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

1) $\lim\limits_{x\to 5^+} \dfrac{x+1}{x-5} =$

$\boxed{a}$ ∞ $\boxed{b}$ $-\infty$ $\boxed{c}$ 5 $\boxed{d}$ -5

2) $\lim\limits_{x\to\infty}\left(\sqrt{x^2+x}-x\right)=$

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

3) The horizontal asymptote of $f(x)=\dfrac{1-x}{2x+1}$ is

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

4) The absolute minimum point of $f(x)=3x^2-12x+1$ in $[0,3]$ is

$\boxed{a}$ $(0,1)$ $\boxed{b}$ $(0,2)$ $\boxed{c}$ $(2,-11)$ $\boxed{d}$ $(2,-13)$

5) If $f(x)=\tan^{-1}(x)$ and $g(x)=\tan(x)$ then $(f\circ g)(x)=$

$\boxed{a}$ x $\boxed{b}$ $\tan^{-1}x\,\tan x$ $\boxed{c}$ 1 $\boxed{d}$ $\tan x$

6) The function $f(x)=\dfrac{x+1}{x^2-9}$ is continuous on

$\boxed{a}$ $\{\pm 3\}$ $\boxed{b}$ $[-3,3]$ $\boxed{c}$ $(-\infty,-3)\cup(3,\infty)$ $\boxed{d}$ $\{x\in\mathbb{R}: x\neq\pm 3\}$

7) If $y=x^x$, then $y'=$

$\boxed{a}$ $1+\ln x$ $\boxed{b}$ $x^x(1+\ln x)$ $\boxed{c}$ x^x $\boxed{d}$ $x^x\ln x$

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

$\boxed{a}$ $\dfrac{2x+y}{3x-2y}$ $\boxed{b}$ $\dfrac{2x}{y}$ $\boxed{c}$ $\dfrac{2x}{3-2y}$ $\boxed{d}$ $\dfrac{3y-2x}{2y-3x}$

9) The tangent line equation to the curve $y=\dfrac{2x}{x+1}$ at the point $(0,0)$ is

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

10) If $y=3^x\cot x$, then $y'=$

$\boxed{a}$ $3^x\ln 3\cot x-3^x\csc^2 x$ $\boxed{b}$ $3^x\cot x+3^x\sec^2 x$

$\boxed{c}$ $3^x\cot x-3^x\csc^2 x$ $\boxed{d}$ $3^x\ln 3\cot x+3^x\sec^2 x$

11) If $y=\left(2x^2+\sec x\right)^7$, then $y'=$

$\boxed{a}$ $7\left(2x^2+\sec x\right)^6$ $\boxed{b}$ $7\left(2x^2+\sec x\right)^6\left(4x+\sec x\tan x\right)$

$\boxed{c}$ $7\left(2x^2+\sec x\right)^6\left(4x-\sec x\tan x\right)$ $\boxed{d}$ $28x\left(2x^2+\sec x\right)^6$

12) If $f(x)=2x-3$, then $f^{-1}(x)=$

$\boxed{a}$ $\dfrac{x+3}{2}$ $\boxed{b}$ $\dfrac{x}{2}-3$

$\boxed{c}$ $\dfrac{x-3}{2}$ $\boxed{d}$ $\dfrac{x}{2}+3$

13) The slope of the perpendicular line to the line $3y+2x-6=0$ is

$\boxed{a}$ $\dfrac{2}{3}$ $\boxed{b}$ $-\dfrac{2}{3}$ $\boxed{c}$ $-\dfrac{3}{2}$ $\boxed{d}$ $\dfrac{3}{2}$

14) If the graph of the function $f(x)=e^x$ is shifted a distance 2 units downward, then the new graph represented the graph of the function

$\boxed{a}$ e^{x+2} $\boxed{b}$ e^x+2 $\boxed{c}$ e^{x-2} $\boxed{d}$ e^x-2

15) $\lim\limits_{x\to 2}\dfrac{x-1}{x^2(x+2)}=$

$\boxed{a}$ does not exist $\boxed{b}$ $\dfrac{1}{16}$ $\boxed{c}$ $\dfrac{1}{8}$ $\boxed{d}$ $\dfrac{1}{4}$

16) $\lim\limits_{x\to 0}\dfrac{\sin 5x}{3x}=$

$\boxed{a}$ $\dfrac{3}{5}$ $\boxed{b}$ $\dfrac{5}{3}$ $\boxed{c}$ $\dfrac{1}{3}$ $\boxed{d}$ 5

17) If $f(x)=\cos x$, then $f^{(46)}(x)=$

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

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

$\boxed{a}$ 3^{-1} $\boxed{b}$ -3 $\boxed{c}$ $\ln 3$ $\boxed{d}$ $-\ln 3$

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

$\boxed{a}$ 120^0 $\boxed{b}$ 150^0 $\boxed{c}$ 270^0 $\boxed{d}$ 210^0

20) The domain of $\log_2(x-2)$ is

$\boxed{a}$ $(-\infty,\infty)$ $\boxed{b}$ $(0,\infty)$ $\boxed{c}$ $(-2,\infty)$ $\boxed{d}$ $(2,\infty)$

