[13-11-04-Th]

EXERCISES 5.6

.ating Definite Integrals

: the Substitution Formula in Theorem 6 to evaluate the integrals in
ercises 1–24.

1 a. $\int_0^3 \sqrt{y+1}\,dy$ b. $\int_{-1}^0 \sqrt{y+1}\,dy$

2 a. $\int_0^1 r\sqrt{1-r^2}\,dr$ b. $\int_{-1}^1 r\sqrt{1-r^2}\,dr$

3 a. $\int_0^{\pi/4} \tan x \sec^2 x\,dx$ b. $\int_{-\pi/4}^0 \tan x \sec^2 x\,dx$

4 a. $\int_0^{\pi} 3\cos^2 x \sin x\,dx$ b. $\int_{2\pi}^{3\pi} 3\cos^2 x \sin x\,dx$

5 a. $\int_0^1 t^3(1+t^4)^3\,dt$ b. $\int_{-1}^1 t^3(1+t^4)^3\,dt$

6 a. $\int_0^{\sqrt{7}} t(t^2+1)^{1/3}\,dt$ b. $\int_{-\sqrt{7}}^0 t(t^2+1)^{1/3}\,dt$

7 a. $\int_{-1}^1 \frac{5r}{(4+r^2)^2}\,dr$ b. $\int_0^1 \frac{5r}{(4+r^2)^2}\,dr$

8 a. $\int_0^1 \frac{10\sqrt{v}}{(1+v^{3/2})^2}\,dv$ b. $\int_1^4 \frac{10\sqrt{v}}{(1+v^{3/2})^2}\,dv$

9 a. $\int_0^{\sqrt{3}} \frac{4x}{\sqrt{x^2+1}}\,dx$ b. $\int_{-\sqrt{3}}^{\sqrt{3}} \frac{4x}{\sqrt{x^2+1}}\,dx$

10. a. $\int_0^1 \frac{x^3}{\sqrt{x^4+9}}\,dx$ b. $\int_{-1}^0 \frac{x^3}{\sqrt{x^4+9}}\,dx$

11. a. $\int_0^{\pi/6} (1-\cos 3t)\sin 3t\,dt$ b. $\int_{\pi/6}^{\pi/3} (1-\cos 3t)\sin 3t\,dt$

12. a. $\int_{-\pi/2}^0 \left(2+\tan\frac{t}{2}\right)\sec^2\frac{t}{2}\,dt$ b. $\int_{-\pi/2}^{\pi/2} \left(2+\tan\frac{t}{2}\right)\sec^2\frac{t}{2}\,dt$

13. a. $\int_0^{2\pi} \frac{\cos z}{\sqrt{4+3\sin z}}\,dz$ b. $\int_{-\pi}^{\pi} \frac{\cos z}{\sqrt{4+3\sin z}}\,dz$

14. a. $\int_{-\pi/2}^0 \frac{\sin w}{(3+2\cos w)^2}\,dw$ b. $\int_0^{\pi/2} \frac{\sin w}{(3+2\cos w)^2}\,dw$

15. $\int_0^1 \sqrt{t^5+2t}\,(5t^4+2)\,dt$ 16. $\int_1^4 \frac{dy}{2\sqrt{y}\,(1+\sqrt{y})^2}$

17. $\int_0^{\pi/6} \cos^{-3} 2\theta \sin 2\theta\,d\theta$ 18. $\int_{\pi}^{3\pi/2} \cot^5\left(\frac{\theta}{6}\right)\sec^2\left(\frac{\theta}{6}\right)d\theta$

19. $\int_0^{\pi} 5(5-4\cos t)^{1/4}\sin t\,dt$ 20. $\int_0^{\pi/4} (1-\sin 2t)^{3/2}\cos 2t\,dt$

21. $\int_0^1 (4y-y^2+4y^3+1)^{-2/3}(12y^2-2y+4)\,dy$

22. $\int_0^1 (y^3+6y^2-12y+9)^{-1/2}(y^2+4y-4)\,dy$

5.6 SUBSTITUTION AND AREA BETWEEN CURVES

1. (a) $\frac{14}{3}$ (b) $\frac{2}{3}$

2. (a) $\frac{1}{3}$ (b) 0

3. (a) $\frac{1}{2}$ (b) $-\frac{1}{2}$

4. (a) 2 (b) 2

5. (a) $\frac{15}{16}$ (b) 0

6. (a) $\frac{45}{8}$ (b) $-\frac{45}{8}$

7. (a) 0 (b) $\frac{1}{8}$

8. (a) $\frac{10}{3}$ (b) $\frac{70}{27}$

9. (a) 4 (b) 0

10. (a) $\frac{\sqrt{10}-3}{2}$ (b) $\frac{3-\sqrt{10}}{2}$

11. (a) $\frac{1}{6}$ (b) $\frac{1}{2}$

12. (a) 3 (b) 8

13. (a) 0 (b) 0

14. (a) $-\frac{1}{15}$ (b) $\frac{1}{15}$

15. $2\sqrt{3}$ 16. $\frac{1}{6}$ 17. $\frac{3}{4}$ 18. 12

19. $3^{5/2}-1$ 20 $\frac{1}{5}$ 21. 3 22. $-\frac{2}{3}$

23. $\frac{\pi}{3}$ 24. $\frac{1}{2}-\frac{1}{4}\sin 2$ 25. $\frac{16}{3}$ 26. 2