Work-energy principle problem solving strategy.

1.
- If there is friction, include both surfaces in the system.
- F_{Fk} is an internal force, therefore it does no work.

$$ME_i = ME_F + \Delta U_{INT}$$

$$\Delta U_{INT} = F_{Fk} \cdot d$$

$$W_{F_{Fk}} = -\Delta U_{INT}$$

If you need to calculate F_{Fk}: $W_{F_{Fk}} = F_{Fk} \cdot d \cdot \cos(180^\circ)$

If you need to calculate mu: $F_{Fk} = \mu_k \cdot F_N$

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2.
- If there is an external force acting on a system:

$$ME_i + W_{NET} = ME_F$$

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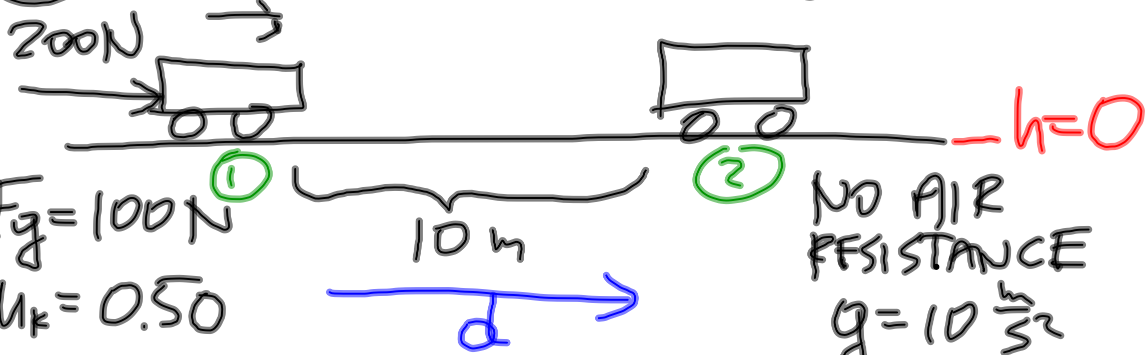
1

$2\,\frac{m}{s}$ $\rightarrow$ $V_2 = ?$



$F_g = 100\,N$

$\mu_k = 0.50$

NO AIR RESISTANCE

$g = 10\,\frac{m}{s^2}$

$$ME_1 + W_{NET} = ME_2 + \Delta U_{INT}$$

$$K_1 + (200)(10)\cos(0^\circ) = K_2 + F_{Fk} \cdot d$$

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$$\frac{1}{2}(10)(2^2) + 2{,}000 = \frac{1}{2}(10)V_2^2 + \mu_k F_N$$

$$20 + 2{,}000 = 5V_2^2 + (0.5)(100)(10)$$

$$20 + 2{,}000 - 500 = 5V_2^2$$

$$1{,}520 = 5V_2^2$$

$$\boxed{V_2 = 17.4\,\frac{m}{s}}$$

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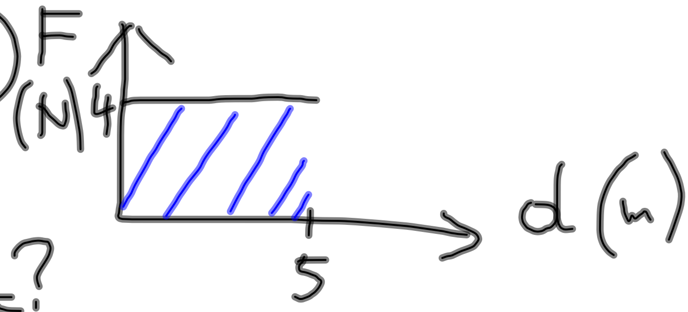
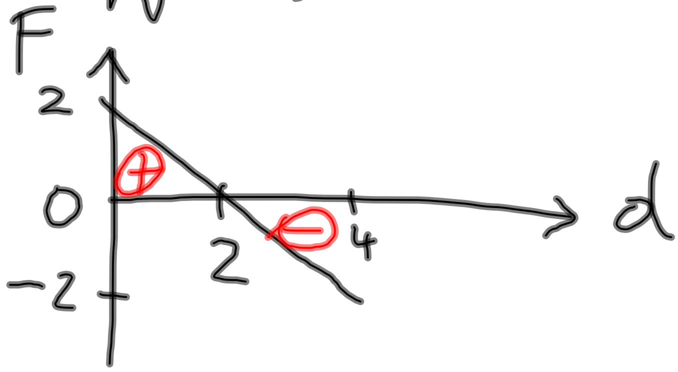
2



$W_F = ?$

W = AREA UNDER F–d GRAPH.

3



$W_{net} = ?$ (F)

$\boxed{W_{net} = \emptyset}$

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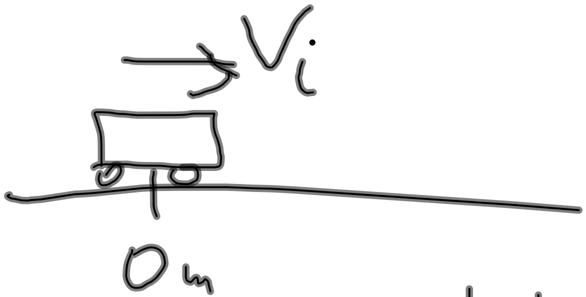

a) What is the car doing from 0–2 m. in terms of its speed? Speeding up.

Why? ⇒ W is + . adding energy.

b) ________ " ________ from 2–4 m?

Why? ⇒ W is − slowing down.

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