University of Jeddah
Faculty of Science
Department of Mathematics

B

Course Code: MATH 101
Academic Year: 1902 Exam: Final
Place: Khulais (Boys)

Exam Pages: 6
No. of Questions: 44
Exam Marks: 40
Exam Time: 120 Minutes

Student Name: ....

ID: ....

Calculator is **NOT** allowed.

(1) Solution of the following inequality $3x+2>8$ is

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

(2) Equation of the horizontal line that passes through the point $(-7,4)$ is

(a) $y=-7$
(b) $y=-4$
(c) $y=4$
(d) $y=7$

(3) Equation of the line with slope 2 and $y-$intercept 3 is

(a) $y+2x+3=0$
(b) $y-2x-3=0$
(c) $y+2x-3=0$
(d) $y-2x+3=0$

(4) Slope of the parallel line to $y=6x+5$ is

(a) 3
(b) 4
(c) 5
(d) 6

(5) Domain of the following function $f(x)=\dfrac{8}{(x+1)(x+2)}$ is

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

(6) $\sin^2(4x)+\cos^2(4x)=$

(a) 4
(b) 8
(c) 1
(d) 4x

(7) The odd function is

(a) symmetric about $x-$axis.
(b) symmetric about the origin
(c) symmetric about $y-$axis.
(d) non$-$symmetric.

(8) $\lim_{x \to 1}\left(x^3 - 2x^2 + 8\right) =$

(a) 4
(b) 6

(c) 7
(d) 8

(9) $\lim_{x \to \infty}\left(\frac{10x^2 + 3x - 1}{2x^3 + 7x^2 + 5}\right) =$

(a) 10
(b) 5

(c) 2
(d) 0

(10) $\lim_{x \to -\infty}\left(\sqrt{x^2 + 3} + 8x\right) =$

(a) 3
(b) ∞

(c) 8
(d) $-\infty$

(11) $\lim_{x \to 2^+}\left(\frac{\lfloor x \rfloor}{x}\right) =$

(a) 3
(b) 2

(c) 0
(d) 1

(12) The trigonometric function $\sin(2\theta)$ is continuous on the interval

(a) $\mathbb{R}$
(b) $\mathbb{R} - \{2\}$

(c) $\mathbb{R} - \{0\}$
(d) $\mathbb{R} - \{-2\}$

(13) The function $f(x) = \frac{x+3}{x-2}$ is continuous on the interval

(a) $\mathbb{R} - \{-2\}$
(b) $\mathbb{R} - \{2\}$

(c) $\mathbb{R} - \{-3\}$
(d) $\mathbb{R} - \{3\}$

(14) $\lim_{x \to 0}\left(\frac{\sin(5x)}{x}\right) =$

(a) 2
(b) 3

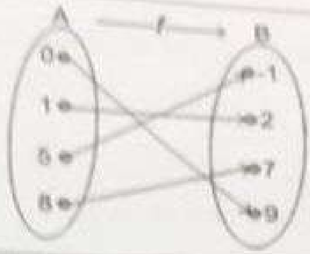
(c) 5
(d) 6

(15) If the function $f = \{(-1,-5),(0,2),(3,7),(6,11)\}$, then $f^{-1} =$

(a) $\{(-1,-5),(2,0),(7,3),(6,11)\}$
(b) $\{(-5,-1),(2,0),(3,7$

(c) $\{(-5,-1),(2,0),(7,3),(11,6)\}$
(d) $\{(-1,-5),(2,0),(7,$

(16) From the facing graph:
does an inverse function be available?



(a) Yes.

(b) No.

(17) The graph of $f^{-1}(x)$ is obtained by reflecting the graph of $f(x)$ about t

