WHEN A MAN RUNS ALONE IT IS CALLED RACE,BUT WHEN HE RUN WITH GOD IT IS CALLED GRACE.

MAT 112 PRACTICE QUESTIONS

(1) Find the derivative of $y=3x^2\sin x$ (a) $2x(x\cos x+2\sin x)$ (b) $6x(x\cos x + 2\sin x)$ **(c) $3x(x\cos x+2\sin x)$** (d) $6x(x\sin x + 2\cos x)$

(2) Find the value of $\frac{\partial y}{\partial x}$ of the equation $3(x^2+y^2)^2$ $100xy$ at point (3,1) (a) -9/13 **(b) 13/9** (c) 9/13 (d) -13/9

(3) Find the derivative of $y= x^2\sqrt{1-x^2}$ (a) $\frac{2x(3-2x^2)}{1-x^2}$ (b) $\frac{3x(2x-4x^2)}{\sqrt{1-x^2}}$ **(c) $\frac{x(2-3x^2)}{\sqrt{1-x^2}}$** (d) $\frac{x(2+3x^2)}{\sqrt{1-x^2}}$

(4) Find the derivative of $y= \sin^3 4t$. (a) $-12\sin^2 4t\cos t$ (b) $3\cos 4t\sin 4t$ **(c) $12\sin^2 4t\cos 4t$** (d) $-3\cos 4t\sin 4t$

(5) If d^2y/dx^2 is greater than zero, we have a point **(a) minimum** (b)maximum (c)infinite (d)zero

(6) if $y =5x+3$, find y^{-1}(inverse of y) (a)$\frac{3-x}{5}$ (b)$\frac{1}{5x+3}$ **(c)$\frac{x-3}{5}$** (d)$\frac{5x-3}{2}$

(7) Integration is the _____ of differentiation (a)power **(b)inverse** (c)opposite (d)factor

(8) The formular of integration by part was derived to be? (a) $\int udv = \int vdu - uv$ (b) $\int udv = uv + \int vdu$ **(c)$\int udv = uv - \int vdu$** (d)$\int vdu = uv - \int udv$

(9)$\int_0^1 x(x^2+1)^3 dx$ (a)-8/15 (b)15/7 (c)-15/8 **(d)15/8**

(10) $\int \sin^2 3x\cos 3x\,dx$ (a)-1/3sin²3x(3sin3x)+c   **(b)1/9sin³3x+c**   (c)-1/9sin³3x+c (d)2cos3xsin3x+c

(1)Y =tan x , $\frac{dy}{dx}$=?(a)$\tan^2 x$(b)$\sin^2 x$ (c)$-\sec x$**(d)$\sec^2 x$**

(2) $\lim_{x\to 3}\frac{x^2-9}{x-3}$ (a)infinity (b) o (c) 3 (d) 6

((3)Differentiate $x\sin x\cos x$ $(a)x\cos x - \sin x$ $(b)\cos x - \sin x$ $(c)\boldsymbol{x\cos x}$ $(d)x\cos + 2\sin x$

(4)The gradient of the curve
$4x^2+2x + 3$ at $x = -2$ is $(a)\,15\ (b)-15\ (c)-14\ (d)$none of the above

(5)$\int {}^1/_x\,dx$ is $(a)-x+c\ (b)-{}^1/_{x^2}\ (c)\boldsymbol{in x}+c\ (d)x^2+c$

(6)find $\frac{dy}{dx}$ if $y = \frac{x^2}{2x+1}$ $(a)\frac{2x(x+1)}{(2x+1)}$ $(b)\frac{4x(x+1)}{(2x+1)^2}$ $(c)\frac{6x^2+2x}{(2x+1)^2}$ $(d)\frac{2x(x+1)}{(2x+1)^2}$

(7)differentiate y
$$= (2x^2 + 3x - 1)^3\ (a)3(2x^2 + 3x - 1)^2\ (b)12x + 9\ (c)\boldsymbol{(2x^2 + 3x - 1)^2(12x +9)}\ (d)$$
$$- 3(2x^2 + 3 - 1)^2(4x + 3)$$

