Question Bank

Find the following integrations:

(1) $\int \sqrt[3]{x}\ln x\ dx =$

(2) Prove the following reduction formula: $\int x^m (\ln x)^n\, dx = \frac{1}{m+1} x^{m+1} (\ln x)^n - \frac{n}{m+1}\int x^m (\ln x)^{n-1} dx$ for $m \neq -1$.

(3) $\int \arcsin x\ dx =$

(4) $\int \cos\left(\sqrt{x}\right)\ dx =$

(5) $\int \frac{\ln x}{x^3}\ dx =$

(6) $\int x\ \operatorname{arcsec} x\ dx =$

(7) $\int e^x \cos x\ dx =$

(8) $\int x^3 \sin\left(x^2\right) dx =$

(9) $\int e^{\sqrt{x}}\ dx =$

(10) $\int x^2 e^{3x}\ dx =$

(11) $\int x^2 \sin x\ dx =$

(12) $\int e^{\sqrt[3]{x}} dx =$

(13) $\int \frac{e^{\sqrt[3]{x}}}{\sqrt[3]{x}} dx =$

(14) $\int \sin(\ln x) dx =$

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

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

(17) $\int \frac{x-6}{x^2-2x}\ dx =$

(18) $\int \frac{1}{u^2-a^2}\ du =$

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

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

(21) $\int \frac{e^x}{e^{2x}+3e^x+2}\ dx =$

(22) $\int \frac{1}{x\sqrt{x+1}}\ dx =$

Find the O.D.E if the G. solution is $y = Ae^{-x} + Be^{x}$

(23) $y = C_1 \sin x + C_2 \cos x$

(24) $y = Ae^{x} + Bx^{2} + Cx$

(25) $y = c_1 e^{-2x} - c_2 \sin x$

Solve the following differential equations

26) $x^3\,dx + (y+1)^2 dy = 0$

27) $x^2\,(y+1)\,dx + y\,(x-1)dy = 0$

28) $xy + \sqrt{1+x^2}\,y' = 0$

29) $y' = x^2 - 8xy + 16y^2$

30) $(x + y + 2)\,dx + (-x - y + 2)\,dy = 0$

31) $(6x-8y-5)\,dy = (3x-4y-2)\,dx$

32) $y\,(xy+1)dx + x\,(1+xy+x^2y^2)dy = 0 \quad -----(1)$

(33) $y^3 \sin 2x\,dx - \frac{3}{2} y^2 \cos 2x\,dy = 0$.

(34) $(3x^2+3xy^2)dx + (3x^2y - 3y^2 + 2y)dy = 0$.

(35) $(2ye^{2x} + 2x\cos y)dx + (e^{2x} - x^2 \sin y)dy = 0$