

Find the general indefinite integral.¹

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

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

Thus,

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

¹Stewart, *Calculus, Early Transcendentals*, p. 409, #14.