King Abdulaziz University
Rabigh College of Science and Arts
Department of Mathematics

Second Exam – Math110
Date: 12/3/1438
Time: 90 minutes

Name……………………………………ID:………......................

**A**

**Choose the correct answer of the following questions:**

| | |
|---|---|
| (1) | $\lim_{x\to -2}(x^3-2x+1)=$ |

| | | | |
|---|---|---|---|
| (a)3 | (b)13 | (c)-11 | (d)-3 |

| | |
|---|---|
| (2) | $\lim_{x\to 2}\frac{x^2-4}{x-2}=$ |

| | | | |
|---|---|---|---|
| (a) 4 | (b) -2 | (c) 2 | (d) 1 |

| | |
|---|---|
| (3) | $\lim_{x\to 0}\frac{\sqrt{x+25}-5}{x}=$ |

| | | | |
|---|---|---|---|
| (a) 10 | (b) -10 | (c) $\frac{1}{10}$ | (d)- $\frac{1}{10}$ |

| | |
|---|---|
| (4) | If $\lim_{x\to 1}f(x)=3$, $\lim_{x\to 1}g(x)=-4$, $\lim_{x\to 1}h(x)=-1$, then $\lim_{x\to 1}[2f(x)g(x)h(x)]=$ |

| | | | |
|---|---|---|---|
| (a) -24 | (b) 48 | (c) 12 | (d) 24 |

| | |
|---|---|
| (5) | If $f(x)=\begin{cases}2x+3 & ; x\ge -2\\ 2x+5 & ; x<-2\end{cases}$, then $\lim_{x\to -2}f(x)=$ |

| | | | |
|---|---|---|---|
| (a) 3 | (b) -1 | (c) 1 | (d) Does not exist |

| | |
|---|---|
| (6) | The function $f(x)=\begin{cases}\frac{x^2-9}{x-3} & \text{if } x\neq 3\\ 1 & \text{if } x=3\end{cases}$ is continuous at $x=3$ |

| | |
|---|---|
| (a) True | (b)False |

| | |
|---|---|
| (7) | $\lim_{x\to\infty}\frac{\sqrt{4x^2+1}}{x}=$ |

| | | | |
|---|---|---|---|
| (a) -4 | ( b) 4 | (c) 3 | (d)2 |

| (8) | $\lim_{x \to \infty}\left(\sqrt{x^2+1}-x\right)=$ | | | |
|---|---|---|---|---|
| | (a) 4 | (b) 0 | (c) -2 | (d) 2 |

| (9) | The vertical asymptotes of the graph of the function $y = \frac{3}{x-2}$ is | | | |
|---|---|---|---|---|
| | (a)x=0 | (b)y=0 | (c)x=2 | (d)y=2 |

| (10) | The horizontal asymptotes of the graph of the function $y = \frac{3}{x-2}$ is | | | |
|---|---|---|---|---|
| | (a)x=0 | (b)y=0 | (c)x=2 | (d)y=2 |

| (11) | Any rational function is continues on $\mathbb{R} = (-\infty, \infty)$. | |
|---|---|---|
| | (a) True | (b) False |

| (12) | $\lim_{x \to 0}\frac{\sin(5x)}{7x}=$ | | | |
|---|---|---|---|---|
| | (a) 5 | (b) 7 | (c) $\frac{5}{7}$ | (d) $\frac{7}{5}$ |

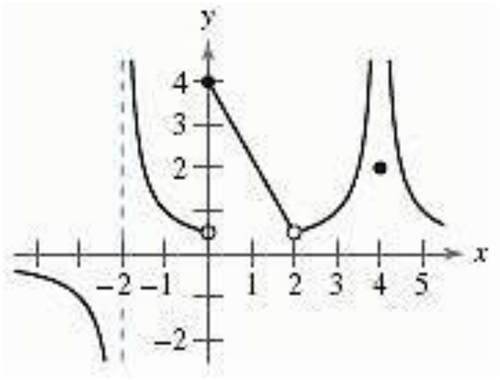
| (13) | An equation for tangent line to $f(x) = \frac{2}{x^2+1}$ at the point $(1,1)$ is | | | |
|---|---|---|---|---|
| | (a) $y=-x+2$ | (b) $y=x$ | (c) $y=2x-1$ | (d) $y=-2x+3$ |

