

Indar biziaren teorema



http://ffden-2.phys.uaf.edu/211_fall2002.web.dir/Shawna_Sastamoinen/Velocity&Kinetic_files/image003.jpg

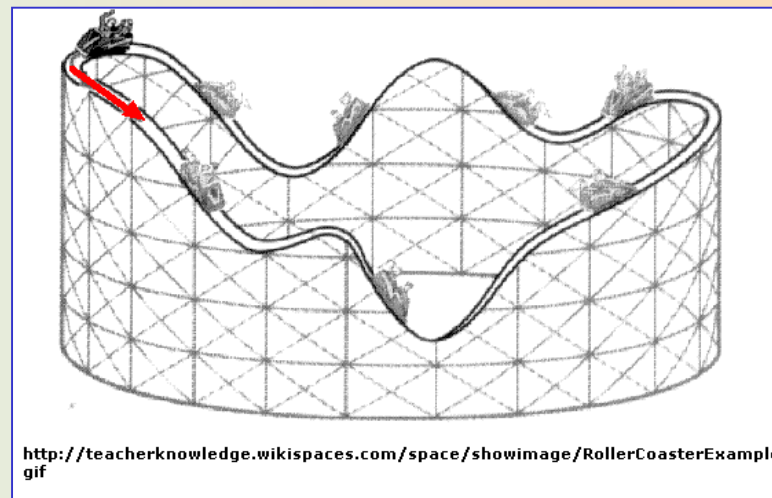
Energia zinetikoa (Ez)

Higitzen ari den gorputz batek bere abiadurari lotutako energia du; energia zinetikoa.

Energia zinetikoa honela kalkulatzen da:

$$E_z = \frac{1}{2} * m * v^2$$

SI-eko unitateak $\text{kg} \cdot \text{m}^2 / \text{s}^2$ edo joule (J) da.



<http://teacherknowledge.wikispaces.com/space/showimage/RollerCoasterExample.gif>

Indar bizen teorema

Work-Energy Theorem

Gorputz baten ganean eginiko lan totala gorputzaren energia zinetikoaren aldaketaren berdina da:

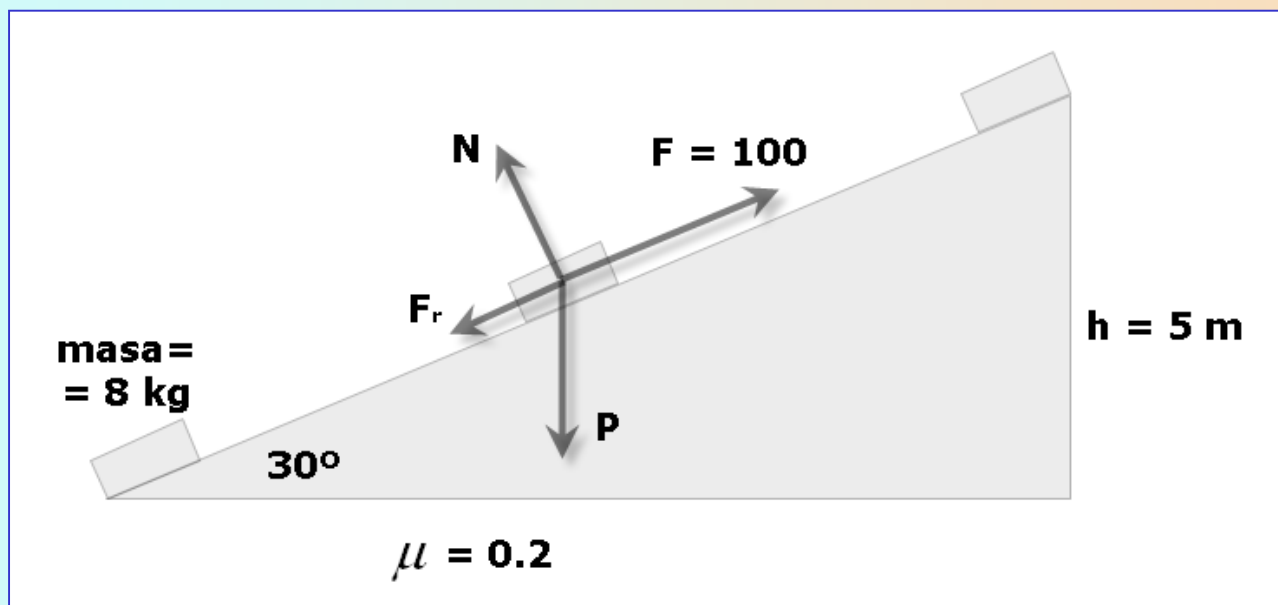
$$W = \Delta E_z = \frac{1}{2}mv^2 - \frac{1}{2}mv_0^2$$

Ariketa

Gorputza malda gora doa. Hasieran, gorputza geldirik dago.

