$$\int_1^4 3\sqrt{x}\,dx = \int_1^4 3\left(x^{\frac{1}{2}}\right)dx$$

$$\sqrt[2]{x^1} = x^{\frac{1}{2}}$$

$$\sqrt[4]{x^3} = x^{\frac{3}{4}}$$

$$\sqrt[3]{(x-2x)} = (x-2x)^{\frac{1}{3}}$$

$$3\int_1^4 x^{\frac{1}{2}}\,dx = 3\left(\frac{x^{\frac{1}{2}+\frac{2}{2}}}{\frac{1}{2}+\frac{2}{2}}\right)\Bigg|_1^4$$

$$= 3\left(\frac{x^{\frac{3}{2}}}{\frac{3}{2}}\right)\Bigg|_1^4$$

$$\int x^n\,dx = \frac{x^{n+1}}{n+1}$$

$$= 3\left(\frac{2x^{\frac{3}{2}}}{3}\right) = \frac{6x^{\frac{3}{2}}}{3} = 2x^{\frac{3}{2}}\Big|_1^4 \quad 4 = 6,\ 1 = 9$$

$$= 2\left(\underset{6}{4^{\frac{3}{2}}} - \underset{9}{1^{\frac{3}{2}}}\right) = 2(8-1) = 2(7) = 14$$