| (14) | If $f(x)=xe^x$, then the nth derivative, $f^{(n)}(x)=$ | | | |
|---|---|---|---|---|
| | (a) $e^x(x+n)$ | (b) $e^x(x+1)$ | (c) $e^x(x-n)$ | (d) $e^x(x-1)$ |

| (15) | $f(x)=\begin{cases} x & \text{if } x<-1 \\ -1 & \text{if } x=-1 \\ \frac{x+1}{x^2-1} & \text{if } x>-1 \end{cases}$ ,then $\lim_{x \to -1^+}(f)=$ | | | |
|---|---|---|---|---|
| | (a) $\frac{1}{2}$ | (b) $-\frac{1}{2}$ | (c) 0 | (d) $-\frac{3}{2}$ |

| (16) | $y = \pi^2$ then $\acute{y} =$ | | | |
|---|---|---|---|---|
| | (a) $\pi$ | (b) $2\pi$ | (c) 1 | (d) 0 |

**In [17-20] Consider the following graph of the function $f(x)$ then**




| | | | | |
|---|---|---|---|---|
| (17) | $\lim_{x\to 0^+} f(x) =$ | | | |
| | (a) 1 | ( b) 0 | (c) 4 | (d) Doesn't exist |

| | | | | |
|---|---|---|---|---|
| (18) | $f(4) =$ | | | |
| | (a) 1 | ( b) 0 | (c) 2 | (d) Doesn't exist |

| | | |
|---|---|---|
| (19) | The function f is discontinuous at the point x=0, because: | |
| | (a) $f(0)$ doesn't exist | (b) $\lim_{x\to 0} f(x) \neq f(0)$ |
| | (c) $\lim_{x\to 0^-} f(x) \neq \lim_{x\to 0^+} f(x)$ | (d) Not of the above |

| | | |
|---|---|---|
| (20) | The function f is continuous at x=2 | |
| | (a)True | (b)False |

| | | | | |
|---|---|---|---|---|
| (21) | $\lim_{x\to 3} \frac{x^2-3}{x} =$ | | | |
| | (a) 0 | ( b) 2 | (c) 16 | (d) 5 |

| | | | | |
|---|---|---|---|---|
| (22) | If $f(x) = e^x - 2x^3 + 4x$ then $f''(x) =$ | | | |
| | (a) $e^x - 6x^2 + 4$ | ( b) $e^x - 12x + 4$ | (c) $e^x - 12x$ | (d) 0 |

| | | | | |
|---|---|---|---|---|
| (23) | If $y = \frac{e^x}{1+x}$ then $\frac{dy}{dx} =$ | | | |
| | (a) $\frac{x}{(1+x)^2}$ | ( b) $\frac{e^x}{(1+x)^2}$ | (c) $\frac{1}{(1+x)^2}$ | (d) $\frac{x e^x}{(1+x)^2}$ |

| | |
|---|---|
| (24) | For what value of the constant c is the function $f$ continuous on $(-\infty, +\infty)$ $$f(x)=\begin{cases} cx^2+2x & if \quad x<2 \\ x^3-cx & if \quad x\ge 2 \end{cases}$$ |

| (a) 3 | (b) 2 | (c) $\frac{2}{3}$ | (d) $\frac{3}{2}$ |
|---|---|---|---|

| | |
|---|---|
| (25) | $\lim_{\theta\to 0}\frac{\cos\theta-1}{\theta}=1$ |

| (a)True | (b) False |
|---|---|

| | |
|---|---|
| (26) | If $y=\sqrt{x}(2x+5)$, then $y'$ |

| (a) $2\sqrt{x}+\frac{2x+5}{\sqrt{x}}$ | (b) $2\sqrt{x}+\frac{2x+5}{2\sqrt{x}}$ | (c) $2\sqrt{x}+\frac{x+5}{\sqrt{x}}$ | (d) $\sqrt{x}+\frac{2x+5}{2\sqrt{x}}$ |
|---|---|---|---|

