

DINAMİK

①

3 yasadan oluşur.

1) Eylemsizlik yasası



$$F_{net} = 0$$

Durur ya da Sabit hızla hareketine devam eder. (Hız varsa)

2) $F = m \cdot a$

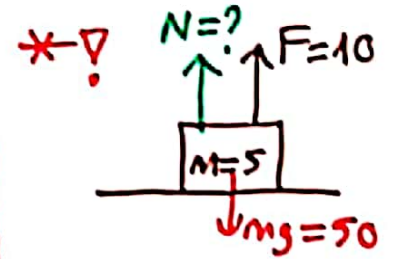
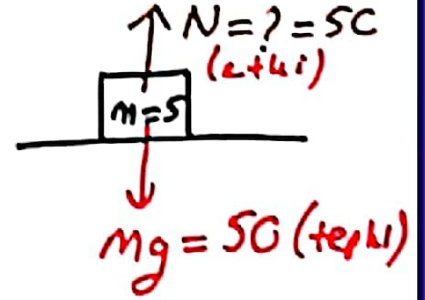


$$F = m \cdot a$$

Kuvvet (N) Kütle (kg) İvme

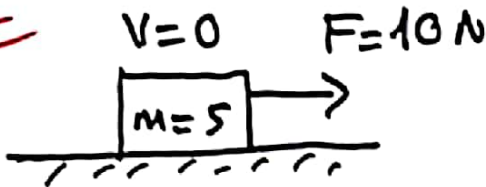
İvme (a): Cismin her saniye hızındaki artış miktarı.

3) Etki-Tepki Yasası



$$\begin{aligned} \text{Tepki (N)} &=? \\ N + F &= 50 \\ N + 10 &= 50 \\ \boxed{N = 40} \end{aligned}$$

Soru



$$\begin{aligned} \text{a) } F &= m \cdot a \\ 10 &= 5 \cdot a \\ \boxed{a = 2} \end{aligned}$$

a) $a = ?$

b) Cismin 4 saniye sonraki hızı?

$$\begin{aligned} \text{b) } v_s &= v_0 + a \cdot t \\ &= 0 + 2 \cdot 4 \\ &= 8 \end{aligned}$$

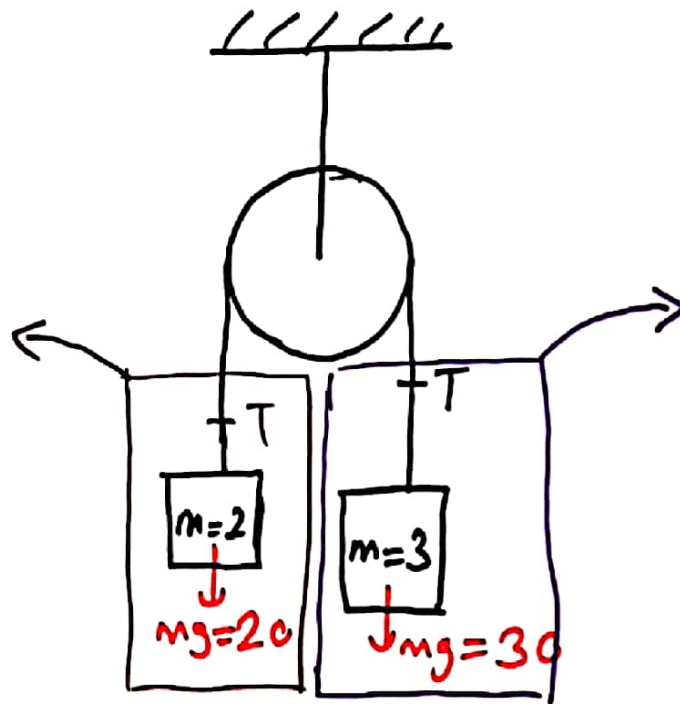


Soru:

$T=?$

③

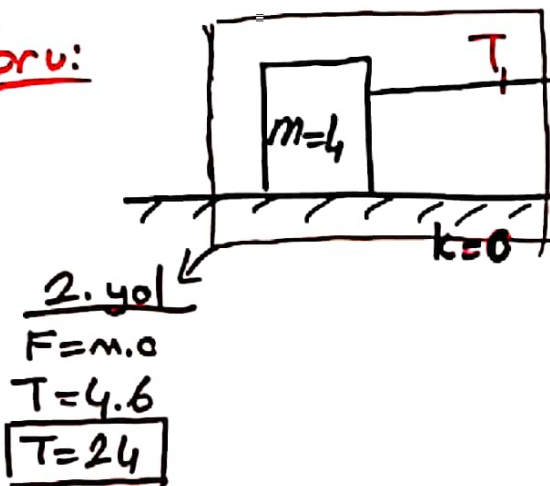
2. yol
 $F_{net} = m \cdot a$
 $T - 20 = 2 \cdot 2$
 $\boxed{T = 24}$



