

26. (a) The gravitational potential energy is

$$U = -\frac{GMm}{r} = -\frac{(6.67 \times 10^{-11} \text{ m}^3/\text{kg}\cdot\text{s}^2) (5.2 \text{ kg})(2.4 \text{ kg})}{19 \text{ m}} = -4.4 \times 10^{-11} \text{ J} .$$

- (b) Since the change in potential energy is

$$\Delta U = -\frac{GMm}{3r} - \left(-\frac{GMm}{r}\right) = -\frac{2}{3}(-4.4 \times 10^{-11} \text{ J}) = 2.9 \times 10^{-11} \text{ J} ,$$

the work done by the gravitational force is $W = -\Delta U = -2.9 \times 10^{-11} \text{ J}$.

- (c) The work done by you is $W' = \Delta U = 2.9 \times 10^{-11} \text{ J}$.