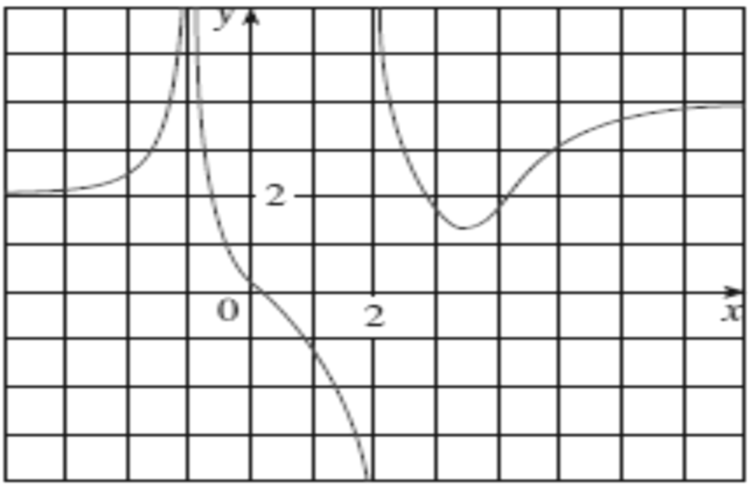
| | |
|---|---|
| (27) | The derivative $\acute{f}(x)$ for the function $f(x)=\sin x-\frac{1}{2}\cot x$ is |

| (a) $\cos x-\frac{1}{2}\cot x$ | (b) $\sin x+\frac{1}{2}\csc^2 x$ | (c) $\cos x+\frac{1}{2}\csc^2 x$ | (d) $\cos x-\frac{1}{2}\csc^2 x$ |
|---|---|---|---|

| | |
|---|---|
| (28) | $\lim_{x\to a}\sqrt[n]{f(x)}=\sqrt{\lim_{x\to a}f(x)}$ |

| (a)True | (b)False |
|---|---|

**In [29-30] Consider the following graph of the function $f(x)$ then**




| | |
|---|---|
| (29) | The function f has horizontal asymptotes at |

| (a) ) x=-2, x=-4 | (b)x=2, x=4 | (c) y=-2, y=-4 | (d)y=2, y=4 |
|---|---|---|---|

| | |
|---|---|
| (30) | The function f has vertical asymptotes at |

| (a)x=2,x=-1 | (b)y=2,y=-1 | (c)x=-2,x=1 | (d) y=-2,y=1 |
|---|---|---|---|

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Second Exam – Math110
Date: 19/3/1439
Time: 90 minutes

Name……………………………………ID:……….......................... **A**

**Choose the correct answer of the following questions:**

| (1) | $\lim_{x\to 2}\frac{2x^2+4}{x^2+6x-4}=$ | | |
|---|---|---|---|
| (a) 1 | (b) 2 | (c) 3 | (d) 4 |

| (2) | $\lim_{x\to 4}\frac{x^2-16}{x-4}=$ | | |
|---|---|---|---|
| (a) 8 | (b) -2 | (c) 4 | (d) 1 |

| (3) | $\lim_{x\to 0}\frac{\sqrt{x+1}-1}{x}=$ | | |
|---|---|---|---|
| (a) 10 | (b) 2 | (c) $\frac{1}{2}$ | (d) $\frac{1}{10}$ |

| (4) | If $\lim_{x\to 1}f(x)=5$, $\lim_{x\to 1}g(x)=-1$, $\lim_{x\to 1}h(x)=2$, then $\lim_{x\to 1}[2f(x)g(x)h(x)]=$ | | |
|---|---|---|---|
| (a) -20 | (b) 48 | (c) 12 | (d) 1 |

| (5) | If $f(x)=\begin{cases}2x+3 & ; x\ge 0\\ 2x+5 & ; x<0\end{cases}$, then $\lim_{x\to 0}f(x)=$ | | |
|---|---|---|---|
| (a) 3 | (b) 5 | (c) 1 | (d) Does not exist |

| (6) | The function $f(x)=\begin{cases}\frac{x^2-9}{x+3} & \text{if } x\ne -3\\ -6 & \text{if } x=-3\end{cases}$ is continuous at $x=-3$ |
|---|---|
| (a) True | (b) False |

| (7) | $\lim_{x\to\infty}\frac{\sqrt{9x^2+1}}{3x}=$ | | |
|---|---|---|---|
| (a) -4 | (b) 4 | (c) 3 | (d) 1 |