1. yol
 $F_{net} = m \cdot a$
 $30 - T = 3 \cdot 2$
 $\boxed{T = 24}$

$F_{net} = m_T \cdot a$
 $(30 - 20) = (3 + 2) \cdot a$
 $\boxed{a = 2}$

Soru:



2. yol
 $F = m \cdot a$
 $T = 4 \cdot 6$
 $\boxed{T = 24}$

$F = m_T \cdot a$
 $60 = (6 + 4) \cdot a$
 $\boxed{a = 6}$

$T=?$

1. yol
 $F_{net} = m \cdot a$
 $60 - T = 6 \cdot 6$
 $\boxed{T = 24}$

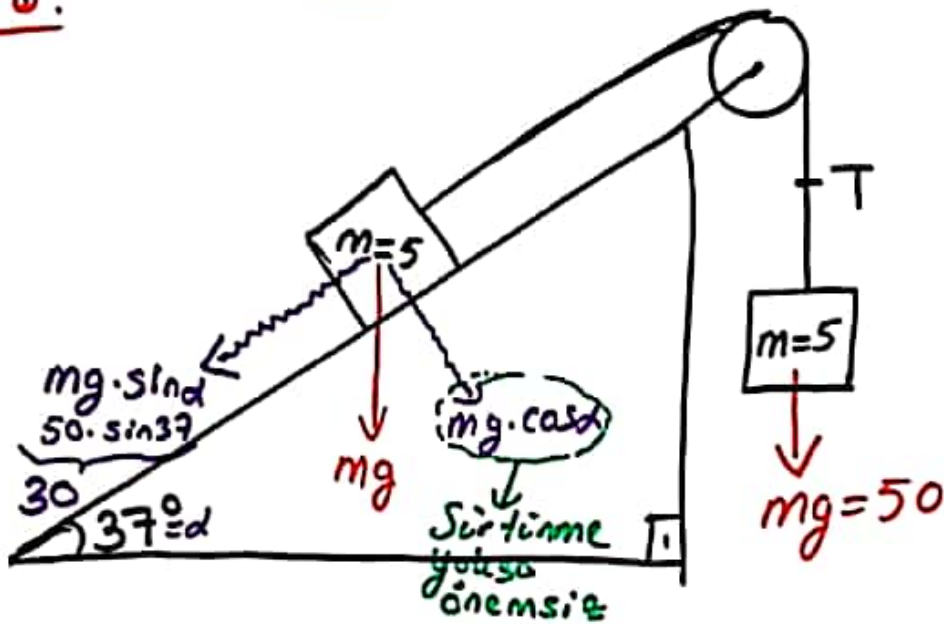
Sorw:



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④

$T = ?$



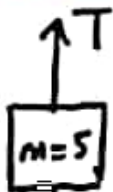
$$F_{\text{net}} = m_T \cdot a$$

$$50 - 30 = (5 + 5) \cdot a$$

$$a = 2$$

1. yol

$a \downarrow$



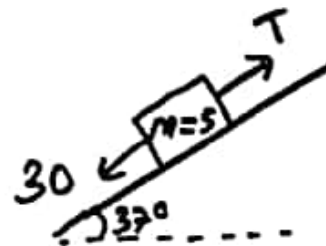
$$mg = 50$$

$$F_{\text{net}} = m \cdot a$$

$$50 - T = 5 \cdot 2$$

$$T = 40$$

2. yol



$$F_{\text{net}} = m \cdot a$$

$$T - 30 = 5 \cdot 2$$

$$T = 40$$

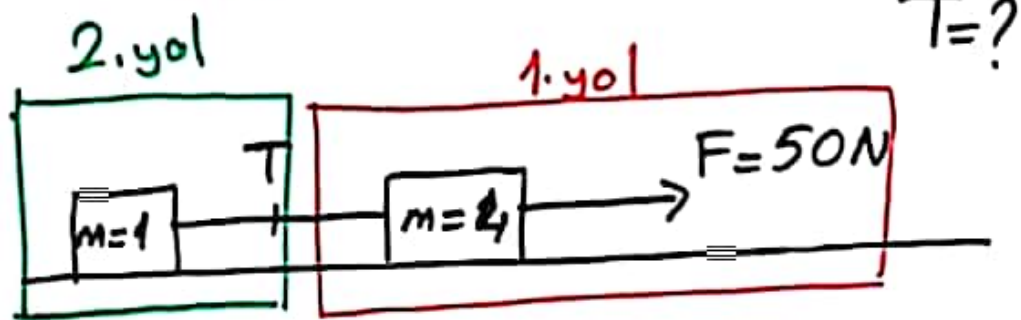
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Soru:

