



### Exercise 7.7 : Solutions of Questions on Page Number : 330

Q1 :  $\sqrt{4-x^2}$

Answer :

$$\text{Let } I = \int \sqrt{4-x^2} dx = \int \sqrt{(2)^2 - (x)^2} dx$$

$$\text{It is known that, } \int \sqrt{a^2 - x^2} dx = \frac{x}{2} \sqrt{a^2 - x^2} + \frac{a^2}{2} \sin^{-1} \frac{x}{a} + C$$

$$\begin{aligned} \therefore I &= \frac{x}{2} \sqrt{4-x^2} + \frac{4}{2} \sin^{-1} \frac{x}{2} + C \\ &= \frac{x}{2} \sqrt{4-x^2} + 2 \sin^{-1} \frac{x}{2} + C \end{aligned}$$

Answer needs Correction? [Click Here](#)

Q2 :  $\sqrt{1-4x^2}$

Answer :

$$\text{Let } I = \int \sqrt{1-4x^2} dx = \int \sqrt{(1)^2 - (2x)^2} dx$$

$$\text{Let } 2x = t \Rightarrow 2 dx = dt$$

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

$$\text{It is known that, } \int \sqrt{a^2 - x^2} dx = \frac{x}{2} \sqrt{a^2 - x^2} + \frac{a^2}{2} \sin^{-1} \frac{x}{a} + C$$

$$\begin{aligned} \Rightarrow I &= \frac{1}{2} \left[ \frac{t}{2} \sqrt{1-t^2} + \frac{1}{2} \sin^{-1} t \right] + C \\ &= \frac{t}{4} \sqrt{1-t^2} + \frac{1}{4} \sin^{-1} t + C \\ &= \frac{2x}{4} \sqrt{1-4x^2} + \frac{1}{4} \sin^{-1} 2x + C \\ &= \frac{x}{2} \sqrt{1-4x^2} + \frac{1}{4} \sin^{-1} 2x + C \end{aligned}$$

Answer needs Correction? [Click Here](#)

Q3 :  $\sqrt{x^2+4x+6}$

Answer :

$$\begin{aligned} \text{Let } I &= \int \sqrt{x^2+4x+6} dx \\ &= \int \sqrt{x^2+4x+4+2} dx \\ &= \int \sqrt{(x^2+4x+4)+2} dx \\ &= \int \sqrt{(x+2)^2 + (\sqrt{2})^2} dx \end{aligned}$$

$$\text{It is known that, } \int \sqrt{x^2+a^2} dx = \frac{x}{2} \sqrt{x^2+a^2} + \frac{a^2}{2} \log |x + \sqrt{x^2+a^2}| + C$$

$$\begin{aligned} \therefore I &= \frac{(x+2)}{2} \sqrt{x^2+4x+6} + \frac{2}{2} \log |(x+2) + \sqrt{x^2+4x+6}| + C \\ &= \frac{(x+2)}{2} \sqrt{x^2+4x+6} + \log |(x+2) + \sqrt{x^2+4x+6}| + C \end{aligned}$$

Answer needs Correction? [Click Here](#)

Q4 :  $\sqrt{x^2+4x+1}$

Answer :

$$\begin{aligned} \text{Let } I &= \int \sqrt{x^2+4x+1} dx \\ &= \int \sqrt{(x^2+4x+4)-3} dx \\ &= \int \sqrt{(x+2)^2 - (\sqrt{3})^2} dx \end{aligned}$$

$$\text{It is known that, } \int \sqrt{x^2-a^2} dx = \frac{x}{2} \sqrt{x^2-a^2} - \frac{a^2}{2} \log |x + \sqrt{x^2-a^2}| + C$$

$$\therefore I = \frac{(x+2)}{2} \sqrt{x^2+4x+1} - \frac{3}{2} \log \left| (x+2) + \sqrt{x^2+4x+1} \right| + C$$

Answer needs Correction? [Click Here](#)

