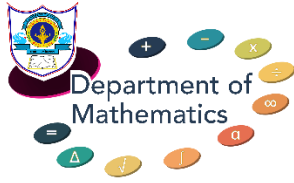


INDIAN SCHOOL AL WADI AL KABIR
Class XII, Applied Mathematics **Worksheet 1- Derivatives**
16-05-2021

MCQ

Q.1.	Derivative of 2^x with respect to x .						
A.	2^x	B.	$2^x \log 2$	C.	$x \log 2$	D.	$2^x(1+x)$
Q.2	If $\sqrt{x} + \sqrt{y} = \sqrt{a}$, then $\frac{dy}{dx}$						
A.	$-\frac{\sqrt{x}}{\sqrt{y}}$	B.	$\frac{\sqrt{x}}{\sqrt{y}}$	C.	$-\frac{\sqrt{y}}{\sqrt{x}}$	D.	$\frac{\sqrt{ax}}{\sqrt{y}}$
Q.3	if $y = \log(x + \sqrt{x^2 + a^2})$, then $\frac{dy}{dx}$						
A.	$\frac{x}{\sqrt{x^2 + a^2}}$	B.	$\frac{\log x}{\sqrt{x^2 + a^2}}$	C.	$\frac{2x}{\sqrt{x^2 + a^2}}$	D.	$\frac{1}{\sqrt{x^2 + a^2}}$
Q.4	if $y = \log(x)$, then $\frac{d^2y}{dx^2}$						
A.	$\frac{x}{\log x}$	B.	$\frac{\log x}{x}$	C.	$-\frac{1}{x^2}$	D.	$\frac{1}{x}$
Q.5	If $x = at^2, y = 3at^3$, then $\frac{dy}{dx}$ at $t = 1$.						
A.	9	B.	9a	C.	$\frac{9}{2}$	D.	$\frac{9}{2a}$
Short answer type (1 mark)							
Q.6.	If $x = t^2, y = t^3$, then find $\frac{d^2y}{dx^2}$.						
Q.7.	Differentiate $\log_7(\log x)$ with respect to x .						
Q.8	Differentiate with respect to $x: \sqrt{3x+2} + \frac{1}{\sqrt{2x^2+4}}$.						
Q.9	Differentiate with respect to $x: (3x^2 - 9x + 5)^9$.						

Q.10	Find the second order derivative of the function with respect to x: $x^3 \log x$.
Long answer type (3 Marks)	
Q.11	Find $\frac{dy}{dx}$, if $x^3 + y^3 + xy = 10$
Q.12	If $x\sqrt{1+y} + y\sqrt{1+x} = 0$, then prove: $\frac{dy}{dx} = -\frac{1}{(1+x)^2}$
Q.13	If $x^p y^q = (x+y)^{p+q}$, then prove: $\frac{dy}{dx} = \frac{y}{x}$ and $\frac{d^2y}{dx^2} = 0$
Q.14	Differentiate with respect to x: $x^{\log x} + (\log x)^x$
Q.15	Find $\frac{dy}{dx}$ if $x^y + y^x + x^x = a^b$
Q.16	If $x = e^{\frac{x}{y}}$, then prove: $\frac{dy}{dx} = \frac{x-y}{x \log x}$.
Q.17	If $y^x = e^{y-x}$, then prove: $\frac{dy}{dx} = \frac{(1 + \log y)^2}{\log y}$.
Q18.	If $y = Ae^{mx} + Be^{nx}$, show that $\frac{d^2y}{dx^2} - (m+n)\frac{dy}{dx} + mny = 0$
Q19.	If $y = 500e^{7x} + 600e^{-7x}$, show that $\frac{d^2y}{dx^2} = 49y$.
Q.20	If $e^y(x+1) = 1$, then show that $\frac{d^2y}{dx^2} = \left(\frac{dy}{dx}\right)^2$



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Answers

Answers	1	B		2	C	3.	D		4	C	
	5	C	6	$\frac{3}{4t}$	7	$\frac{1}{x \log 7 \cdot \log x}$		8	$\frac{3}{2\sqrt{3x+2}} - \frac{2x}{(2x^2+4)^{\frac{3}{2}}}$		
	9	$9(6x-9)(3x^2-9x+5)^8$			10.	$x(7+2\log x)$		11.	$-\frac{(3x^2+y)}{(3y^2+x)}$		
	14.	$x^{\log x - 1}(2\log x) + (\log x)^x \left(\frac{1}{\log x} + \log(\log x) \right)$									
	17	$-\left[\frac{y^x \log y + yx^{y-1} + x^x(1+\log x)}{x \cdot y^{x-1} + x^y \log x} \right]$									
