King Abdul Aziz University | Faculty of Sciences | Mathematics Department

Math 110 Fall 2011 | Final (40 Marks) | Time 120 m

Student Name: | Student Number: | C

1) The vertical asymptote of $f(x)=\dfrac{7-x}{x^2-x-2}$ is

[a] $x=-1,2$ [b] $y=-1,2$ [c] $x=-2,1$ [d] $y=-2,1$

2) The function $f(x)=\sqrt{x^2-25}$ is continuous on

[a] $[-5,5]$ [b] $(-5,5)$ [c] $(-\infty,-5)\cup(5,\infty)$ [d] $(-\infty,-5]\cup[5,\infty)$

3) If $y=2^{\cot x}$, then $y'=$

[a] $-2^{\cot x}\csc^2 x\ln 2$ [b] $-2^{\cot x}\csc^2 x$ [c] $-2^{\cot x}\ln 2$ [d] $2^{\cot x}\csc^2 x\ln 2$

4) The tangent line equation to the curve of $f(x)=\dfrac{1-x}{x+3}$ at the point $(-1,1)$ is

[a] $y=-x+2$ [b] $y=-x$ [c] $y=x+2$ [d] $y=2x+3$

5) If $xy+y^2-x^3=0$, then $y'=$

[a] $\dfrac{3x^2-y}{x-2y}$ [b] $\dfrac{3x^2-y}{x+2y}$

[c] $-\dfrac{3x^2+y}{x-2y}$ [d] $-\dfrac{3x^2+y}{x+2y}$

6) If $y=\log_7(x^3-5)$, then $y'=$

[a] $\dfrac{x^2}{(x^3-5)\ln 7}$ [b] $\dfrac{3x^2}{x^3-5}$ [c] $\dfrac{3x^2}{(x^3-5)\ln 7}$ [d] $\dfrac{1}{(x^3-5)\ln 7}$

7) If $y=\tan^3(7x)$, then $y'=$

[a] $7\tan^2(7x)\sec^2(7x)$ [b] $-21\tan^2(7x)\sec^2(7x)$

[c] $3\tan^2(7x)\sec^2(7x)$ [d] $21\tan^2(7x)\sec^2(7x)$

8) The function $f(x)=5x^4+3x^2$ is

[a] Even [b] Odd [c] Even and odd [d] Neither even nor odd

9) Find the domain of the function $f(x)=\dfrac{x+5}{x^2-x-2}$.

[a] $(-\infty,\infty)$ [b] $\mathbb{R}\setminus\{-2,1\}$

[c] $\mathbb{R}\setminus\{-1,2\}$ [d] $\mathbb{R}\setminus(-1,2)$

10) If $f(x)=9-x^2$, and $g(x)=10$, then $(f\circ g)(x)=$

[A] -91 [B] $9-(9-x^2)^2$ [C] 10 [D] $1-x^2$

11) $\lim_{x\to 1}\frac{\ln x}{2x-2}=$

[a] $-\frac{1}{2}$ [b] 2 [c] -2 [d] $\frac{1}{2}$

12) $\lim_{x\to 0}\frac{x}{\sqrt{x+4}-2}=$

[a] $-\frac{1}{4}$ [b] -4 [c] $\frac{1}{4}$ [d] 4

13) $D^{81}(\cos x)=$

[a] $\sin x$ [b] $\cos x$ [c] $-\sin x$ [d] $-\cos x$

14) If $y=\sqrt{3x^2-\sec x}$, then $y'=$

[a] $\frac{6x-\sec x\tan x}{\sqrt{3x^2+\sec x}}$ [b] $\frac{6x-\sec x\tan x}{2\sqrt{3x^2-\sec x}}$

[c] $\frac{6x+\sec x\tan x}{\sqrt{3x^2-\sec x}}$ [d] $\frac{6x+\sec x\tan x}{2\sqrt{3x^2+\sec x}}$

15) $\lim_{x\to 3^-}\frac{|x-3|}{x-3}=$

[a] 1 [b] -1 [c] does not exist [d] 0

16) If $x=\sin^{-1}\left(\frac{1}{3}\right)$, and $0<x<\frac{\pi}{2}$, then $\tan x=$

[a] $2\sqrt{2}$ [b] $\frac{1}{2\sqrt{2}}$ [c] $\frac{2\sqrt{2}}{3}$ [d] $\frac{3}{2\sqrt{2}}$

