Topic 11: Exercises on Integration
Level 1

1. Find $\int \frac{\ln x}{x} dx$.

$\frac{1}{2}(\ln x)^2 + c$

2. Find $\int \frac{\cos x}{2 + \sin x} dx$.

$\ln(2 + \sin x) + c$

3. Find $\int \frac{x}{1 + x^2} dx$.

$\frac{1}{2}\ln(1 + x^2) + c$

4. Find $\int \frac{x}{(1+x^2)^2} dx$.

$$-\frac{1}{2(1+x^2)}+c$$

5. Find $\int e^{\sin x} \cos x dx$.

$$e^{\sin x}+c$$

6. Find $\int x\sqrt{(1+x^2)}dx$.

$\frac{1}{3}(1+x^2)^{3/2}+c$

7. Find $\int x\sec^2(x^2)dx$.

$\frac{1}{2}\tan(x^2)+c$

8. Evaluate $\int_{\frac{\pi}{4}}^{\frac{\pi}{6}} \cot x dx$.

$\ln(\sin\frac{\pi}{6}) - \ln(\sin\frac{\pi}{4})$

9. Evaluate $\int_0^2 \frac{1}{4+x^2} dx$.

$\frac{\pi}{8}$

10. Evaluate $\int_2^4 \frac{(x^2-1)^2}{x} dx$.

$48+\ln 2$

11. Find $\int \frac{1}{x^2+2x+2} dx$ {Show first that $x^2+2x+2=(x+1)^2+1$}.

$\tan^{-1}(x+1)+c$

12. Find $\int \frac{1}{\sqrt{2x-x^2}}dx$. {Show first that $2x-x^2 = 1-(x-1)^2$}.

$\sin^{-1}(x-1)+c$

13. Find $\int \frac{x-1}{x^2+1}dx$.

$\frac{1}{2}\ln(x^2+1)-\tan^{-1}x+c$

14. Find $\int \frac{6x-10}{(x+1)(x-3)}dx$.

$4\ln|x+1|+2\ln|x-3|+c$

15. Evaluate $\int_{-1}^{3} \frac{1}{x^2-2x+5}dx$ {Show first that $5-2x+x^2 = 4+(x-1)^2$}.

$\frac{\pi}{4}$

16. Evaluate $\int_{-1}^{0} \frac{1}{\sqrt{3-2x-x^2}}dx$ {Show first that $3-2x-x^2 = 4-(x+1)^2$}.

$\frac{\pi}{6}$

17. Find $\int \frac{x}{\sqrt{x+1}}dx$, using the substitution $u^2 = x+1$.

$\frac{2}{3}(x+1)^{3/2} - 2\sqrt{x+1} + c$