Q5 :  $\sqrt{1-4x-x^2}$

Answer :

$$\begin{aligned} \text{Let } I &= \int \sqrt{1-4x-x^2} \, dx \\ &= \int \sqrt{1-(x^2+4x+4-4)} \, dx \\ &= \int \sqrt{1+4-(x+2)^2} \, dx \\ &= \int \sqrt{(\sqrt{5})^2 - (x+2)^2} \, dx \end{aligned}$$

$$\text{It is known that, } \int \sqrt{a^2 - x^2} \, dx = \frac{x}{2} \sqrt{a^2 - x^2} + \frac{a^2}{2} \sin^{-1} \frac{x}{a} + C$$

$$\therefore I = \frac{(x+2)}{2} \sqrt{1-4x-x^2} + \frac{5}{2} \sin^{-1} \left( \frac{x+2}{\sqrt{5}} \right) + C$$

Answer needs Correction? [Click Here](#)

Q6 :  $\sqrt{x^2+4x-5}$

Answer :

$$\begin{aligned} \text{Let } I &= \int \sqrt{x^2+4x-5} \, dx \\ &= \int \sqrt{(x^2+4x+4)-9} \, dx \\ &= \int \sqrt{(x+2)^2 - (3)^2} \, dx \end{aligned}$$

$$\text{It is known that, } \int \sqrt{x^2 - a^2} \, dx = \frac{x}{2} \sqrt{x^2 - a^2} - \frac{a^2}{2} \log \left| x + \sqrt{x^2 - a^2} \right| + C$$

$$\therefore I = \frac{(x+2)}{2} \sqrt{x^2+4x-5} - \frac{9}{2} \log \left| (x+2) + \sqrt{x^2+4x-5} \right| + C$$

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Q7 :  $\sqrt{1+3x-x^2}$

Answer :

$$\begin{aligned} \text{Let } I &= \int \sqrt{1+3x-x^2} \, dx \\ &= \int \sqrt{1-\left(x^2-3x+\frac{9}{4}-\frac{9}{4}\right)} \, dx \\ &= \int \sqrt{\left(1+\frac{9}{4}\right)-\left(x-\frac{3}{2}\right)^2} \, dx \\ &= \int \sqrt{\left(\frac{\sqrt{13}}{2}\right)^2 - \left(x-\frac{3}{2}\right)^2} \, dx \end{aligned}$$

$$\text{It is known that, } \int \sqrt{a^2 - x^2} \, dx = \frac{x}{2} \sqrt{a^2 - x^2} + \frac{a^2}{2} \sin^{-1} \frac{x}{a} + C$$

$$\begin{aligned} \therefore I &= \frac{x-\frac{3}{2}}{2} \sqrt{1+3x-x^2} + \frac{13}{4 \times 2} \sin^{-1} \left( \frac{x-\frac{3}{2}}{\frac{\sqrt{13}}{2}} \right) + C \\ &= \frac{2x-3}{4} \sqrt{1+3x-x^2} + \frac{13}{8} \sin^{-1} \left( \frac{2x-3}{\sqrt{13}} \right) + C \end{aligned}$$

Answer needs Correction? [Click Here](#)

Q8 :  $\sqrt{x^2+3x}$

Answer :

$$\begin{aligned} \text{Let } I &= \int \sqrt{x^2+3x} \, dx \\ &= \int \sqrt{x^2+3x+\frac{9}{4}-\frac{9}{4}} \, dx \\ &= \int \sqrt{\left(x+\frac{3}{2}\right)^2 - \left(\frac{3}{2}\right)^2} \, dx \end{aligned}$$

$$\text{It is known that, } \int \sqrt{x^2 - a^2} \, dx = \frac{x}{2} \sqrt{x^2 - a^2} - \frac{a^2}{2} \log \left| x + \sqrt{x^2 - a^2} \right| + C$$

$$\begin{aligned} \therefore I &= \frac{\left(x+\frac{3}{2}\right)}{2} \sqrt{x^2+3x} - \frac{9}{2} \log \left| \left(x+\frac{3}{2}\right) + \sqrt{x^2+3x} \right| + C \\ &= \frac{(2x+3)}{4} \sqrt{x^2+3x} - \frac{9}{8} \log \left| \left(x+\frac{3}{2}\right) + \sqrt{x^2+3x} \right| + C \end{aligned}$$

