Second Exam Math. 110 (A)

1. If $f\ (x) = |x-1|$, then f is one to one function.

   (a) True.
   (b) False.

2. $\log_a(xy) =$

   (a) $(\log_a\ x)\ (\log_a\ y)$
   (b) $\log_a\ (x+y)$
   (c) $\log_a\ x + \log_a\ y$
   (d) $\log_a \left(\dfrac{x}{y}\right)$.

3. If $f\ (x) = \cos x$, then f has an inverse function on the interval $[-\pi, \pi]$.

   (a) True
   (b) False.

4. If $e^{3x-2} = 5$, then $x =$

   (a) $\dfrac{\ln 5 + 3}{2}$
   (b) $\dfrac{\ln 3 + 5}{2}$
   (c) $\dfrac{\ln 5 + 2}{3}$
   (d) $\dfrac{\ln 2 + 5}{3}$

5. If $f\ (x) = \sqrt{3-x}$, then $f^{-1}(x) =$

   (a) x^2+3
   (b) x^2−3
   (c) $3 - x^2$
   (d) $\sqrt{3-x^2}$.

6. $\cos\left(\sin^{-1}\frac{x}{2}\right)=$

(a) $\frac{\sqrt{4-x^2}}{2}$

(b) $\frac{\sqrt{4-x^2}}{x}$

(c) $\frac{2}{\sqrt{4-x^2}}$

(d) $\frac{x}{\sqrt{4-x^2}}$.

7. $\log_{10} 5 + \log_{10} 20 =$

(a) 3

(b) 10

(c) -2

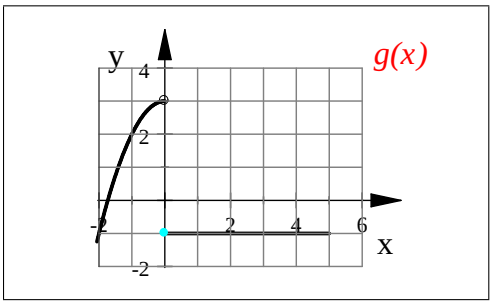
(d) 2

8. If $f\ (x) = \tan^{-1} x$, then domain $(f\ \ ) = R$.

(a) True.

(b) False.

9. If $g\ (x)$ is the function whose graph is shown , then $\lim_{x\to 0^+} g(x) =$



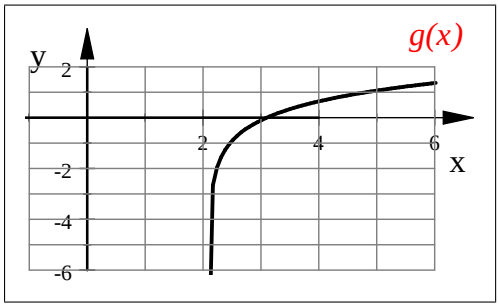
(a) 0

(b) 3

(c) -1

(d) does not exist.

10. The figure below shows that



(a) $\lim_{x \to 2^-} g(x) = \infty$

(b) $\lim_{x \to 2^-} g(x) = -\infty$

(c) $\lim_{x \to 2^+} g(x) = \infty$

(d) $\lim_{x \to 2^+} g(x) = -\infty$.

11. The vertical asymptote(s) of the function $f\ (x) = \dfrac{x+1}{x^2 - 2x - 3}$ is (are)

(a) $x = 3$

(b) $x = 3, x = -1$

(c) $x = -1$

(d) $y = 3$.

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

(a) -4

(b) 16

(c) does not exist

(d) 4.

13. If $f\ (x) = \begin{cases} 3x^2 + 11 & \text{if } x \geq 1 \\ 5x + 3 & \text{if } x < 1 \end{cases}$, then $\lim_{x \to 1^-} f\ (x) =$

(a) -2

(b) 14

(c) 8

(d) does not exist.

14. $\lim_{x \to 0} \frac{(x-5)^2 - 25}{x} =$

(a) 10

(b) -10

(c) does not exist

(d) ∞.

15. $\lim_{x \to 1} \frac{1 - \sqrt{2-x}}{x-1} =$

(a) 0

(b) $\frac{-1}{2}$

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

(d) 1.

16. $\lim_{x \to -1} \sqrt{x+1} =$

(a) 0

(b) 2

(c) does not exist

(d) -2.