(8)find $\dfrac{dy}{dx}$ if $= \sin^2(x^2 + 1)(a)\boldsymbol{4x\sin(x^2 + 1)}(b)\,2\sin(x^2 + 1)(c)\,(2x + 1)\cos^2(x^2 + 1)(d)$no answer

(9 differentiate $y = \cos x$ $(a)\frac{1}{\sqrt{1-x^2}}$ $(b)\frac{-1}{\sqrt{1-x^2}}$ $(c)\frac{1}{1-x^2}$ $(d)\frac{-1}{1-x^2}$

(10)find $\frac{dy}{dx}$ if $y = \sin^{-1}4x$ $(a)\frac{1}{\sqrt{1-16x^2}}$ $(b)\frac{-1}{\sqrt{1-16x^2}}$ $(c)\frac{4}{\sqrt{1-16x^2}}$ $(d)\frac{-4}{1-16x^2}$

(11)
what is the equation of the curve of gradient $8x + 2$ at point $(1, -2)$? $(a)\,8x^2 + 2x + 8\ (b)\,4x^2 - 2x - 8\ (c)\,2x^2 + 2x + 8\ (d)\,\boldsymbol{2x^2 + x - 4}$

(12)$\lim_{x\to 0}\frac{\sin x}{x}$ is (a)infinity $(b)\boldsymbol{1}\ (c)-1\ (d)$zero

(13) $\lim_{x\to 0}\frac{\cos x}{x}$ is (a)infinity $(b)\,1\ (c)-1\ (d)\boldsymbol{zero}$

(14) $\lim_{x\to 3} e^{3x}$ is $(a)\,e^6\ (b)3e^9\ \boldsymbol{(c)\ e^9}\ (d)\ e^9$

(15) $\lim_{x\to\infty}\frac{4x^4 +3x^3 +9x^2 +2}{3x^4}$ is (a)infinity (b) zero (c) $(d)\ {}^4/_3$

(16) $\lim_{x \to -1}\left(\frac{x^2+2x+1}{x^2+3x+2}\right)$ (a)$infinity$ (b)$zero$ (c)1 (d)-1

(17) $\lim_{x \to \frac{\pi}{4}}(3x - \tan x)$ (a)$1 - \frac{3\pi}{4}$ (b)$\frac{3\pi}{4} - 1$ (c)$\tan\frac{\pi}{4} - \frac{3\pi}{4}$ (d)$no\ answer$

(18)
$\int \frac{7x+8}{2x^2+11x+5}dx$ (a)$(x+5)\ln(3+x)+c$ (b)$3\ln(x+5)+\frac{1}{2}\ln(2x+1)+c$ (c)$no\ answer$ (d)$3\ln(7x+8)+\frac{1}{2}\ln(2x+1)+c$

(19)$\int (3x+2)^4 dx$ (a)$4(3x+2)^3+c$ (b)$12(3x+2)^3+c$ (c)$\frac{(3x+2)^5}{15}+c$ (d)$no\ answer$

(20)$\int \sin^2 x\, dx$ (a)$\frac{1}{2} - cosx + c$ (b)$2sin^2xcosx + c$ (c)$sinx + x + c$ (d)$no\ answer$

(21)
$differentiate\ x^3\cos x$ (a)$3x^2\cos x - x^3\sin x$ (b)$3x^2\sin x + x^3\cos x$ (c)$3x^2\cos x + x\sin x$ (d)$3x^2\sin x - x^3\cos x$

(22)$find\ the\ derivative\ of\ \log(\sin x^2)\ with\ respect\ to\ x$ (a)$\frac{2}{x}\cos x^2$ (b)$2x\cot x^2$ (c)$\frac{2}{x}(\log_8 \cos x^2)$

(d)$2x\log(\cos x^2)$

(23)$evaluate\ \lim_{x\to 3}\frac{x^5-243}{x^2-9}$ (a)0 (b)1 (c)2 **(d)infinity**

(24)integrate$\frac{\cos x}{5+\sin x}$ (a)$\ln(3+\sin x)+c$ (b)$\frac{5}{(5+\sin x)^2}+c$ (c)$\ln(5+\sin x)+c$ (d)$\frac{1}{5}\ln(5+\cos x)+c$