Answer needs Correction? [Click Here](#)

Q9 :  $\sqrt{1+\frac{x^2}{9}}$

Answer :

$$\text{Let } I = \int \sqrt{1+\frac{x^2}{9}} dx = \frac{1}{3} \int \sqrt{9+x^2} dx = \frac{1}{3} \int \sqrt{(3)^2+x^2} dx$$

$$\text{It is known that, } \int \sqrt{x^2+a^2} dx = \frac{x}{2} \sqrt{x^2+a^2} + \frac{a^2}{2} \log|x+\sqrt{x^2+a^2}| + C$$

$$\begin{aligned} \therefore I &= \frac{1}{3} \left[ \frac{x}{2} \sqrt{x^2+9} + \frac{9}{2} \log|x+\sqrt{x^2+9}| \right] + C \\ &= \frac{x}{6} \sqrt{x^2+9} + \frac{3}{2} \log|x+\sqrt{x^2+9}| + C \end{aligned}$$

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Q10 :  $\int \sqrt{1+x^2} dx$  is equal to

A.  $\frac{x}{2} \sqrt{1+x^2} + \frac{1}{2} \log|x+\sqrt{1+x^2}| + C$

B.  $\frac{2}{3} (1+x^2)^{\frac{3}{2}} + C$

C.  $\frac{2}{3} x (1+x^2)^{\frac{3}{2}} + C$

D.  $\frac{x^2}{2} \sqrt{1+x^2} + \frac{1}{2} x^2 \log|x+\sqrt{1+x^2}| + C$

Answer :

$$\text{It is known that, } \int \sqrt{a^2+x^2} dx = \frac{x}{2} \sqrt{a^2+x^2} + \frac{a^2}{2} \log|x+\sqrt{a^2+x^2}| + C$$

$$\therefore \int \sqrt{1+x^2} dx = \frac{x}{2} \sqrt{1+x^2} + \frac{1}{2} \log|x+\sqrt{1+x^2}| + C$$

Hence, the correct answer is A.

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Q11 :  $\int \sqrt{x^2-8x+7} dx$  is equal to

A.  $\frac{1}{2} (x-4) \sqrt{x^2-8x+7} + 9 \log|x-4+\sqrt{x^2-8x+7}| + C$

B.  $\frac{1}{2} (x+4) \sqrt{x^2-8x+7} + 9 \log|x+4+\sqrt{x^2-8x+7}| + C$

C.  $\frac{1}{2} (x-4) \sqrt{x^2-8x+7} - 3\sqrt{2} \log|x-4+\sqrt{x^2-8x+7}| + C$

D.  $\frac{1}{2} (x-4) \sqrt{x^2-8x+7} - \frac{9}{2} \log|x-4+\sqrt{x^2-8x+7}| + C$

Answer :

$$\begin{aligned} \text{Let } I &= \int \sqrt{x^2-8x+7} dx \\ &= \int \sqrt{(x^2-8x+16)-9} dx \\ &= \int \sqrt{(x-4)^2-(3)^2} dx \end{aligned}$$

$$\text{It is known that, } \int \sqrt{x^2-a^2} dx = \frac{x}{2} \sqrt{x^2-a^2} - \frac{a^2}{2} \log|x+\sqrt{x^2-a^2}| + C$$

$$\therefore I = \frac{(x-4)}{2} \sqrt{x^2-8x+7} - \frac{9}{2} \log|(x-4)+\sqrt{x^2-8x+7}| + C$$

Hence, the correct answer is D.

Answer needs Correction? [Click Here](#)

\*\*\*\*\* END \*\*\*\*\*