17. $\lim_{x \to 0} \frac{x+1}{x+3} =$

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

(b) 0

(c) $\frac{-1}{3}$

(d) 1.

18. $\lim_{x \to 4} \frac{x^2 - 7x + 12}{x^2 - x - 12} =$

(a) 1

(b) 0

(c) $\frac{1}{7}$

(d) does not exist..

19. If $\frac{1}{\sqrt{3}} \leq f\ (x) \leq \cot x$, then $\lim\limits_{x \to \frac{\pi}{3}} f\ (x) =$

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

(b) $\frac{\sqrt{3}}{3}$

(c) does not exist

(d) $3\sqrt{3}$

20. The figure below shows that

(a) $\lim\limits_{x \to 1^+} f\ (x) = 2$

(b) $\lim\limits_{x \to 1^-} f\ (x) = 2$

(c) $\lim\limits_{x \to 3^+} f\ (x) = 2$

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

21. If $f\ (x) = \begin{cases} x+1 & if \quad x \leq 1 \\ \frac{1}{x} & if \quad 1 < x < 3 \\ \sqrt{x-3} & if \quad x > 3 \end{cases}$, then

(a) $f\ (x)$ is continuous from the right at $x = 3$

(b) $f\ (x)$ is continuous from the left at $x = 3$

(c) $f\ (x)$ is continuous from the right at $x = 1$

(d) $f\ (x)$ is continuous from the left at $x = 1.$

22. $f\ (x) = \frac{\sqrt{25 - x^2}}{x - 5}$ is continuous on

(a) $[-5, 5]$

(b) $[-5, 5)$

(c) $(-5, 5]$

(d) $(-5, 5).$

23. If $f\ (x)$ is continuous on R and $f\ (0) = 2$, then $\lim\limits_{x \to 0} \frac{4 - f\ (x)}{x - 2} =$

(a) -1

(b) 1

(c) 2

(d) does not exist.

24. If $f\ (x)$ is continuous on R such that $f\ (x) = \begin{cases} cx+1 & if \quad x \geq 1 \\ 2c & if \quad x < 1 \end{cases}$, then $c =$

(a) 0
(b) 1
(c) $\frac{1}{3}$
(d) -1

25. $\lim\limits_{x \to 2^+} \frac{3}{4-x^2} =$

(a) 0
(b) ∞
(c) $-\infty$
(d) $\frac{3}{4}$

26. $\lim\limits_{x \to \infty} \frac{x+1}{3\sqrt{x^2+x}} =$

(a) $\frac{1}{3}$
(b) $-\frac{1}{3}$
(c) 0
(d) ∞

27. $\lim\limits_{x \to \infty} e^{x^5-x^2} =$

(a) 0
(b) ∞
(c) $-\infty$
(d) e^3

28. The horizontal asymptote(s) of the function $f\ (x) = \frac{\sqrt{9x^2+1}-3}{3x-2}$ is (are)

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

(d) $y = 3$.

29. $\lim_{x \to \infty} \frac{\sin^{-1}\left(\frac{1}{x}\right)}{5 + x^{-3}} =$

(a) 5
(b) ∞
(c) $-\infty$
(d) 0

30. The function $f\ (x) = \sec x$ is discontinuous at

(a) $x = \frac{n\ \pi}{2}\ , n \in Z$
(b) $x = n\ \pi\ , n \in Z$
(c) $x = \frac{n\ \pi}{4}\ , n \in Z$
(d) $x = (2n+1)\frac{\pi}{2}\ , n \in Z.$

31. If $f\ (x) = \frac{x+1}{2x-6}$, then the range of $f^{-1}(x) =$

(a) $(-\infty, 3) \cup (3, \infty)$
(b) $(-\infty, -1) \cup (-1, \infty)$
(c) $(-\infty, -3) \cup (-3, \infty)$
(d) $(-\infty, 1) \cup (1, \infty)$

32. $\lim_{x \to \infty} \frac{x^4 + 6x^3}{2x^3 + 3} =$

(a) $\frac{1}{2}$
(b) 2
(c) 0
(d) ∞

33. $\lim_{x \to \infty} \sin^{-1}(\frac{x^2 - x}{x^2 + x}) =$

(a) $\frac{\pi}{2}$
(b) $-\frac{\pi}{2}$
(c) π
(d) 0