

CLASS 12

MATHEMATICS

NCERT SOLUTIONS

NCERT Solutions for Class 12 Mathematics Chapter 6: Applications of Derivatives – Free PDF Download

Complete, verified solutions to the NCERT Class 12 Maths Chapter 6 (Applications of Derivatives) exercise questions. These Class 12 Mathematics Chapter 6 solutions are also useful as quick revision notes before exams.

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Complete, verified solutions to the NCERT Class 12 Maths Chapter 6 (Applications of Derivatives) exercise questions. These Class 12 Mathematics Chapter 6 solutions are also useful as quick revision notes before exams.

NCERT Exercise Solutions

6.1 Find the rate of change of the area of a circle with respect to its radius r when $r=3\text{cm}$ and $r=4\text{cm}$.

Ans: $A=\pi r^2$, $dA/dr=2\pi r$. At $r=3$: $dA/dr=6\pi \text{ cm}^2/\text{cm}$. At $r=4$: $dA/dr=8\pi \text{ cm}^2/\text{cm}$.

6.2 The volume of a cube is increasing at a rate of $8 \text{ cm}^3/\text{s}$. How fast is the surface area increasing when the length of an edge is 12cm ?

Ans: $V=x^3$, $dV/dt=3x^2(dx/dt)=8$, so at $x=12$: $dx/dt=8/(3 \times 144)=1/54 \text{ cm/s}$. $S=6x^2$, $dS/dt=12x(dx/dt)=12(12)(1/54)=144/54=8/3 \text{ cm}^2/\text{s}$.

6.3 A stone is dropped into a quiet lake and waves move in circles at a speed of 5 cm/s . At the instant when the radius of the circular wave is 8cm , how fast is the enclosed area increasing?

Ans: $dr/dt=5 \text{ cm/s}$. $A=\pi r^2$, $dA/dt=2\pi r(dr/dt)=2\pi(8)(5)=80\pi \text{ cm}^2/\text{s}$.

6.4 Find the intervals in which the function $f(x)=2x^3-3x^2-36x+7$ is (a) increasing (b) decreasing.

Ans: $f'(x)=6x^2-6x-36=6(x^2-x-6)=6(x-3)(x+2)$. $f'(x)=0$ at $x=-2, 3$. Testing sign in intervals: increasing on $(-\infty, -2) \cup (3, \infty)$, decreasing on $(-2, 3)$.

6.5 Find the maximum and minimum values, if any, of $f(x)=(2x-1)^2+3$.

Ans: $f'(x)=4(2x-1)=0 \Rightarrow x=1/2$. $f''(x)=8>0$, so $x=1/2$ is a minimum point. Minimum value = $f(1/2)=0+3=3$. No maximum (function $\rightarrow \infty$ as $x \rightarrow \pm \infty$).

Class 12 Mathematics Chapter 6 – Notes and Extra Questions

Along with these NCERT Solutions, students can also use the [Class 12 Mathematics Chapter 6 Extra Questions](#) and [Class 12 Mathematics Chapter 6 Revision Notes](#) for quick revision and extra practice.

See also: [Chapter 1](#) | [Chapter 2](#) | [Chapter 3](#) | [Chapter 4](#) | [Chapter 5](#)

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