17) If $y=\csc^{-1}\left(x^3\right)$, then $y'=$

[a] $\frac{3}{x\sqrt{x^6-1}}$ [b] $-\frac{3}{x\sqrt{x^5-1}}$

[c] $-\frac{3}{x\sqrt{x^6-1}}$ [d] $\frac{3}{x\sqrt{x^5-1}}$

18) If $y=x^2e^{-3x}$, then $y'=$

[a] $xe^{-3x}(3x+2)$ [b] $-xe^{-3x}(3x+2)$

[c] $xe^{-3x}(2-3x)$ [d] $xe^{-3x}(3x-2)$

19) $\frac{5\pi}{6}$ rad $=$

[a] 120^0 [b] 150^0 [c] 270^0 [d] 210^0

20) $\lim_{x\to 3}\dfrac{x^2-8x+15}{x^2+4x-21}=$

[a] does not exist [b] 5 [c] $-\dfrac{1}{5}$ [d] -5

21) $\log_3 9-\log_3 27+\log_3\sqrt{3}=$

[a] 1 [b] $\dfrac{1}{2}$ [c] 0 [d] $-\dfrac{1}{2}$

22) Find the inverse of the function $f(x)=\dfrac{x-2}{x}$.

[a] $f^{-1}(x)=\dfrac{x}{x-2}$ [b] $f^{-1}(x)=\dfrac{2}{1-x}$

[c] $f^{-1}(x)=\dfrac{2}{1+x}$ [d] $f^{-1}(x)=-\dfrac{2}{1-x}$

23) $\lim_{x\to\infty}\dfrac{3x+1}{9x^2+4x-13}=$

[a] 0 [b] $-\infty$ [c] $\dfrac{1}{3}$ [d] ∞

24) $\lim_{x\to\infty}\dfrac{6e^x}{x^3}=$

[a] ∞ [b] 6 [c] $-\infty$ [d] 0

25) The equation of the line passes through $(8,-5)$ and $(4,-3)$ is

[a] $y=-2x+5$ [b] $y=-\dfrac{x}{2}-1$ [c] $y=-2x+11$ [d] $y=-\dfrac{x}{2}+1$

26) If $y=x^{4x}$, then $y'=$

[a] $x^{4x}[1+\ln x]$ [b] $4[1+\ln x]$ [c] $1+\ln x$ [d] $4x^{4x}[1+\ln x]$

27) $\lim_{x\to 7^-}\dfrac{1}{x-7}=$

[a] 0 [b] 1 [c] $-\infty$ [d] ∞

28) The number(s) c in $(-2,0)$ which make the function $f(x)=x^3-4x+2$ satisfy Rolle's Theorem on $[-2,0]$ is (are)

[a] $\dfrac{2}{\sqrt{3}}$ [b] $-\dfrac{2}{\sqrt{3}}$ [c] $\pm\dfrac{2}{\sqrt{3}}$ [d] $\dfrac{4}{3}$

29) The solution of the inequality $|x-3|\le 5$ is

[a] $(-2,8)$ [b] $[-2,8]$ [c] $(-\infty,-2]\cup[8,\infty)$ [d] $(-\infty,-2)\cup(8,\infty)$

30) The value c that makes $f(x)=\begin{cases} cx^2+2x & : x \le 2 \\ x^3-cx & ; x>2 \end{cases}$ is continuous at 2 is

[a] $-\frac{2}{3}$ [b] $\frac{2}{3}$ [c] 0 [d] $\frac{3}{2}$

31) The critical numbers of the function $f(x)=2x^3-3x^2-12x+2$ are

[a] $1,2$ [b] $-2,1$ [c] $-2,-1$ [d] $-1,2$

32) The function $f(x)=2x^3-3x^2-12x+2$ is decreasing on

[a] $(-1,2)$ [b] $(-2,-1)$ [c] $(1,2)$ [d] $(-2,1)$

33) The function $f(x)=2x^3-3x^2-12x+2$ is increasing on

[a] $(-\infty,-2)\cup(1,\infty)$ [b] $(-\infty,-1)\cup(2,\infty)$ [c] $(-\infty,1)\cup(2,\infty)$ [d] $(-\infty,-2)\cup(-1,\infty)$

34) The function $f(x)=2x^3-3x^2-12x+2$ has a relative maximum point at

[a] $(1,-11)$ [b] $(-1,9)$ [c] $(-2,-2)$ [d] $(2,-18)$

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36) The graph of $f(x)=2x^3-3x^2-12x+2$ concave upward on

[a] $(-\infty,-\frac{1}{2})$ [b] $(-\infty,\frac{1}{2})$ [c] $(-\frac{1}{2},\infty)$ [d] $(\frac{1}{2},\infty)$

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38) The function $f(x)=2x^3-3x^2-12x+2$ has an inflection point at

[a] $(\frac{1}{2},7)$ [b] $(\frac{1}{2},-\frac{9}{2})$ [c] $(-\frac{1}{2},-\frac{9}{2})$ [d] $(-\frac{1}{2},7)$

39) The absolute maximum value of the function $f(x)=2x^3-3x^2-12x+2$ on $[0,2]$ is

[a] -18 [b] -11 [c] 2 [d] 9

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