9}}{x}$ *
(**d**) $\frac{\sqrt{9-x^2}}{x}$

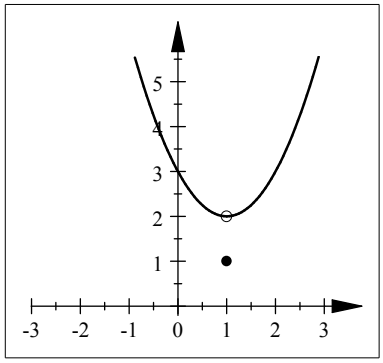
4. The domain of the function $f(x) = \cos^{-1}(3x+4)$ is

(**a**) $\left[-\frac{5}{3}, -1\right]$ *
(**b**) $\left(-\frac{5}{3}, -1\right)$
(**c**) $\left[1, \frac{5}{3}\right]$
(**d**) $\left(1, \frac{5}{3}\right)$

5. The exact value of the expression $e^{-2\ln 3}$ is

(**a**) -6
(**b**) 9
(**c**) $\frac{1}{9}$ *
(**d**) $\frac{1}{6}$

6. If $f(x)$ is the function whose graph is shown ,



then $\lim_{x \to 1} f(x) =$

(**a**) 3
(**b**) 1
(**c**) 2 *
(**d**) Does not exist.

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

(**a**) –4 *
(**b**) -1
(**c**) -2
(**d**) 4

8. If $\lim_{x \to 3} \dfrac{f(x) - 2}{x^2} = 2$, then $\lim_{x \to 3} f(x) =$

(**a**) 0
(**b**) 20 *
(**c**) 16
(**d**) 4

9. $\lim_{x \to 3} \dfrac{(x-1)^2 - 4}{x - 3} =$

(**a**) ∞
(**b**) 2
(**c**) -4
(**d**) 4 *

10. If $5(x-1) \le f(x) \le x^3 + x^2 - 2$, then $\lim_{x \to -3} f(x) =$

(**a**) 34
(**b**) 20
(**c**) –20 *
(**d**) Does not exist.

11. $\lim_{x \to 0} \dfrac{\sqrt{25+x} - 5}{x} =$

(**a**) $\dfrac{1}{10}$ *
(**b**) $\dfrac{1}{25}$
(**c**) 0
(**d**) ∞

12. $\lim_{x \to \frac{\pi}{2}} x \sin x =$

(**a**) $\dfrac{\pi}{2}$ *
(**b**) 0
(**c**) $-\dfrac{\pi}{2}$
(**d**) Does not exist.

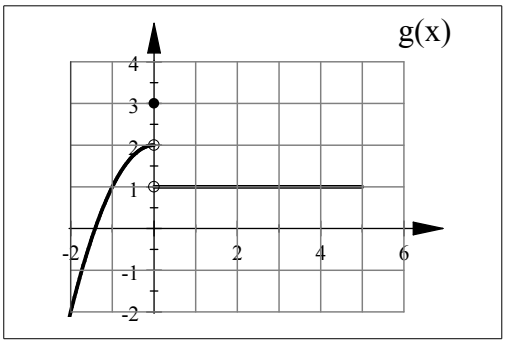
13. $\lim_{x \to 2} \dfrac{x-2}{x^3 - 8} =$

(**a**) 2
(**b**) $\dfrac{1}{12}$ *
(**c**) $\dfrac{1}{4}$
(**d**) Does not exist.

14. $\lim_{x \to -4} \dfrac{\frac{1}{4} + \frac{1}{x}}{4 + x} =$

(**a**) $\dfrac{1}{16}$
(**b**) $-\dfrac{1}{16}$ *
(**c**) 16
(**d**) −16

15. If $g(x)$ is the function whose graph is shown,



then $\lim_{x \to 0^+} g(x) =$

(**a**) 3
(**b**) 2
(**c**) 1 *
(**d**) Does not exist.

16. If $f(x) = \begin{cases} -3x+1 & \text{if } x > 1 \\ x+2 & \text{if } x < 1 \end{cases}$, then $\lim_{x \to 1^-} f(x) =$

(**a**) -2
(**b**) 3 *
(**c**) 2
(**d**) Does not exist.

17. If $f(x) = \dfrac{x^2-4}{|x-2|}$, then $\lim_{x \to 2^-} f(x) =$

(**a**) 16
(**b**) 4
(**c**) -4 *
(**d**) Does not exist.

18. $\lim_{x \to 4} \dfrac{\sin(x-4)}{2x-8} =$

(**a**) 0
(**b**) 1
(**c**) $-\frac{1}{2}$
(**d**) $\frac{1}{2}$ *

19. $\lim_{\theta \to 0} \dfrac{\tan\theta}{2\theta + \sin\theta} =$

(**a**) 0
(**b**) 1
(**c**) $\frac{1}{3}$ *
(**d**) Does not exist.