(a) $x=0$

(b) $y=0$

(c) $x=1$

(d) $y=x$

(18) If $f(x)=\sqrt{x-4}$, then its inverse function $f^{-1}(x)$ is given by

(a) $x+4$

(b) x^2+4

(c) $x-4$

(d) x^2-4

(19) $\sqrt[3]{x^{15}}=$

(a) x^3

(b) x^4

(c) x^5

(d) x^6

(20) Domain of the logarithmic function $\log_4 x$ is

(a) $(4,\infty)$

(b) $(0,\infty)$

(c) $(-\infty,4)$

(d) $(-\infty,0)$

(21) Range of the exponential function 4^x is

(a) $(4,\infty)$

(b) $(0,\infty)$

(c) $(-\infty,4)$

(d) $(-\infty,0)$

(22) $\log_5\left(5^{(x+1)}\right)=$

(a) $x+1$

(b) $x+5$

(c) $x-1$

(d) $x-5$

(23) $\log 25+\log 4+\log_6 1=$

(a) 3

(b) 2

(c) 6

(d) 5

(24) The solution's set of the following inequality $e^x \geq 7$ is

(a) $(\ln 7, \infty)$

(b) $(-\infty, \ln 7)$

(c) $[\ln 7, \infty)$

(d) $(-\infty, \ln 7]$

(25) If $\log_4 (x+2)^2 = 1$, then $x =$

(a) 1

(b) 2

(c) 3

(d) 4

(26) $\log_2 5 =$

(a) $\ln\left(\frac{5}{2}\right)$

(b) $\frac{\ln 5}{\ln 2}$

(c) $\ln 2$

(d) $2\ln 5$

(27) $\frac{d}{dx}\left(\ln\left(\pi^2\right)\right) =$

(a) π^2

(b) $2\ln(\pi)$

(c) $\frac{1}{\pi^2}$

(d) 0

(28) If $f(x) = 6^{\left(x^2+7x-8\right)}$, then $f'(x) =$

(a) $6^{(2x+7)}$

(b) $6^{\left(x^2+7x-8\right)}(2x+7)$

(c) $6^{\left(x^2+7x-8\right)}\ln(6)(2x+7)$

(d) $6^{\left(x^2+7x-8\right)}\ln(6)$

(29) If $f(x) = e^{(\sin x+2)}$, then $f'(x) =$

(a) $e^{(\sin x+2)}(\cos x)$

(b) $e^{(\cos x)}(\sin x)$

(c) $e^{(\sin x+2)}$

(d) $e^{(\cos x)}$

(30) If $y = e^{3x}\cot x$, then $y' =$

(a) $e^{3x}\left(\cot x - 3\csc^2 x\right)$

(b) $e^{3x}\left(3\cot x - \csc^2 x\right)$

(c) $e^{3x}\left(\tan x + 3\sec^2 x\right)$

(d) $e^{3x}\left(3\tan x + \sec^2 x\right)$

If $y = \ln(\cos x)^2$, then $y' =$

(a) $2\cot x$

(b) $-2\cot x$

(c) $2\tan x$

(d) $-2\tan x$

(32) If $y = \log_5(x^3+11)$, then $y' =$

(a) $\dfrac{3x^2}{(x^3+11)\ln 5}$

(b) $\dfrac{3x^2}{x^3+11}$

(c) $x^2(x^3+11)\ln 5$

(d) $3x^2(x^3+11)\ln 5$

(33) $\dfrac{d}{dx}(x^3+\sec x+7^x) =$

(a) $3x^2+\sec x\tan x$

(b) $3x^2+\sec x\tan x+7$

(c) $3x^2+\sec x\tan x+7^x$

(d) $3x^2+\sec x\tan x+7^x\ln 7$

(34) If $y = e^{3x}$, then $y^{(8)} =$

(a) $24e^{3x}$

(b) 3^8e^{3x}

(c) $8e^{3x}$

(d) e^{3x}

For the questions (35) to (44), consider the function $f(x)$ as follows:

$$f(x) = 2x^3 - 6x - 3$$

(35) The critical numbers of $f(x)$ are

(a) 0,1

(b) −1,0

(c) −1,1

(d) 1,2

(36) The local maximum value of $f(x)$ is

(a) 1

(b) 3

(c) 5

(d) 7

(37) The local minimum value of $f(x)$ is

(a) −1

(b) −3

(c) −5

(d) −7

(38) The absolute maximum value of $f(x)$ in $[-3, 3]$ is

(a) 35

(b) 33

(c) 39

(d) 37

(39) The absolute minimum value of $f(x)$ in $[-3, 3]$ is

(a) -33 (b) -35

(c) -37 (d) -39

(40) $f(x)$ is increasing on the interval

(a) $(-\infty, \infty)$ (b) $(-\infty, 0) \cup (1, \infty)$

(c) $(-\infty, -1) \cup (0, \infty)$ (d) $(-\infty, -1) \cup (1, \infty)$

(41) $f(x)$ is decreasing on the interval

(a) $(-4, 0)$ (b) $(-1, 1)$

(c) $(0, 4)$ (d) $[-1, 1] - \{0\}$

(42) The graph of $f(x)$ is concave upward on the interval

(a) $(-\infty, 0)$ (b) $(-\infty, -1)$

(c) $(0, \infty)$ (d) $(1, \infty)$

(43) The graph of $f(x)$ is concave downward on the interval

(a) $(-\infty, 0)$ (b) $(-\infty, -1)$

(c) $(0, \infty)$ (d) $(1, \infty)$

(44) $f(x)$ has an inflection point at

(a) $(0, -3)$ (b) $(0, 3)$

(c) $(0, -1)$ (d) $(0, 1)$