$$dW = F \cdot ds \qquad F = \frac{GMm}{r^2} \qquad ds = dr$$

$$W = \int_{r_1}^{r_2} F\,dr = \int_{r_1}^{r_2} \frac{GMm}{r^2}\,dr$$

$$W = GMm\left(\frac{-1}{r_2} - \frac{-1}{r_1}\right)$$