

1- Show that $\iint e^{\frac{x}{y}} dA$ $D = \{(x, y): 1 \leq y \leq 2, y \leq x \leq y^3\}$?

2- Show that $\iint dx dy = \iint r dr d\theta$?

3- compute $\int_0^8 \int_{\sqrt[3]{y}}^9 \sqrt{x^4 + 1} dx dy$? (Change order)

4- compute $\iint f(x, y) dx dy$ where $R = x^2 + y^2$, $f(x, y) = \sqrt{1 - y^2}$?

5-Set up the integral that gives volume above $z = -\sqrt{3x^2 + 3y^2}$ and below $x^2 + y^2 + z^2 = 4$ to Cartesian?

6-Set up the integral that gives volume above $z = -\sqrt{3x^2 + 3y^2}$ and below $x^2 + y^2 + z^2 = 4$ to Cylindrical ?

7- Set up the integral that gives volume above $z = -\sqrt{3x^2 + 3y^2}$ and below $x^2 + y^2 + z^2 = 4$ to Spherical ?

8- prove that $\Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}$?

9- Evaluate $\int_0^\infty \sqrt[4]{x} e^{-\sqrt{x}} dx$?

10--Evaluate $\int_0^1 x^4 (1 - \sqrt{x})^5 dx$?

11 -compute $\int_1^3 \int_0^1 (1 + 4xy) dx dy$

12- compute $\int_0^1 \int_1^2 4x^3 - 9x^2y^2 dx dy$

13- $\int_0^1 \int_0^2 (2x + y)^4 dx dy$

14- $\int_0^1 \int_1^2 \frac{xe^x}{y} dy dx$

15-compute $\int_1^3 \int_{2x}^1 (x - y) dx dy$

16- compute $\int_0^2 \int_0^{2y} xy dx dy$

17- Evaluate $\iint xy e^{x^2 y} dA$ $D = \{(x, y): 0 \leq y \leq 2, 0 \leq x \leq 1\}$

18- $\int_1^2 \int_{2x}^1 (x + y) dx dy$

19- $f(x, y) = xy$, D is the integral with vertices $(0, 0)$, $(1, 0)$ and $(1, 3)$

20- $f(x, y) = e^y \sqrt{x + e^y}$, $D = \{(x, y): 0 \leq y \leq 1, 0 \leq x \leq 4\}$

21- $f(x, y) =$

$x^2 y$, R is the integral with vertices $(-1, 0)$, $(-1, 5)$, $(1, 5)$ and $(1, 0)$

22- Find the volume of the solid that

23- Find the volume of the solid inside the sphere $x^2 + y^2 + z^2 = 16$, outside the cone $z = \sqrt{x^2 + y^2}$ and above the $x y$ plane?

24- Use spherical coordinate to find the volume of the solid that lie above the cone

$z = \sqrt{x^2 + y^2}$ and below the sphere $x^2 + y^2 + z^2 = z$?

25- prove that $\Gamma(x + 1) = x!$?

30- Find $\Gamma\left(\frac{5}{2}\right)$

31- Find $\Gamma\left(\frac{-5}{2}\right)$

32- Evaluate $\int_0^\infty x^7 e^{-x} dx$?

33- Evaluate $\int_0^\infty x^3 e^{-4x} dx$?

34- Evaluate $\int_0^\infty e^{-k^2 x^2} dx$?

35- what's the relation between Gamma function and Beta Function

36- prove that $\beta(n, m) = \beta(m, n)$?

37- Evaluate $\int_0^1 x^6 (1 - 2x)^6 dx$?

38- Evaluate $\int_0^1 (1 - x^4)^{\frac{-1}{2}} dx$?

39-prove that $\beta(n, m) = \beta(m + 1, n) + \beta(m, n + 1)$?

40-Evalute $\iiint y dv$ where D is the region that lie below the plane $z = x + 2$ above the xy plane and between the Cylinderes $x^2 + y^2 = 1$ and $x^2 + y^2 = 4$

41—compute $\iiint 8xyz dv, D = [2, 3] \times [1, 2] \times [0, 1]$?

42-Let D be the interior of the circle of $x^2 + y^2 = 2x$, find $I =$

$$\iint \sqrt{x^2 + y^2} dA?$$

43-compute $\iint \frac{y^2}{x^2} dA$ D is a part of the annulus $0 \leq x^2 + y^2 \leq b^2$ lying in the first quarter and below the line $y = x$?

44-Find the volume of the solid enclosed by the planes $4x + 2y + z = 10$, $y = 3x, z = 0, x = 0$?

45- Find the volume of the solid that lies below the surface given by $z = 16xy + 200$ and lies above the region in the xy plane bounded by $y = x^2$ and $y = 8 - x^2$?

46-Prove that $erf(0) = 0$?

47- Prove that $erf(\infty) = 1$?

48- Prove that $erf(x) + erf_c(x) = 1$?

49- Prove that $erf(-x) = -erf(x)$?

50-Prove that $erf_c(x) + erf_c(-x) = 2$?

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