(25)$\lim_{x\to 1}\frac{\ln x}{x-1}$ (a)1 (b)o (c)∞ (d)$\frac{1}{2}$

(26)Evaluate $\int_0^\infty e^{-4x}\,dx$ (a)$\frac{1}{2}$ (b)$\frac{1}{4}$ (c)$\frac{-1}{2}$ (d)$\frac{-1}{4}$

(27) $find\ \int \frac{1}{\sqrt{25-9x^2}}dx$ (a)$\frac{1}{3}\sin^{-1}\left(\frac{3x}{5}\right)$ (b)$\frac{1}{5}\sin^{-1}\left(\frac{3x}{5}\right)$ (c)$\frac{1}{3}\cos^{-1}\left(\frac{3x}{5}\right)$ (d)$\frac{1}{15}\sin^{-1}(\frac{3x}{5})$

(28) $y = t^3 sint+\cos 3t$ $x = 2t - cost\ find\ \frac{dy}{dx}$ (a)$\frac{t^3\cos t+3t^2-3\sin 3t}{2+\sin t}$ (b)$\frac{t^2\cos t-3t^2\sin t+3\cos 3t}{2+\sin t}$

(29)$if\ \frac{d^2y}{dx^2}<0,\ldots\ldots\ldots point\ occur.$ (a)$minimum$ (b)$maximum$ (c)$dorminant$ (d)$mini-maximum$

(30)$if\ x^2+y^2=\sin x\ find\ \frac{dy}{dx}\ at point\ (0,2)$ (a)$\frac{-1}{4}$ (b)$\frac{1}{4}$ (c)4 (d)-4

(31)$find\ \frac{dy}{dx}\ when\ x^2y+y^2=\sin x\ at\ point\ (0,3)$ (a)$\frac{1}{8}$ (b)$\frac{-1}{8}$ (c)$\frac{1}{6}$ (d)$\frac{-1}{6}$

(32)

determine the value of $\frac{d^2y}{dx^2}$ at the stationary point of the equation $y = x^3 + 2x^2 + x + 3$ (a) -6 (b) 4 (c) -4 (d) 6

(33)

find the area of the region under the line $y = 2x + 1$ over the interval $1 \le x \le 3$ (a) -12 (b) 11 (c) 9 (d) 10

(34) reduction formular is derived from ……………….. (a) differentiation

(b) integration by part (c) quocient rule (d) explicit rule

(35) find the area of the curve $y = \cos x$ between $x = 0$ and $x = {}^{\pi}/_2$ (a)1 (b)-1 (c)2 **(d)$\frac{1}{2}$**

(36)

find the volume generated when the plane figure bounded by $y = 5\cos 2x$, the x − axis and ordinate at $x = 0$ and $x = \frac{\pi}{4}$, rotates about the x − axis through a complete revolution. (a) $\frac{8\pi^2}{25}$ (b) $\frac{25}{8}\pi^2$ (c) $\frac{27}{8}\pi^3$ (d) $\frac{8}{27}\pi^2$

(37) if $y = \frac{u}{v}$, $\frac{dy}{dx}$ with respect to u, v is given as: (a) $u\frac{dv}{dx} - v\frac{du}{dv}$ (b) $v\frac{du}{dx} - u\frac{dv}{dx}$ © $\frac{v\frac{du}{dx} - u\frac{dv}{dx}}{v^2}$ (d) $\frac{u\frac{dv}{dx}}{v^2}$

(38) if $y = \sin p$, $\frac{d^2y}{dp^2}$ is ? (a) $\sin^2 p$ **(b) $-\sin p$** (c) $\cos p$ (d) $-\cos p$

(39) if if $y = \sin^{-1} 4x$, $\frac{dy}{dx}$ is ? (a) $\frac{4}{\sqrt{1-4x^2}}$ (b) $\frac{-4}{\sqrt{1+4x^2}}$ (c) $\frac{4}{\sqrt{1-16x^2}}$ (d) $\frac{4}{\sqrt{1+16x}}$

(40) $\int x^4 dx$ (a) $4x^3 + c$ (b) $\frac{4x^5}{5}$ +c **(c) $\frac{x^5}{5}$ +c** (d) $\frac{5x^4}{4}$