King Abdul Aziz University | Faculty of Sciences | Mathematics Department

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

Student Name: | Student Number: | D

1) If $y = x^{5x}$, then $y' =$

[a] $5x^{5x}[1+\ln x]$ [b] $5[1+\ln x]$ [c] $1+\ln x$ [d] $x^{5x}[1+\ln x]$

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

3) If $y = \log_7(x^3-1)$, then $y' =$

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

4) If $x = \sin^{-1}\left(\dfrac{1}{3}\right)$, and $0 < x < \dfrac{\pi}{2}$, then $\sec x =$

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

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

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

7) If $y = \sec^{-1}(x^3)$, then $y' =$

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

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

[a] $\dfrac{6x-\csc x\cot x}{2\sqrt{3x^2+\csc x}}$ [b] $\dfrac{6x-\csc x\cot x}{\sqrt{3x^2+\csc x}}$

[c] $\dfrac{6x+\csc x\cot x}{2\sqrt{3x^2-\csc x}}$ [d] $\dfrac{6x+\csc x\cot x}{\sqrt{3x^2-\csc x}}$

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

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

10) $\lim_{x\to\infty}\frac{3x^2-8x+15}{9x^2+4x-13}=$

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

11) If $y=x^2e^{-4x}$, then $y'=$

[a] $2xe^{-4x}(1-2x)$ [b] $-2xe^{-4x}(2x+1)$

[c] $2xe^{-4x}(2x+1)$ [d] $2xe^{-4x}(2x-1)$

12) $\lim_{x\to3}\frac{x^2+4x-21}{x^2-8x+15}=$

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

13) $\lim_{x\to3^+}\frac{|x-3|}{x-3}=$

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

14) $\lim_{x\to0}\frac{\sqrt{x+9}-3}{x}=$

[a] $-\frac{1}{6}$ [b] -6 [c] $\frac{1}{6}$ [d] 6

15) If $y=\cot^3(5x)$, then $y'=$

[a] $-15\cot^2(5x)\csc^2(5x)$ [b] $-\cot^2(5x)\csc^2(5x)$

[c] $-3\cot^2(5x)\csc^2(5x)$ [d] $15\cot^2(5x)\csc^2(5x)$

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

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

17) The critical numbers of the function $f(x)=2x^3-9x^2+12x+2$ are

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

18) The function $f(x)=2x^3-9x^2+12x+2$ is decreasing on

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

19) The function $f(x)=2x^3-9x^2+12x+2$ is increasing on

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

20) The function $f(x)=2x^3-9x^2+12x+2$ has a relative maximum point at

[a] $(1,7)$ [b] $(-1,-21)$ [c] $(-2,-74)$ [d] $(2,6)$

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22) The graph of $f(x)=2x^3-9x^2+12x+2$ concave upward on

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24) The function $f(x)=2x^3-9x^2+12x+2$ has an inflection point at

[a] $(-\frac{3}{2},\frac{13}{2})$ [b] $(-\frac{3}{2},-43)$ [c] $(\frac{3}{2},\frac{13}{2})$ [d] $(\frac{3}{2},-43)$

25) The absolute maximum value of the function $f(x)=2x^3-9x^2+12x+2$ on $[0,2]$ is

[a] -21 [b] 6 [c] 2 [d] 7

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27) $\frac{2\pi}{3}$ rad =

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

28) $D^{84}(\cos x)=$

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

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

[a] $1-x^2$ [b] 10 [c] $9-(9-x^2)^2$ [d] -91

30) The number(s) c in $(-3,0)$ which make the function $f(x)=x^3-9x-2$ satisfy Rolle's Theorem on $[-3,0]$ is (are)

[a] $\sqrt{3}$ [b] $-\sqrt{3}$ [c] $\pm\sqrt{3}$ [d] ± 3

31) If $y=3^{\tan x}$, then $y'=$

[a] $3^{\tan x}\sec^2 x$ [b] $3^{\tan x}\sec^2 x\ln 3$

[c] $3^{\tan x}\ln 3$ [d] $-3^{\tan x}\sec^2 x\ln 3$

32) Find the domain of the function $f(x)=\frac{x+2}{x^2-3x+2}$.

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

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

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

34) $\lim_{x\to\infty}\frac{x^2}{2e^x}=$

[a] ∞ [b] 1 [c] does not exist [d] 0

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

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

36) $\lim_{x\to 9^+}\frac{1}{x-9}=$

[a] $-\infty$ [b] 1 [c] 0 [d] ∞

37) The number c that makes $f(x)=\begin{cases} x-2 & :x>5 \\ cx-3 & ;x\le 5 \end{cases}$ is continuous at 5 is

[a] $-\frac{6}{5}$ [b] $\frac{5}{6}$ [c] 2 [d] $\frac{6}{5}$

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

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

39) The solution of the inequality $|x-3|>5$ is

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

40) The vertical asymptote of $f(x)=\frac{7-x}{x^2-3x+2}$ is

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