King Abdul Aziz University | Faculty of Sciences | Mathematics Department

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

Student Name: | Student Number: | B

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

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

2) $\lim_{x\to 5^+}\frac{1}{x-5}=$

[a] 0 [b] ∞ [c] 1 [d] $-\infty$

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

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

4) If $y=x^{3x}$, then $y'=$

[a] $x^{3x}[1+\ln x]$ [b] $3[1+\ln x]$ [c] $3x^{3x}[1+\ln x]$ [d] $1+\ln x$

5) The function $f(x)=\frac{x+3}{\sqrt{25-x^2}}$ is continuous on

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

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

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

7) $D^{82}(\cos x)=$

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

8) The function $f(x)=2x^3+7$ is

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

9) Find the domain of the function $f(x)=\frac{x+9}{x^2+3x+2}$.

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

10) 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] $-1,2$

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

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

12) 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] $(-\infty,-2)\cup(-1,\infty)$

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

[a] $(1,25)$ [b] $(-1,-3)$ [c] $(2,78)$ [d] $(-2,-2)$

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

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

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

[a] $(-\frac{3}{2},-\frac{5}{2})$ [b] $(-\frac{3}{2},47)$ [c] $(\frac{3}{2},-\frac{5}{2})$ [d] $(\frac{3}{2},47)$

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

[a] 78 [b] 25 [c] 2 [d] -3

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20) 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] $\frac{6}{5}$

21) The number(s) c in $(0,3)$ which make the function $f(x)=x^3-9x-1$ satisfy Rolle's Theorem on $[0,3]$ is (are)

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

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

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

23) If $y=7^{\cot x}$, then $y'=$

[a] $7^{\cot x}\csc^2 x\ln 7$ [b] $-7^{\cot x}\csc^2 x$

[c] $-7^{\cot x}\ln 7$ [d] $-7^{\cot x}\csc^2 x\ln 7$

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

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

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

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

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

26) $\lim_{x\to\infty} \frac{x^3}{6e^x} =$

[a] ∞ [b] 0 [c] $\frac{1}{6}$ [d] 1

27) $\lim_{x\to 0} \frac{x}{\sqrt{x+49}-7} =$

[a] -14 [b] $-\frac{1}{14}$ [c] 14 [d] $\frac{1}{14}$

28) $\log_3 81 - \log_3 27 + \log_3 \sqrt{3} =$

[a] $\frac{3}{2}$ [b] 1 [c] $-\frac{1}{2}$ [d] 0

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

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

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

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

[a] $x = 2,1$ [b] $y = 2,1$

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

31) $\lim_{x\to 5^+} \frac{|x-5|}{x-5} =$

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

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

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

33) If $y = \tan^3(6x)$, then $y' =$

[a] $6\tan^2(6x)\sec^2(6x)$ [b] $18\tan^2(6x)\sec^2(6x)$

[c] $3\tan^2(6x)\sec^2(6x)$ [d] $-18\tan^2(6x)\sec^2(6x)$

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

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

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

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

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

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

37) 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] $f^{-1}(x)=-\dfrac{2}{1-x}$

38) If $y=\log_7(x^3+2)$, then $y'=$

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

39) $\dfrac{7\pi}{6}$ rad $=$

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

40) 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] $-\dfrac{3x^2+y}{x+2y}$