King Abdul Aziz University Math 110 Fall 2011	Faculty of Sciences Final (40 Marks)	Mathematics Department Time 120 m
Student Name:	Student Number:	$\boxed{A}$

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

$\boxed{a}$ $1,2$ $\boxed{b}$ $-2,1$ $\boxed{c}$ $-2,-1$ $\boxed{d}$ $-1,2$

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

$\boxed{a}$ $(-1,2)$ $\boxed{b}$ $(-2,-1)$ $\boxed{c}$ $(1,2)$ $\boxed{d}$ $(-2,1)$

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

$\boxed{a}$ $(-\infty,-2)\cup(1,\infty)$ $\boxed{b}$ $(-\infty,-1)\cup(2,\infty)$ $\boxed{c}$ $(-\infty,1)\cup(2,\infty)$ $\boxed{d}$ $(-\infty,-2)\cup(-1,\infty)$

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

$\boxed{a}$ $(2,6)$ $\boxed{b}$ $(-1,15)$ $\boxed{c}$ $(-2,22)$ $\boxed{d}$ $(1,-5)$

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

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

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

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

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

$\boxed{a}$ $(\frac{1}{2},-3)$ $\boxed{b}$ $(\frac{1}{2},\frac{17}{2})$ $\boxed{c}$ $(-\frac{1}{2},\frac{17}{2})$ $\boxed{d}$ $(-\frac{1}{2},-3)$

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

$\boxed{a}$ 22 $\boxed{b}$ 6 $\boxed{c}$ 2 $\boxed{d}$ -5

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$\boxed{a}$ 22 $\boxed{b}$ 6 $\boxed{c}$ 2 $\boxed{d}$ -5

11) The number(s) c in $(0,2)$ which make the function $f(x)=x^3-4x+1$ satisfy Rolle's Theorem on $[0,2]$ is (are)

$\boxed{a}$ $\frac{2}{\sqrt{3}}$ $\boxed{b}$ $-\frac{2}{\sqrt{3}}$ $\boxed{c}$ $\pm\frac{2}{\sqrt{3}}$ $\boxed{d}$ $\frac{4}{3}$

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

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

13) The solution of the inequality $|x-3|<5$ is

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

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

a $-\infty$ b 2 c ∞ d 0

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

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

16) If $y = 9^{\tan x}$, then $y' =$

a $-9^{\tan x}\sec^2 x \ln 9$ b $9^{\tan x}\sec^2 x$ c $9^{\tan x}\sec^2 x \ln 9$ d $9^{\tan x}\ln 9$

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

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

18) 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 $\frac{3}{2}$

19) $\lim_{x\to 3^-} \frac{1}{x-3} =$

a ∞ b $-\infty$ c 1 d 0

20) If $y = x^{2x}$, then $y' =$

a $x^{2x}[1+\ln x]$ b $2x^{2x}[1+\ln x]$ c $2[1+\ln x]$ d $1+\ln x$

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

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

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

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

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

a $\frac{3x^2-y}{x-2y}$ b $\frac{3x^2-y}{x+2y}$ c $-\frac{3x^2+y}{x-2y}$ d $-\frac{3x^2+y}{x+2y}$

24) The function $f(x) = 3x^5 - x$ is

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

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

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

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

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

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

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

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

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

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

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

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

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

30) If $y = \cot^3(4x)$, then $y' =$

[a] $-4\cot^2(4x)\csc^2(4x)$ [b] $-3\cot^2(4x)\csc^2(4x)$

[c] $-12\cot^2(4x)\csc^2(4x)$ [d] $12\cot^2(4x)\csc^2(4x)$

31) 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] $y=x+2$ [d] $y=-x$

32) $\dfrac{3\pi}{2}$ rad =

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

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

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

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

35) $D^{83}(\cos x) =$

$\boxed{a}$ $\sin x$ $\boxed{b}$ $\cos x$ $\boxed{c}$ $-\sin x$ $\boxed{d}$ $-\cos x$

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

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

37) $\lim\limits_{x\to 3} \dfrac{x^2-8x+15}{x^2+4x-21} =$

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

38) $\lim\limits_{x\to 5^-} \dfrac{|x-5|}{x-5} =$

$\boxed{a}$ does not exist $\boxed{b}$ 0 $\boxed{c}$ 1 $\boxed{d}$ -1

39) $\lim\limits_{x\to 0} \dfrac{x}{\sqrt{x+36}-6} =$

$\boxed{a}$ -12 $\boxed{b}$ $-\dfrac{1}{12}$ $\boxed{c}$ 12 $\boxed{d}$ $\dfrac{1}{12}$

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

$\boxed{a}$ $1-x^2$ $\boxed{b}$ $9-(9-x^2)^2$ $\boxed{c}$ 10 $\boxed{d}$ -91