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☐	Question Type	Question	A	B
☐	MCQ	Expand $$\sinh x$$ by using Maclaurin series	$x+\frac{x^3}{3!}+\frac{x^5}{5!}+\frac{x^7}{7!}+\cdots$	$1+x+\frac{x^2}{2!}+\frac{x^2}{2!}+\frac{x^3}{3!}+\cdots$
☐	MCQ	Expand $$\cos x$$ by using Maclaurin series	$1+x+\frac{x^2}{2!}+\frac{x^2}{2!}+\frac{x^3}{3!}+\cdots$	$1-x-\frac{x^2}{2!}-\frac{x^2}{2!}-\frac{x^3}{3!}-\cdots$
☐	MCQ	Give the first few terms of $$\sin x$$ using Maclaurin series	$x+\frac{x^3}{3!}+\frac{x^5}{5!}+\frac{x^7}{7!}+\cdots$	$1+x+\frac{x^2}{2!}+\frac{x^2}{2!}+\frac{x^3}{3!}+\cdots$
☐	MCQ	The product of $$e^{2x}$$ and $$e^{-x}$$ can be written as ________________	$1+x+\frac{x^2}{2!}+\frac{x^2}{2!}+\frac{x^3}{3!}+\cdots$	$1-x-\frac{x^2}{2!}-\frac{x^2}{2!}+-fracx^33!-\cdots$
☐	MCQ	Find limit $$\lim_{(x,y,z)\to(1,2,5)}\sqrt{(x+y+z)}$$	2	3
		Evaluate the $\frac{d^3f}{dx^3}$ $f(x) = \sin(x)\cos(x)$	$\frac{d^3f}{dx} = -4(\cos^2(x) - \sin^2(x))$	
		Find the value of in open interval (a, b) such that $f(x) = x(x^2 - x - 2)$, [-1, 1]	$c = \frac{-1}{3}$	
		Let $f(x) = x^4 - 2x^2$, . Find the all c where c is the interception on the x-axis) in the interval (-2, 2) such that $f'(x) = 0$. . (Hint use Rolle's theorem)	(-1, 0, 1)	
☐	MCQ	Find the limit of $$\lim_{(x,y)\to(2,4)}\frac{x+y}{x-y}$$	1	2
		For $g(x) = \frac{x-4}{x-3}$ we can use the mean value theorem on [4, 6], Hence determine c	$c = 3 \pm \sqrt{(3)}$	

☐	MCQ	Find the limit of $\lim_{(x,y)\to(2,1)} x+3y^2$	4	5
☐	MCQ	The gradient of the tangent at any point (x,y) of the conic $f(x, y) = ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$	$\frac{dy}{dx} = -\frac{2ax+2hy+2g}{2by+2hx+2f}$	$\frac{dy}{dx} = \frac{2ax+2hy+2g}{2by+2hx+2f}$
		Given $f(x) = 3x(x - 1)^5$.. Compute $f'''(x)$	$f'''(x) = 180(x - 1)^2(2x - 1)$	
		Let $f(x) = x^4 - 2x^2$.. Find the all c (where c is the interception on the x-axis) in the interval (-2, 2) such that $f'(x) = 0$. (Hint use Rolle's theorem)	(-1, 0, 1)	
		Compute the first thrre derivatives of $f(x) = 2x^5 + x^{\frac{3}{2}} - \frac{1}{2x}$	$f'(x)=10x^{4}-\frac{3}{2}x^{\frac{1}{2}}+\frac{1}{2x^{2}}, 40x^{3}-\frac{3}{4}x^{-\frac{1}{2}}- \frac{1}{x^{3}}, 120x^{2}-\frac{3}{8}x^{-\frac{3}{2}}+ \frac{3}{x^{4}}$	
		Find the two x-intercept of $f(x) = x^2 - 3x + 2$	x= 1, 2	
		Find limit $\lim_{(x,y,z)\to(1,2,5)} \sqrt{(x + y + z)}$	$2\sqrt{(2)}$	
☐	MCQ	Given the function $f(x, y) = \tan^{-1}\frac{y}{x}$, find f_{yy}	$f_{xy} = -\frac{2xy}{(x^2 - y^2)^2}$	$f_{xy} = -\frac{2xy}{(x^2 + y^2)^2}$
		Expand $\cos x$ by using Maclaurin series	$1-\frac{x^{2}}{2!}+\frac{2x^{4}}{4!}-\frac{6x^{6}}{6!}+\cdots$	
		Find the limit **of** $\lim_{(x, y)\rightarrow (2, 1)} x+3y^{2}$	5	
		Use Leibnitz theorem to find the second derivative of $\cos x \sin 2x$	$2 \sin x(2 - 9 \cos^2 x)$	

