Integrals

Worksheet-2

I Evaluate the integrals

1. $\int_0^2 x(x-3)\,dx$

2. $\int_{-1}^1 (x^2-2x+3)\,dx$

3. $\int_{-2}^2 \frac{3}{(x+3)^4}\,dx$

4. $\int_{-1}^1 x^{299}\,dx$

5. $\int_1^4 \left(3x^2-\frac{x^3}{4}\right)dx$

6. $\int_{-2}^3 (x^3-2x+3)\,dx$

7. $\int_0^1 \left(x^2+\sqrt{x}\right)dx$

8. $\int_1^{32} x^{-6/5}\,dx$

9. $\int_0^{\pi/3} 2\sec^2 x\,dx$

10. $\int_0^{\pi} (1+\cos x)\,dx$

11. $\int_{\pi/4}^{3\pi/4} \csc\theta\cot\theta\,d\theta$

12. $\int_0^{\pi/3} 4\frac{\sin u}{\cos^2 u}\,du$

13. $\int_{\pi/2}^0 \frac{1+\cos 2t}{2}dt$

14. $\int_{-\pi/3}^{\pi/3} \sin^2 t\,dt$

15. $\int_0^{\pi/4} \tan^2 x\,dx$

16. $\int_0^{\pi/6} (\sec x+\tan x)^2\,dx$

21. $\displaystyle\int_{\sqrt{2}}^{1}\left(\frac{u^7}{2}-\frac{1}{u^5}\right)du$

22. $\displaystyle\int_{-3}^{-1}\frac{y^5-2y}{y^3}\,dy$

23. $\displaystyle\int_{1}^{\sqrt{2}}\frac{s^2+\sqrt{s}}{s^2}\,ds$

24. $\displaystyle\int_{1}^{8}\frac{(x^{1/3}+1)(2-x^{2/3})}{x^{1/3}}\,dx$

25. $\displaystyle\int_{\pi/2}^{\pi}\frac{\sin 2x}{2\sin x}\,dx$

26. $\displaystyle\int_{0}^{\pi/3}(\cos x+\sec x)^2\,dx$

27. $\displaystyle\int_{-4}^{4}|x|\,dx$

28. $\displaystyle\int_{0}^{\pi}\frac{1}{2}(\cos x+|\cos x|)\,dx$

II Evaluate the indefinite integrals by using the given substitutions to reduce the integrals to standard form

1. $\displaystyle\int 2(2x+4)^5\,dx, \quad u=2x+4$

2. $\displaystyle\int 7\sqrt{7x-1}\,dx, \quad u=7x-1$

3. $\displaystyle\int 2x(x^2+5)^{-4}\,dx, \quad u=x^2+5$

4. $\displaystyle\int \frac{4x^3}{(x^4+1)^2}\,dx, \quad u = x^4 + 1$

5. $\displaystyle\int (3x+2)(3x^2+4x)^4\,dx, \quad u = 3x^2 + 4x$

6. $\displaystyle\int \frac{\left(1+\sqrt{x}\right)^{1/3}}{\sqrt{x}}\,dx, \quad u = 1 + \sqrt{x}$

7. $\displaystyle\int \sin 3x\,dx, \quad u = 3x$

8. $\displaystyle\int x\sin\left(2x^2\right)dx, \quad u = 2x^2$

9. $\displaystyle\int \sec 2t \tan 2t\,dt, \quad u = 2t$

10. $\displaystyle\int \left(1-\cos\frac{t}{2}\right)^2 \sin\frac{t}{2}dt, \quad u = 1 - \cos\frac{t}{2}$

11. $\displaystyle\int \frac{9r^2\,dr}{\sqrt{1-r^3}}, \quad u = 1 - r^3$

12. $\displaystyle\int 12(y^4+4y^2+1)^2(y^3+2y)\,dy, \quad u = y^4 + 4y^2 + 1$

13. $\displaystyle\int \sqrt{x}\sin^2(x^{3/2}-1)\,dx, \quad u = x^{3/2} - 1$

14. $\displaystyle\int \frac{1}{x^2}\cos^2\left(\frac{1}{x}\right)dx, \quad u = -\frac{1}{x}$