

Answer on Question 65919, Physics, Mechanics

Question:

Messy with a mass of 440 *lbs* walks up a flight of stairs 120 *cm* high in 30 seconds. What power has she used? Express your answer in horse power.

Solution:

By the definition of the power we have:

$$P = \frac{W}{t} = \frac{Fh}{t} = \frac{mgh}{t} = \frac{440 \text{ lbs} \cdot \left(\frac{0.45359237 \text{ kg}}{1 \text{ lbs}}\right) \cdot 9.8 \frac{\text{m}}{\text{s}^2} \cdot 1.20 \text{ m}}{30 \text{ s}} = 78.23 \text{ W}.$$

Let's convert watts to horse power:

$$P_{(hp)} = \frac{P_{(W)}}{745.6} = \frac{78.23 \text{ W}}{745.6} = 0.105 \text{ hp}.$$

Answer:

$$P = 0.105 \text{ hp}.$$