		Find the first partial derivative of the functon $f(x,y)=2x^{3}y^{2}+y^{3}$	$\frac{\partial f}{\partial x}=6x^{2}y^{2}, \frac{\partial f}{\partial y}=4x^{3}y+y^{2}$		
		Find the total differential of the function $f(x,y)=x^{2}+3xy$ wth respect to x, given that $y=sin^{-1} x$.	$2x+3sin^{-1} x+\frac{3x}{(1-x^{2}}^{\frac{1}{2}}$		

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☐	MCQ	Given the function $$f(x, y) = \tan^{-1}\frac{y}{x}$$, find $$f_{xy}$$	$$f_{xy} = -\frac{2xy}{(x^2 - y^2)^2}$$	$$f_{xy} = -\frac{2xy}{(x^2 + y^2)^2}$$
☐	MCQ	If \[f(u)=\sin u\] and \[u=\sqrt(x^{2}+y^{2}\], then find \[f_{x}\]	\[f_{x}=\frac{x\cos \sqrt(x^{2}+y^{2})}{\sqrt(x^{2}+y^{2})}\]	\[f_{x}=\frac{x\cos \sqrt(x^{2}-y^{3})}{\sqrt(x^{2}-y^{2})}\]
☐	MCQ	If the function \[f(x,y)=\tan^{-1} \frac{y}{x}\], find \[f_{y}\]	\[f_{x}=\frac{x}{x^{2}-y^{2}}\]	\[f_{x}=\frac{y}{x^{2}+y^{2}}\]
☐	MCQ	If the function \[f(x,y)=\tan^{-1} \frac{y}{x}\], find \[f_{x}\]	\[f_{x}=\frac{x}{x^{2}-y^{2}}\]	\[f_{x}=\frac{y}{x^{2}+y^{2}}\]
☐	MCQ	Given that \[f(x,y)=\sin^{2} x\cos y+\frac{x}{y^{2}}\], find \[f_{y}\]	\[f_{y}=\sin^{2}x\sin y-\frac{x}{y^{2}}\]	\[f_{y}=-2\sin^{2} x\sin y-\frac{2x}{y^{3}}\]
☐	MCQ	Given that \[f(x,y)=\sin^{2} x\cos y+\frac{x}{y^{2}}\], find \[f_{x}\]	\[f_{x}=2\sin x\cos x\cos y+\frac{1}{y^{2}}\]	\[f_{x}=-2\sin x\cos x\cos y-\frac{1}{y^{2}}\]
☐	MCQ	Find the total differential of the function \[f(x,y)=x^{2}+3xy\] wth respect to x, given that \[y=sin^{-1} x\].	\[x+2sin^{-1} x+\frac{x}{2-2x^{2}}^{\frac{1}{2}}\]	\[2x+3sin^{-1} x+\frac{3x}{(1-x^{2}}^{\frac{1}{2}}\]
☐	MCQ	Find the total differential of the function \[f(x,y)=y e^{x+y}\]	\[d f=[y e^{x+y}]dx+[(1+y)e^{x+y}]dy\]	\[d f=[y e^{x+y}]dx-[(1+y)e^{x+y}]dy\]
☐	MCQ	Evaluate the second partial derivative of the functon \[f(x,y)=2x^{3}y^{2}+y^{3}\]	\[\frac{\partial^{2}f}{\partial x^{2}}=12xy, \frac{\partial^{2} f}{\partial y^{2}}=x^{3}+y, \frac{\partial^{2} f}{\partial x\partial y}=2x^{2}y \]	\[\frac{\partial^{2}f}{\partial x^{2}}=12x^{2}y^{2}, \frac{\partial^{2} f}{\partial y^{2}}=4x+6y, \frac{\partial^{2} f}{\partial x\partial y}=10x^{2}y \]
☐	MCQ	Find the first partial derivative of the functon \[f(x,y)=2x^{3}y^{2}+y^{3}\]	\[\frac{\partial f}{\partial x}=6x^{2}y^{2}, \frac{\partial f}{\partial y}=4x^{3}y+y^{2}\]	\[\frac{\partial f}{\partial x}=6x^{3}y^{3}, \frac{\partial f}{\partial y}=4x^{4}y+y^{2}\]
☐	MCQ	Evaluate the stationary points of the function \[f(x,y)=xy\left(x^{2}+y^{2}-1\right)\]	\[c=3\pm \sqrt(3)\]	\[(0,0), (0,0), (0, 0), \pm \left(0, \frac{1}{2}\right), \pm \left(0, -\frac{1}{2}\right)\]
☐	MCQ	Use Leibnitz theorem to evaluate the fourth derivative of \[\left(2x^{3}+3x^{2}+x+2\right)e^{2x}\]	\[16\left(2x^{3}+15x^{2}+31x+19\right)e^{2x}\]	\[8\left(x^{2}+5x^{2}+3x+14\right)e^{2x}\]
☐	MCQ	Compute the third derivative of \[\sin x ln x\] using Leibnitz theorem	\[(2x^{-2}-3x^{-2})\cos x-(3x^{-3}+ln 2x) \sin x\]	\[(x^{-3}-x^{-2})\cos x-(x^{-2}+ln x) \cos x\]
☐	MCQ	Use Leibnitz theorem to find the second derivative of \[\cos x \sin 2x\]	\[2 \sin x (2-9\cos^{2} x)\]	\[2 \sin x (1-5\cos^{3} x)\]
☐	MCQ	Compute the n-th differential coefficient of \[y=x\log_{e}x\]	\[(-1)^{n-2}\frac{(n+2)!}{x^{n+1}}\left(n^{3}+2\right)\]	\[(-1)^{n-2}\frac{(n-2)!}{x^{n-1}}\left(n^{3}-2\right)\]
☐	MCQ	Obtain the n-th differential coefficient of \[y=(x^{2}+1)e^{2x}\]	\[2^{n-3}e^{4x}(x^{2x}+nx+n^{3}-n+4)\]	\[2^{n-2}e^{2x}(4x^{3x}+5nx+n^{3}-n+4)\]
☐	MCQ	Expand the function \[f(x)=e^{3x}\] about x=0 using Maclaurin's series	\[e^{3x}=1+3x+\frac{(3x)^{2}}{2!}+\frac{(3x)^{3}}{3!}+\cdots+\frac{(3x)^{n}}{n!}\]	\[e^{3x}=1-3x-\frac{(3x)^{2}}{2!}-\frac{(3x)^{3}}{3!}-\cdots-\frac{(3x)^{n}}{n!}\]
☐	MCQ	Given \f(x)=3x(x-1)^{5}. Compute \[f'''(x)\]	\[2i-j\]	\[f'''(x)=80(2x-1)^{2}(x-1)\]
☐	MCQ	Evaluate the \[\frac{d ^{3}f}{d x^{3}}\] of \[f(x)= sin (x) cos (x)\]	\[\frac{d ^{3}f}{d x^{3}}=-4\left(cos^{2} (x)-sin^{2} (x)\right)\]	\[\frac{d ^{3}f}{d x^{3}}=-2\left(Cos^{2} (x)+sin^{2} (x)\right)\]