| | | | | |
|---|---|---|---|---|
| (8) | $\lim_{x\to\infty} \frac{1-x-2x^2}{x^2-7} =$ | | | |
| | (a) -4 | (b) 4 | (c) -2 | (d) 2 |

| | | | | |
|---|---|---|---|---|
| (9) | The vertical asymptotes of the graph of the function $y = \frac{2x^2+x-1}{x^2+x-2}$ are | | | |
| | (a) $x=2$ | (b) $x=1, x=-2$ | (c) $y=2$ | (d) $y=1, y=-2$ |

| | | | | |
|---|---|---|---|---|
| (10) | The horizontal asymptote of the graph of the function $y = \frac{2x^2+x-1}{x^2+x-2}$ is | | | |
| | (a) $x=2$ | (b) $x=1, x=-2$ | (c) $y=2$ | (d) $y=1, y=-2$ |

| | | |
|---|---|---|
| (11) | Any rational function is continuous on $\mathbb{R} = (-\infty, \infty)$. | |
| | (a) True | (b) False |

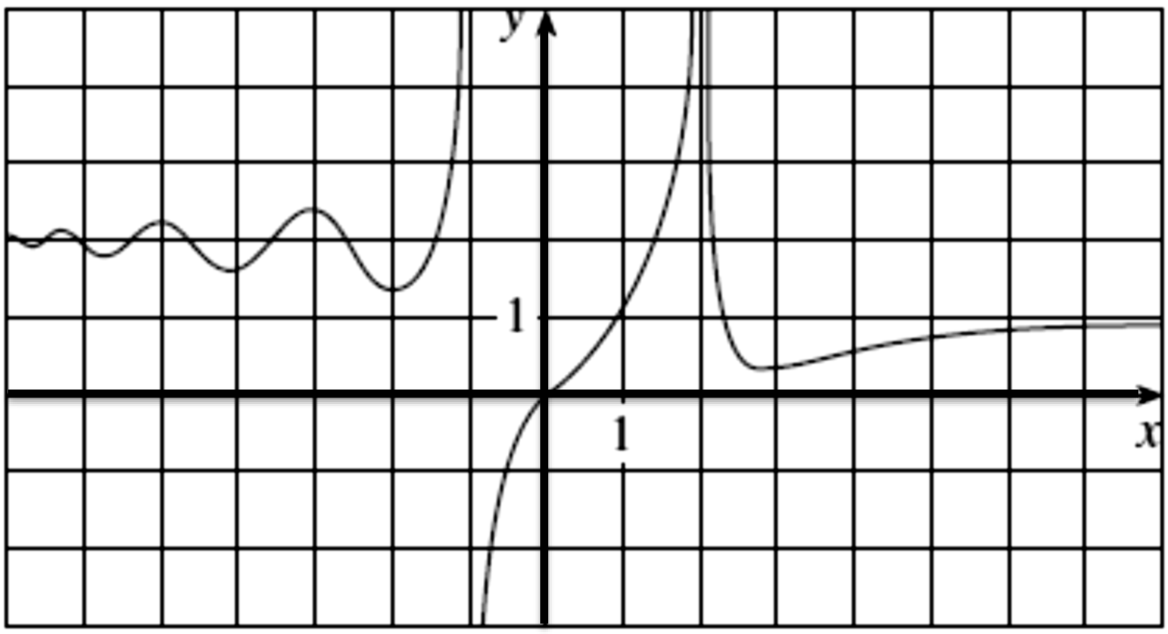
| | | |
|---|---|---|
| (12) | If $f$ and $g$ are continuous at $a$, then $\frac{f}{g}$ is also continuous at $a$. | |
| | (a) True | (b) False |

| | | | | |
|---|---|---|---|---|
| (13) | $f(x) = \begin{cases} x & \text{if } x \neq 1 \\ -3 & \text{if } x = 1 \end{cases}$, then $\lim_{x\to 1^-} f(x) =$ | | | |
| | (a) 0 | (b) 1 | (c) -1 | (d) Does not exist |

| | | | | |
|---|---|---|---|---|
| (14) | If $\lim_{x\to 2} \frac{g(x)+3}{x} = -3$, then $\lim_{x\to 2} g(x) =$ | | | |
| | (a) 0 | (b) 3 | (c) -3 | (d) -9 |

| | | | | |
|---|---|---|---|---|
| (15) | The function $f(x) = x^2 + \sqrt{2x-6}$ is continuous on | | | |
| | (a) $(0,3)\cup(3,\infty)$ | (b) $(3,\infty)$ | (c) $[3,\infty)$ | (d) $(-\infty,\infty)$ |

