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.**	xlog2	**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* $y = log\left(x+\sqrt{x^2+a^2}\right)$, *then* $\frac{dy}{dx}$

	A.	$\frac{x}{\sqrt{x^2+a^2}}$	**B.**	$\frac{logx}{\sqrt{x^2+a^2}}$	**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.	$\frac{x}{logx}$	**B.**	$\frac{logx}{x}$	**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)

Q6. *If* $x = t^2, y = t^3$, *then find* $\frac{d^2y}{dx^2}$.

Q7. Differentiate $log_7(logx)$ *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	$Differentiate\ with\ respect\ to x:\ \ x^{logx} + (logx)^x$
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	$If y^x = e^{y-x}, then\ prove: \frac{dy}{dx} = \frac{(1+logy)^2}{logy}.$
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**	$\frac{1}{xlog7.logx}$	**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.**	$x(7+2logx)$	**11.**	$-\frac{(3x^2+y)}{(3y^2+x)}$

14.	$x^{logx-1}(2logx)+(logx)^x\left(\frac{1}{logx}+\log(logx)\right)$
17	$-\left[\frac{y^x logy+yx^{y-1}+x^x(1+logx)}{x.y^{x-1}+x^y logx}\right]$

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