Bellwork 1/11

Evaluate:

$$\int_0^4 (4 - t)\sqrt{t}\,dt$$

: : reset

Bellwork 1/11 - Solution

$$\begin{aligned}\int_0^4 (4-t)\sqrt{t}\,dt &= 4\int_0^4 \sqrt{t}\,dt - \int_0^4 t^{\frac{3}{2}}\,dt \\ &= \frac{8}{3}\left[t^{\frac{3}{2}}\right]_0^4 - \frac{2}{5}\left[t^{\frac{5}{2}}\right]_0^4 \\ &= \frac{8}{3}\left(4^{\frac{3}{2}}\right) - \frac{2}{5}\left(4^{\frac{5}{2}}\right) \\ &= \boxed{\frac{128}{15}}\end{aligned}$$

Exercise 1

Find the general indefinite integral:

$$\int \sqrt[4]{x^5} dx$$

Exercise 1 - Solution

$$\int \sqrt[4]{x^5}dx = \int x^{\frac{5}{4}}dx$$
$$= \boxed{\frac{4}{9}x^{\frac{9}{4}} + C} \text{ (Power Rule)}$$

Exercise 2

Find the general indefinite integral:

$$\int \left(\frac{1+r}{r}\right)^2 dr$$

Exercise 2 - Solution

$$\begin{aligned}
\int \left(\frac{1+r}{r}\right)^2 dr &= \int \frac{(1+r)^2}{r^2} dr \\
&= \int \frac{r^2+2r+1}{r^2} dr \\
&= \int 1 + \frac{2}{r} + r^{-2} dr \\
&= \boxed{r + 2\ln|r| - r^{-1} + C}
\end{aligned}$$