

Sheet-10 Integration 2

Integrate each of the following

1. $\int \frac{dx}{x^2 + 12x + 15},$

2. $\int \frac{dx}{8 - 12x - x^2},$

3. $\int \frac{dx}{x^2 + 14x + 60},$

4. $\int \frac{x-8}{x^2 + 4x + 16} dx,$

5. $\int \frac{dx}{\sqrt{x^2 + 12 + 48}},$

6. $\int \frac{dx}{\sqrt{17 - 14x - x^2}},$

7. $\int \frac{dx}{\sqrt{x^2 + 16x + 30}},$

8. $\int \frac{6x-5}{\sqrt{x^2 - 12x + 52}} dx,$

9. $\int \frac{dx}{4\sin^2 x + 9\cos^2 x},$

10. $\int \frac{dx}{3\sin x - 4\cos x},$

11. $\int \frac{x+3}{\sqrt{1-x^2}} dx,$

12. $\int \frac{\cos x}{2 - \cos x} dx,$

13. $\int \frac{x^2 - x + 14}{(x^2 + 4)(x + 2)} dx,$

14. $\int \frac{dx}{5 + 4\cos^2 x}.$

ANSWERS

1. $\frac{1}{2\sqrt{21}} \ln \left(\frac{x+6-\sqrt{21}}{x+6+\sqrt{21}} \right) + c,$

2. $\frac{1}{4\sqrt{11}} \ln \left(\frac{2\sqrt{11} + x + 6}{2\sqrt{11} - x - 6} \right) + c,$

3. $\frac{1}{\sqrt{11}} \tan^{-1} \left(\frac{x+7}{\sqrt{11}} \right) + c,$

4. $\frac{1}{2} \ln(x^2 + 4x + 16) - \frac{5}{\sqrt{3}} \tan^{-1} \left(\frac{x+2}{2\sqrt{3}} \right) + c,$

5. $\sinh^{-1} \left(\frac{x+6}{2\sqrt{3}} \right) + c,$

6. $\sin^{-1} \left(\frac{x+7}{\sqrt{66}} \right) + c,$

7. $\cosh^{-1} \left(\frac{x+8}{2\sqrt{7}} \right) + c,$

8. $6\sqrt{x^2 - 12x + 52} + 31 \sinh^{-1} \left(\frac{x-6}{4} \right) + c,$

9. $\frac{1}{6} \tan^{-1} \left(\frac{2 \tan x}{3} \right) + c,$

10. $\frac{1}{5} \ln \left(\frac{2 \tan \frac{x}{2} - 1}{\tan \frac{x}{2} + 2} \right) + c,$

11. $3\sin^{-1} x - \sqrt{1-x^2} + c,$

12. $\frac{4}{\sqrt{3}} \tan^{-1} \left(\sqrt{3} \tan \frac{x}{2} \right) - x + c,$

13. $\frac{5}{2} \ln(x+2) - \frac{3}{4} \ln(x^2 + 4) + \tan^{-1} \left(\frac{x}{2} \right) + c,$

14. $\frac{1}{3\sqrt{5}} \tan^{-1} \left(\frac{\sqrt{5} \tan x}{3} \right) + c.$