

# NCERT/CBSE MATHEMATICS CLASS 12 textbook

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## MISCELLANEOUS EXERCISES

Answers to NCERT/CBSE MATH (Class XII) textbook

Chapter 7

INTEGRALS

$$3. \frac{1}{x\sqrt{ax-x^2}}$$

$$3. \text{Let } I = \int \frac{1}{x\sqrt{ax-x^2}} dx; \text{ Put } x = \frac{a}{t} \Rightarrow dx = -\frac{a}{t^2} dt$$

$$I = \int \frac{1}{\frac{a}{t} \sqrt{a \cdot \frac{a}{t} - \frac{a^2}{t^2}}} \left(-\frac{a}{t^2}\right) dt$$

$$I = -\frac{1}{t} \int \frac{1}{\sqrt{\frac{a^2}{t} - \frac{a^2}{t^2}}} dt$$

$$= -\frac{1}{t} \int \frac{1}{\frac{a}{t} \sqrt{t-1}} dt$$

$$= -\frac{1}{a} \int \frac{1}{\sqrt{t-1}} dt = -\frac{1}{a} \int (t-1)^{-\frac{1}{2}} dt$$

$$= -\frac{1}{a} \frac{(t-1)^{\frac{1}{2}}}{\frac{1}{2}} = -\frac{2}{a} (t-1)^{\frac{1}{2}}$$

$$= -\frac{2}{a} \sqrt{t-1} = -\frac{2}{a} \sqrt{\left(\frac{a}{x} - 1\right)} = -\frac{2}{a} \sqrt{\frac{a-x}{x}} + C$$

$$\left[ x = \frac{a}{t} \Rightarrow t = \frac{a}{x} \right]$$

Please do not copy the answer given here

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