

1. The volume of the solid generated by revolving the region bounded by the graphs of $y = \sqrt{25 - x^2}$, $y = 0$, $x = 0$, and $x = 3$ about the x -axis, is equal to

- (a) 66π _____(correct)
(b) 44π
(c) 22π
(d) 77π
(e) 11π

2. The volume of the solid generated by revolving the region bounded by the graphs of $y = x^2$ and $y = 2 - x^2$ about the line $x = 1$, is equal to

- (a) $\frac{16\pi}{3}$ _____(correct)
(b) $\frac{14\pi}{3}$
(c) π
(d) 3π
(e) $\frac{4\pi}{3}$

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

(a) $\ln \frac{(x-1)^2}{x^2+1} - 2 \arctan x + C$ _____(correct)

(b) $\ln \frac{(x-1)^2}{x^2+1} + 2 \arctan x + C$

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

(d) $\ln \frac{x-1}{(x^2+1)^2} + \operatorname{arccot} x + C$

(e) $\ln \frac{(x-1)^2}{x^2+1} - \arctan x + C$

4. The area of the surface generated by revolving the curve $y = 1 - \frac{x^2}{4}$ on the interval $[0, 2]$ about the y -axis is equal to

(a) $\frac{8\pi}{3} (2\sqrt{2} - 1)$ _____(correct)

(b) $\frac{8\pi}{3} (2\sqrt{2} + 1)$

(c) $\frac{4\pi}{3} (2\sqrt{2} - 1)$

(d) $\frac{4\pi}{3} (2\sqrt{2} + 1)$

(e) $\frac{4\pi}{3} (\sqrt{2} + 1)$

5. $\int_0^\pi x \sin(2x) \, dx =$

(a) $-\frac{\pi}{2}$ _____(correct)

(b) $\frac{\pi}{2}$

(c) $-\frac{\pi}{4}$

(d) $\frac{\pi}{4}$

(e) π

6. $\int_1^2 \frac{(\ln x)^2}{x^2} \, dx =$

(a) $1 - \ln 2 - \frac{(\ln 2)^2}{2}$ _____(correct)

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

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

(d) $1 - \ln 2 + \frac{(\ln 2)^2}{2}$

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

7. $\int \cos^3 x \sin^2 x \, dx =$

(a) $\frac{\sin^3 x}{3} - \frac{\sin^5 x}{5} + C$ _____(correct)

(b) $\frac{\sin^3 x}{3} + \frac{\sin^5 x}{5} + C$

(c) $-\frac{\sin^3 x}{3} - \frac{\sin^5 x}{5} + C$

(d) $\frac{\sin^3 x}{3} + \frac{\cos^5 x}{5} + C$

(e) $\frac{\cos^3 x}{3} - \frac{\cos^5 x}{5} + C$

8. $\int_0^{\frac{\pi}{4}} \tan^4 x \, dx =$

(a) $\frac{\pi}{4} - \frac{2}{3}$ _____(correct)

(b) $\frac{\pi}{4} + \frac{2}{3}$

(c) $\frac{\pi}{4} - \frac{4}{3}$

(d) $\frac{\pi}{4} + \frac{4}{3}$

(e) $\frac{\pi}{2} + \frac{4}{3}$

9. If $\frac{-13 + 9x - x^2}{(x - 2)(x - 1)^2} = \frac{A}{x - 2} + \frac{B}{x - 1} + \frac{C}{(x - 1)^2}$ then $A + B + C =$

(a) 4 _____(correct)

(b) 3

(c) -3

(d) 5

(e) 0

10. $\int_2^{7/2} \sqrt{5 + 4x - x^2} dx =$

(a) $\frac{3\pi}{4} + \frac{9\sqrt{3}}{8}$ _____(correct)

(b) $\frac{\pi}{4} + \frac{\sqrt{3}}{8}$

(c) $\frac{3\pi}{4} + \frac{\sqrt{3}}{8}$

(d) $\frac{\pi}{4} + \frac{9\sqrt{3}}{8}$

(e) $\frac{\pi}{2} + \frac{\sqrt{3}}{8}$

11. The arc length of the graph of the function $f(x) = \ln(\sec x)$ over the interval $\left[0, \frac{\pi}{4}\right]$ is equal to

- (a) $\ln(\sqrt{2} + 1)$ _____(correct)
(b) $\ln(\sqrt{2} - 1)$
(c) $\ln(\sqrt{3} + 1)$
(d) $\ln(\sqrt{3} - 1)$
(e) $\ln(\sqrt{3} - \sqrt{2})$

12. $\int_{\frac{1}{2\sqrt{3}}}^{\frac{1}{2}} \frac{dx}{x^2\sqrt{4x^2 + 1}} =$

- (a) $4 - 2\sqrt{2}$ _____(correct)
(b) $4 + 2\sqrt{2}$
(c) $2 - 4\sqrt{2}$
(d) $2 + 4\sqrt{2}$
(e) $2 + \sqrt{2}$

13. Using the substitution $t = \tan \frac{x}{2}$, $\int_{\frac{\pi}{3}}^{\frac{\pi}{2}} \frac{1}{1 + \sin x - \cos x} dx =$

(a) $\ln \frac{\sqrt{3} + 1}{2}$ _____(correct)

(b) $\ln \frac{\sqrt{3} - 1}{2}$

(c) $\ln \frac{\sqrt{3}}{2}$

(d) $\ln \frac{\sqrt{2} + 1}{3}$

(e) $\ln \frac{\sqrt{2} - 1}{3}$

14. $\int \frac{4 - 2t}{3t^2 - 12t - 1} dt =$

(a) $-\ln |\sqrt[3]{3t^2 - 12t - 1}| + C$ _____(correct)

(b) $-\ln |\sqrt{3t^2 - 12t - 1}| + C$

(c) $\ln |\sqrt[3]{3t^2 - 12t - 1}| + C$

(d) $\ln |\sqrt{3t^2 - 12t - 1}| + C$

(e) $\ln |\sqrt{3t^2 + 12t + 1}| + C$