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☐	MCQ	Compute the first thrre derivatives of \[f(x)=2x^{5}+x^{\frac{3}{2}}-\frac{1}{2x}\]	\[f'(x)=10x^{3}-\frac{2}{2}x^{\frac{1}{2}}+ \frac{1}{2x^{2}}, 20x^{3}-\frac{3}{4}x^{-\frac{1}{2}}- \frac{1}{x^{3}}, 10x^{2}-\frac{1}{8}x^{-\frac{3}{2}}+ \frac{3}{x^{4}}\]	\[f'(x)=10x^{4}-\frac{3}{2}x^{\frac{1}{2}}+ \frac{1}{2x^{2}}, 40x^{3}-\frac{3}{4}x^{-\frac{1}{2}}- \frac{1}{x^{3}}, 120x^{2}-\frac{3}{8}x^{-\frac{3}{2}}+ \frac{3}{x^{4}}\]
☐	MCQ	For \[g(x)=\frac{x-4}{x-3}, we can use the mean value theorem on [4, 6], Hence determine \[c\]	\[c=3\pm \sqrt(3)\]	\[\sqrt (112) \]
☐	MCQ	Find the number \[c\] guaranteed by the mean value theorem for derivatives for \[f(x)=(x+1)^{3}, [-1, 1] \]	\[c=\frac{-\sqrt (3) \pm 2}{\sqrt(3)}\]	\[c=\frac{-\sqrt (2) \pm 1}{\sqrt(3)}\]
☐	MCQ	Determine whether the Rolle's theorem can be applied to \[f\] on the closed interval [a, b] . If can be applied, Find the values of \[c\] in open interval (a, b) such that \[f'(c) = 0\], \[f(x)=\frac{x^{2}-2x-3}{x+2}, [-1, 3]\]	\[c=-2\pm\sqrt(5)\]	\[c=-1\pm\sqrt(5)\]
☐	MCQ	Determine whether the mean value theorem can be applied to \[f\] on the closed interval [a, b] . If can be applied, Find the value of \[c\] in open interval (a, b) such that \[f(x)=x(x^{2}-x-2), [-1, 1]\]	\[c=\frac{-1}{2}\]	\[c=\frac{-1}{3}\]
☐	MCQ	Find the two x-intercept of \[f(x)=x^{2}-3x+2\]	x=1, 3	x=1, 1
☐	MCQ	Let \[f(x)=x^{4}-2x^{2}\]. Find the all \[c\] (where \[c\] is the interception on the x-axis) in the interval (-2, 2) such that \[f'(x)=0\]. (Hint use Rolle's theorem)	(-1, 0, 1)	(-1, 1, 1)

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