**In [16-20] consider the following graph of the function $f(x)$ then**




| | |
|---|---|
| (16) | $\lim_{x \to -1^+} f(x) =$ |
| | (a) $-\infty$ \| (b) 0 \| (c) 4 \| (d) $\infty$ |

| | |
|---|---|
| (17) | $\lim_{x \to -1^-} f(x) =$ |
| | (a) $-\infty$ \| (b) 0 \| (c) 4 \| (d) $\infty$ |

| | |
|---|---|
| (18) | The function $f$ is continuous at $x = 2$. |
| | (a) True \| (b) False |

| | |
|---|---|
| (19) | The vertical asymptotes of the function $f$ are: |
| | (a) $y=-2,\ y=-1$ \| (b) $x=-1,\ x=2$ \| (c) $y=1,\ y=2$ \| (d) $x=1,\ x=-2$ |

| | |
|---|---|
| (20) | The horizontal asymptotes of the function $f$ are: |
| | (a) $y=-2,\ y=-1$ \| (b) $x=-1,\ x=2$ \| (c) $y=1,\ y=2$ \| (d) $x=1,\ x=-2$ |

| | |
|---|---|
| (21) | $\lim_{x \to \infty} \left( \sqrt{x^2+1} - x \right) =$ |
| | (a) 4 \| (b) 0 \| (c) 2 \| (d) Does not exist |

| (22) | If $y=(2x^3+2)(5x^2-3)$, then $y'=$ | | | |
|---|---|---|---|---|
| | (a) $60x^3$ | (b) $50x^4-18x^2+20x$ | (c) $50x^4-18x^2$ | (d) $4x^3-3x^2+6x$ |

| (23) | If $f(x)=(x-1)e^x$, then $f''(x)=$ | | | |
|---|---|---|---|---|
| | (a) $xe^x$ | (b) $e^x(x-1)$ | (c) $e^x(x+1)$ | (d) $e^x$ |

| (24) | If $y=e^2$ the $y'=$ | | | |
|---|---|---|---|---|
| | (a) $e$ | (b) $2e$ | (c) $0$ | (d) $e^2$ |

| (25) | An equation of the tangent line to the curve $y=\sqrt[4]{x}$ at the point $(1,1)$ is | | | |
|---|---|---|---|---|
| | (a) $4y-x=3$ | (b) $4y+x=3$ | (c) $y-4x=5$ | (d) $y+4x=5$ |

| (26) | If $f$ is a differentiable function at $a$, then $f$ is a continuous function at $a$. | |
|---|---|---|
| | (a) True | (b) False |

| (27) | $\lim_{\theta\to 0}\frac{\cos\theta-1}{\theta}=1$ | |
|---|---|---|
| | (a) True | (b) False |

| (28) | $\lim_{x\to\infty} e^x =$ | | | |
|---|---|---|---|---|
| | (a) 1 | (b) 0 | (c) $-\infty$ | (d) $\infty$ |

| (29) | If $f(x)$ is a differentiable function, then $f'(x)=$ | |
|---|---|---|
| | (a) $\lim_{h\to 0}\frac{f(x+h)+f(x)}{h}$ | (b) $\lim_{h\to 0}\frac{f(x)-f(x+h)}{h}$ |
| | (c) $\lim_{h\to\infty}\frac{f(x+h)-f(x)}{h}$ | (d) $\lim_{h\to 0}\frac{f(x+h)-f(x)}{h}$ |

| (30) | If $y=\frac{x}{e^x}$, the $y'=$ | | | |
|---|---|---|---|---|
| | (a) $\frac{1+x}{e^x}$ | (b) $\frac{1+x}{e^{2x}}$ | (c) $\frac{1-x}{e^x}$ | (d) $\frac{1-x}{e^{2x}}$ |