

By. Er. Dharmendra Sir

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DPM CLASSES

6th to 10th (Math's & Science), 11th & 12th (Physics, Chemistry, Math's)

TEST - PAPER (CBSE/NCERT)

APPLICATION OF DERIVATIVES

SESSION -2024-25

CLASS - 12th

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Time : 1 hr :- Application of Derivatives :- mm:

Q. 1. A Kite is moving horizontally at a height of 151.5 m. If the speed of Kite is 10 m/s, how fast is the string being let out, when the Kite is 250 m away from the boy who is flying the Kite, if the height of boy is 1.5 m?

Q. 2. Find the approximate value of $(1.999)^5$

Q. 3. The volumes of a cube increases at a constant rate. prove that the increase in its surface area varies inversely as the length of the side.

Q. 4. prove that the curves $xy = 4$ and $x^2 + y^2 = 8$ touch each other.

Q. 5. prove that the curves $y^2 = 4x$ and $x^2 + y^2 - 6x + 1 = 0$ touch each other at the point (1, 2)

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Q.6. Show that $f(x) = 2x + \cot^{-1}x + \log(\sqrt{1+x^2}-x)$ is increasing in \mathbb{R} .

Q.7. Show that for $a \geq 1$, $f(x) = \sqrt{3} \sin x - \cos x - 2ax + b$ is decreasing in \mathbb{R} .

Q.8. At what point, the slope of the curve

$$y = -x^3 + 3x^2 + 9x - 27$$

is maximum? also, find the maximum slope.

Q.9. If the straight line $x \cos \alpha + y \sin \alpha = p$ touches the curve $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ then prove

that $a^2 \cos^2 \alpha + b^2 \sin^2 \alpha = p^2$

Q.10. Find the dimensions of the rectangle of perimeter 36 cm which will sweep out a volume as large as possible, when revolved about one of its sides. Also, find the maximum volume.

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