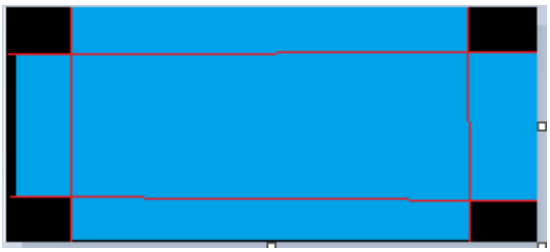
INDIAN SCHOOL AL WADI AL KABIR

Department of Mathematics, 2020-2021

Class XII **MATHEMATICS (041)** 26.10.2020

WORKSHEET- Application of derivatives

Q.1.	The curve $y = x^{\frac{1}{5}}$ *has* _____ tangent at (0, 0).							
	A	a vertical tangent	**B**	a parallel tangent	**C**	an oblique tangent	**D**	no tangent
Q.2.	The points at which the tangents to the curve $x^3 - 12x + 18$ are parallel to X axis are							
	A	(2, -2) and (-2, -34)	**B**	(2, 34), (-2, 0)	**C**	(0, 34), (-2, 0)	**D**	(2, 2) (-2, 34)
Q.3.	The interval on which the function $f(x) = 2x^3 + 9x^2 + 12x - 1$ *is decreasing is*							
	A	[-1, ∞)	**B**	[-2, 1]	**C**	$(-\infty, -2]$	**D**	[-2, -1]
Q.4.	The maximum value of sinx.cosx							
	A	$\frac{1}{4}$	**B**	$\frac{1}{2}$	**C**	$\sqrt{2}$	**D**	$2\sqrt{2}$
Q.5.	If x is real, the minimum value of $x^2 - 8x + 17$							
	A	0	**B**	1	**C**	-1	**D**	17
Q.6.	Which of the following functions is decreasing on $\left(0, \frac{\pi}{2}\right)$							
	A	Sin2x	**B**	tanx	**C**	cosx	**D**	cos3x
Q.7.	The cost function of a firm is $C = 3x^2 + 2x - 3$. Then the marginal cost , when x= 3							
	A	20	**B**	10	**C**	5	**D**	25

Q.8.	$If\ f(x) = x^x, then\ f\ has\ a\ stationary\ point\ at$						
	A	x= e	**B**	$x = \frac{1}{e}$	**C**	$x = 1$	**D**	$x = \sqrt{e}$
Q.9.	The equation of normal to the curve y = tanx at (0, 0)						
	A	$y = x$	**B**	x - y =1	**C**	$x + y = 0$	**D**	$x + y = 1$
Q10.	$If\ f(x) = \|sin3x + 2\|$, then the minimum and maximum values of the function f(x)						
	A	2 and 3	**B**	-1 and 1	**C**	1 and 5	**D**	1 and 3
	An open topped box is to be constructed by removing equal squares from each corner of a 3 m by 8 m rectangular sheet of aluminum and folding up the sides. 8m  3m Based on the above information answer the following: (Qn. 11 to 14)						
Q11.	Let x m be the length of a side of the removed squares. Then the dimensions of the box will be						
	A	$(8-x)m,$ $(3-x)m,\quad xm$	**B**	$(8+x)m,$ $(3-x)m, x\ m$	**C**	$(8-2x)m,$ $(3-2x)m, x\ m$	**D**	$(8-2x)m,$ $(3-2x)m, 2x\ m$
Q12.	If V(x) is the volume of the box , then v(x) =						
	A	$(8-2x)\ (3-2x)\ x$	**B**	$(8-x)\ (3-x)\ x$	**C**	$(8+x)\ (3+x)\ x$	**D**	$(8-2x)\ (3-2x)2x$
Q13.	The volume of the box will be maximum, when x =						
	A	$\frac{2}{3}m$	**B**	3m	**C**	1m	**D**	0.5m
Q14.	The maximum volume of the box						
	A	$200m^3$	**B**	$\frac{200}{7}m^3$	**C**	$\frac{100}{7}m^3$	**D**	$100m^3$

Q15.	Let f be a function defined on an interval I and c ∈ I. Let f be twice differentiable at c. Then x = c is a point of local maxima if f ′(c) = 0 and f ″(c) < 0							
	A	f ′(c) $>$ 0 and f ″(c) < 0	**B**	f ′(c) = 0 and f ″(c) $\leq$0	**C**	f ′(c) = 0 and f ″(c) $>$ 0	**D**	f ′(c) = 0 and f ″(c) < 0
ANSWER THE FOLLLOWING QUESTIONS (V. S. A. – 1mark each)								
Q16.	Prove that $f(x) = e^{2x}$ *is an increasing function on* R.							
Q17.	Find the slope of the normal to the curve $x = asint, y = acost$ *at* $t = \frac{\pi}{4}$.							
Q18	Find the point at which tangent to the curve $y = \sqrt{4x-3} - 1$ *has its slope* $\frac{2}{3}$.							
Q19.	Show that $f(x) = \frac{logx}{x}$ *has a maximum at* $x = e$.							
Q20.	Find the absolute maximum value of the function $f(x) = sinx + cosx, x \in [0, \pi]$.							

****

ANSWERS									
1.	A	**2.**	D	**3.**	D	**4.**	B	**5.**	B
6.	C	**7.**	A	**8.**	B	**9.**	C	**10.**	D
11.	C	**12.**	A	**13.**	A	**14.**	B	**15.**	D
17.	1	**18.**	(3, 2)	**20.**	$\sqrt{2}$				

&&&&&&&&&&&&&&&&&&