Answer on Question #61965 – Math – Calculus

Question

6 Find the integral with respect to x

∫cosxsinxdx

Solution

$$\int cosxsinxdx = \int sinxd(sinx) = \frac{(sinx)^2}{2} + c$$

Answer: $\frac{(sinx)^2}{2} + c$.

Question

7 Evaluate

∫2−1y2+y−2dy

Solution

$$\int_{-1}^{2}(\mathrm{y}^2 + \mathrm{y} - 2)\mathrm{dy} = \left(\frac{\mathrm{y}^3}{3} + \frac{\mathrm{y}^2}{2} - 2\mathrm{y}\right)_{-1}^{2} = \left(\frac{2^3}{3} + \frac{2^2}{2} - 2(2)\right) - \left(\frac{(-1)^3}{3} + \frac{(-1)^2}{2} - 2(-1)\right) = -\frac{3}{2}.$$

Answer: $-\frac{3}{2}$.

Question

8 Integrate with respect to x:

∫2−1x2(x3+4)2dx

Solution

$$\int_{-1}^{2} x^2(x^3+4)^2 dx = \frac{1}{3}\int_{-1}^{2}(x^3+4)^2 d(x^3+4) = \frac{1}{3}\left(\frac{(x^3+4)^3}{3}\right)_{-1}^{2} = \frac{1}{9}((2^3+4)^3 - ((-1)^3+4)^3)$$
$$= 189$$

Answer: 189.

Question

9 Integrate with respect to x:

$\int_{-1}^{3} \frac{x}{7+x^2} dx$

Solution

$$\int_{-1}^{3} \frac{x}{7+x^2} dx = \frac{1}{2}\int_{-1}^{3} \frac{1}{7+x^2} d(x^2+7) = \frac{1}{2}\ln(x^2+7)\Big|_{-1}^{3} = \frac{1}{2}\ln\left(\frac{3^2+7}{(-1)^2+7}\right) = \frac{1}{2}\ln 2.$$

Answer: $\frac{1}{2}\ln 2$.

Question

10. Integrate with respect to x:

$$\int_1^4 \left(x + \frac{1}{\sqrt{x}}\right) dx$$

Solution

$$\int_1^4 \left(x + \frac{1}{\sqrt{x}}\right) dx = \int_1^4 x dx + \int_1^4 \frac{1}{\sqrt{x}} dx = \frac{x^2}{2}\Big|_1^4 + \frac{x^{-\frac{1}{2}+1}}{-\frac{1}{2}+1}\Big|_1^4 = \frac{x^2}{2}\Big|_1^4 + 2\sqrt{x}\Big|_1^4 = \frac{4^2}{2} - \frac{1^2}{2} + 2\sqrt{4} - 2\sqrt{1} =$$

$$= 8 - \frac{1}{2} + 2 \cdot 2 - 2 = 8 - \frac{1}{2} + 4 - 2 = 9.5.$$

Answer: 9.5.