21) The values in $(0,2)$ which makes $f(x)=x^3-3x^2+2x+5$ satisfied Rolle's Theorem on $[0,2]$ are

$\boxed{a}$ $1\pm\frac{4\sqrt{3}}{6}\in[0,2]$ $\boxed{b}$ $-1\pm\frac{\sqrt{3}}{3}\in(0,2)$ $\boxed{c}$ $1\pm\frac{\sqrt{3}}{3}\in(0,2)$ $\boxed{d}$ $1\pm\frac{\sqrt{3}}{6}\in(0,2)$

22) $\lim\limits_{x\to 1}\frac{\ln x}{x-1}=$

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

23) $\sec^{-1}(2)=$

$\boxed{a}$ $\frac{\pi}{2}$ $\boxed{b}$ $\frac{\pi}{6}$ $\boxed{c}$ $\frac{\pi}{4}$ $\boxed{d}$ $\frac{\pi}{3}$

24) The distance between the points $(-1,2)$ and $(2,-1)$ is

$\boxed{a}$ $3\sqrt{2}$ $\boxed{b}$ $2\sqrt{3}$ $\boxed{c}$ 9 $\boxed{d}$ 3

25) If $|x-4|=3$, then $x=$

$\boxed{a}$ 1 or 7 $\boxed{b}$ -7 $\boxed{c}$ -1 $\boxed{d}$ -1 or -7

26) The range of e^x is

$\boxed{a}$ $(-\infty,\infty)$ $\boxed{b}$ $(-\infty,0)$ $\boxed{c}$ $[0,\infty)$ $\boxed{d}$ $(0,\infty)$

27) If $y=\sin^3(4x)$, then $y'=$

$\boxed{a}$ $4\cos^3(4x)$ $\boxed{b}$ $3\sin^2(4x)\cos(4x)$

$\boxed{c}$ $4\sin^3(4x)+12\sin^2 x\cos x$ $\boxed{d}$ $12\sin^2(4x)\cos(4x)$

28) The domain of $\frac{x+3}{\sqrt{x^2-4}}$ is

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

29) $\lim\limits_{x\to 0}\frac{x^2-2x}{x}=$

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

30) If $f(x)=\frac{\ln x}{x^2}$, then $f'(1)=$

$\boxed{a}$ 1 $\boxed{b}$ 4 $\boxed{c}$ 0 $\boxed{d}$ 2

31) If $\ln(5-x)=3$, then $x=$

$\boxed{a}$ $5-e^3$ $\boxed{b}$ -2 $\boxed{c}$ $5-e$ $\boxed{d}$ $5e^{-3}$

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

$\boxed{a}\ -\dfrac{e^{x}}{1+e^{2x}}$ $\qquad \boxed{b}\ \dfrac{1}{1+e^{2x}}$ $\qquad \boxed{c}\ -\dfrac{1}{1+e^{2x}}$ $\qquad \boxed{d}\ \dfrac{e^{x}}{1+e^{2x}}$

33) The critical numbers of the function $f(x)=\frac{1}{3}x^{3}-\frac{1}{2}x^{2}-2x+1$ are

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

34) The function $f(x)=\frac{1}{3}x^{3}-\frac{1}{2}x^{2}-2x+1$ is increasing on

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

35) The function $f(x)=\frac{1}{3}x^{3}-\frac{1}{2}x^{2}-2x+1$ is decreasing on

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

36) The function $f(x)=\frac{1}{3}x^{3}-\frac{1}{2}x^{2}-2x+1$ has a relative maximum point at

$\boxed{a}$ $(1,-\frac{7}{6})$ $\qquad \boxed{b}$ $(-1,\frac{13}{6})$ $\qquad \boxed{c}$ $(-2,\frac{1}{3})$ $\qquad \boxed{d}$ $(2,-\frac{7}{3})$

37) The function $f(x)=\frac{1}{3}x^{3}-\frac{1}{2}x^{2}-2x+1$ has a relative minimum point at

$\boxed{a}$ $(1,-\frac{7}{6})$ $\qquad \boxed{b}$ $(-1,\frac{13}{6})$ $\qquad \boxed{c}$ $(-2,\frac{1}{3})$ $\qquad \boxed{d}$ $(2,-\frac{7}{3})$

38) The graph of $f(x)=\frac{1}{3}x^{3}-\frac{1}{2}x^{2}-2x+1$ concave upward on

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

39) The graph of $f(x)=\frac{1}{3}x^{3}-\frac{1}{2}x^{2}-2x+1$ concave downward on

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

40) The function $f(x)=\frac{1}{3}x^{3}-\frac{1}{2}x^{2}-2x+1$ has an inflection point at

$\boxed{a}$ $(\frac{1}{2},\frac{-1}{12})$ $\qquad \boxed{b}$ $(\frac{1}{2},\frac{1}{12})$ $\qquad \boxed{c}$ $(-\frac{1}{2},\frac{11}{6})$ $\qquad \boxed{d}$ $(-\frac{1}{2},-\frac{11}{6})$