Kalkulatu abiadura goian, indar bizen teorema erabiliz.

$$v = 10,7 \text{ m/s}$$



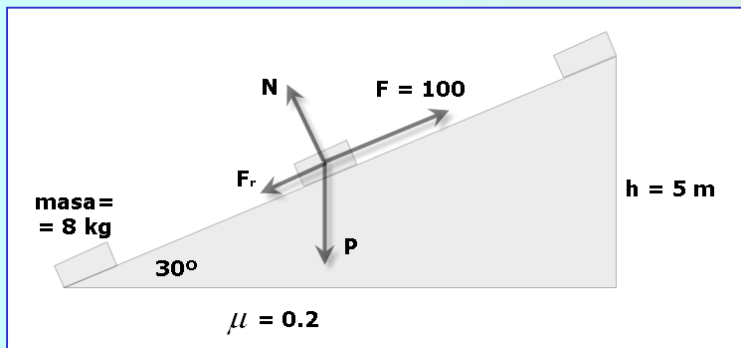
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Indaz bizen teorema

$$W = \Delta E_z$$

Lan totala kalkulatzeko espresio hau erabil daiteke:

$$W = W_F + W_P + W_N + W_{F_r}$$

Desplazamendua:

$$\sin 30^\circ = \frac{1}{2} = \frac{5 \text{ m}}{\Delta x} \rightarrow \boxed{\Delta x = 10 \text{ m}}$$

Indar bakoitzaren lana:

$$W_F = 100 \text{ N} \times 10 \text{ m} \times \cos 0^\circ = 1000 \text{ J}$$

$$W_P = 80 \text{ N} \times 10 \text{ m} \times \cos (-120^\circ) = -400 \text{ J}$$

$$W_N = N \times 10 \text{ m} \times \cos 90^\circ = 0$$

$$N = P_y = P \times \cos 30^\circ = 80 \text{ N} \times \cos 30^\circ = 69,3 \text{ N}$$

$$F_r = \mu \times N = 0,2 \times 69,3 \text{ N} = 14 \text{ N}$$

$$W_{F_r} = 14 \text{ N} \times 10 \text{ m} \times \cos 180^\circ = -140 \text{ J}$$

Indaz totala:

$$W = W_F + W_P + W_N + W_{F_r} = 460 \text{ J}$$

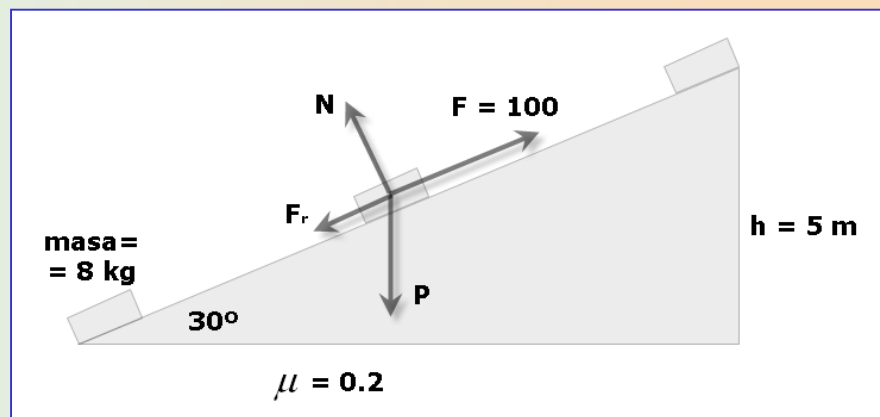
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Teorema aplikatuz:

$$W = \Delta E_z \rightarrow 460 \text{ J} = \frac{1}{2} \times 8 \text{ Kg} \times v^2 - \frac{1}{2} \times 8 \text{ Kg} \times 0$$

$$460 \text{ J} = 4 \text{ Kg} \times v^2 \rightarrow v = \sqrt{\frac{460 \text{ J}}{4 \text{ Kg}}} \rightarrow \boxed{v = 10,7 \frac{\text{m}}{\text{s}}}$$