20. $\lim_{x\to\infty} \dfrac{x-4}{x^2-x-12} =$

(**a**) 0 *

(**b**) $\frac{1}{3}$

(**c**) 4

(**d**) ∞

21. $\lim_{x\to-\infty} \dfrac{\sqrt{x^2-2}}{3x-5} =$

(**a**) $\frac{1}{3}$

(**b**) $-\frac{1}{3}$ *

(**c**) ∞

(**d**) $-\infty$.

22. The horizontal asymptote of $f(x) = \dfrac{7x^3-5x^2-3}{8x^3+x}$ is

(**a**) $y = \frac{7}{8}$ *

(**b**) $x = \frac{7}{8}$

(**c**) $y = -\frac{7}{8}$

(**d**) $x = -\frac{7}{8}$

23. The function $f(x) = \dfrac{-3x^4-4x^2+35}{x^3-8}$ does not have a horizontal asymptote.

(**a**) True *

(**b**) False

24. $\lim_{x\to-\infty} (5x^2+2x+7) =$

(**a**) $-\infty$

(**b**) 5

(**c**) 7

(**d**) ∞ *

25. $\lim_{x\to-\infty} \cos\left(\dfrac{1}{2x+\pi}\right) =$

(**a**) 1 *

(**b**) $\frac{\pi}{2}$

(**c**) 0

(**d**) Does not exist.

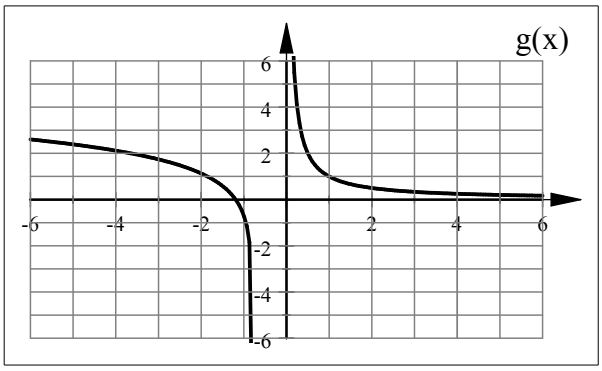
26. $\lim_{x\to 3^-} \dfrac{2x}{x-3} =$

(**a**) ∞
(**b**) $-\infty$ *
(**c**) 2
(**d**) 6

27. The vertical asymptote(s) of $f(x) = \dfrac{x-3}{x^2+x-12}$ is (are)

(**a**) $y = 3$, $y = -4$
(**b**) $x = 3$, $x = -4$
(**c**) $y = -4$
(**d**) $x = -4$ *

28. The horizontal asymptote(s) of the following function is (are)



(**a**) $y = 0$, $y = 3$ *
(**b**) $y = -1$, $y = 0$
(**c**) $x = 0$, $x = 3$
(**d**) $x = 0$

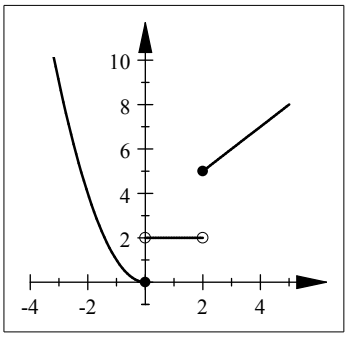
29. The function $f(x) = \begin{cases} x-1 & \text{if } x < 0 \\ x^2 & \text{if } x \geq 0 \end{cases}$ is continuous at $a = 0$

(**a**) Ttue
(**b**) False *

30. The function $f(x) = \begin{cases} k^2x - 3x & \text{if } x \geq 2 \\ 6x & \text{if } x < 2 \end{cases}$ is continuous on $\mathbb{R}$ if

(**a**) $k = \pm 3$ *
(**b**) $k = \pm 9$
(**c**) $k = 9$
(**d**) $k = -9$.

31. If $f(x)$ is the function whose graph is shown below ,



then $f(x)$ is

(**a**) continuous from the right at $x = 0$
(**b**) discontinuous from the right at $x = 0$ *
(**c**) continuous from the left at $x = 2$
(**d**) discontinuous from the right at $x = 2$

32. The function $f(x) = \tan x$ is discontinuous at $x =$

(**a**) $(2n+1)\pi \quad , \quad n \in Z$
(**b**) $(2n+1)\frac{\pi}{2} \quad , \quad n \in Z$ *
(**c**) $n\pi \quad , \quad n \in Z$
(**d**) $\frac{n\pi}{2} \quad , \quad n \in Z$

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

(**a**) $[-2,2]$
(**b**) $[-2,2)$ *
(**c**) $(-\infty,-2]\cup(2,\infty)$
(**d**) $(-\infty,-2)\cup(2,\infty)$.