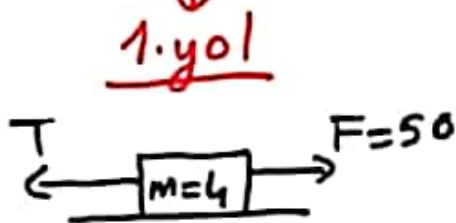


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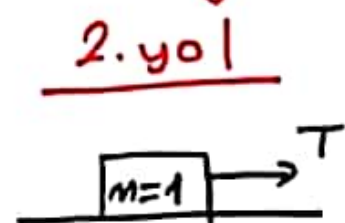
5



$$F = m_T \cdot a$$
$$50 = 5 \cdot a$$
$$a = 10$$



$$F_{\text{net}} = m \cdot a$$
$$50 - T = 4 \cdot 10$$
$$T = 10$$



$$F = m \cdot a$$
$$T = 1 \cdot 10$$
$$T = 10$$

3.yol (Ü.G yolu)

⚠ Herkezi arkasından sorumlu.

50 N $\times$ 5 kg'ı cekirse
? $\times$ 1 kg'ı

$$?(T) = 10$$

✓

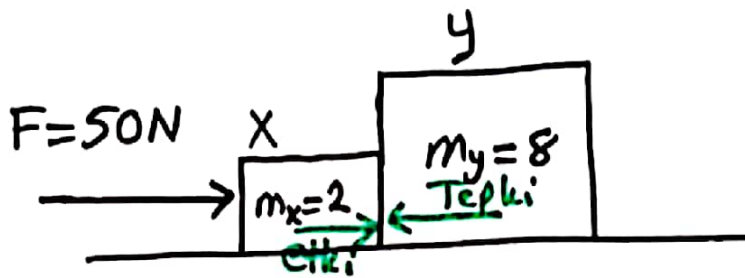
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Soru:



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6



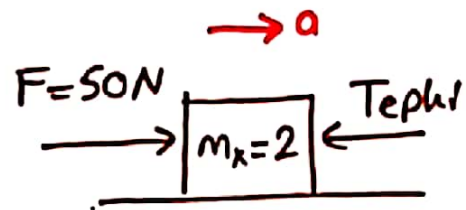
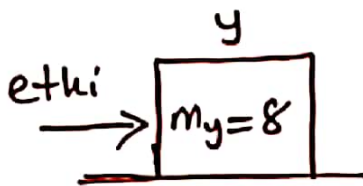
$$F_{net} = m_T \cdot a$$

$$50 = (8+2) \cdot a$$

$$\boxed{a = 5}$$

a) X'in Y'ye etkisi?

b) Y'nin X'e tepkisi?



$$F = m \cdot a$$
$$etki = 8 \cdot 5$$

$$\boxed{etki = 40}$$

$$\Rightarrow etki = Tepki$$

$$F_{net} = m \cdot a$$

$$50 - Tepki = 2 \cdot 5$$

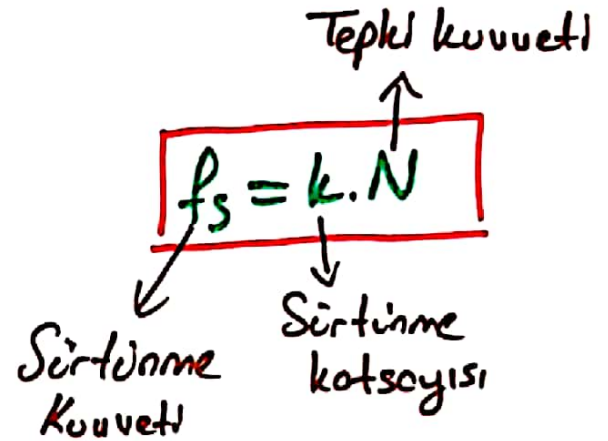
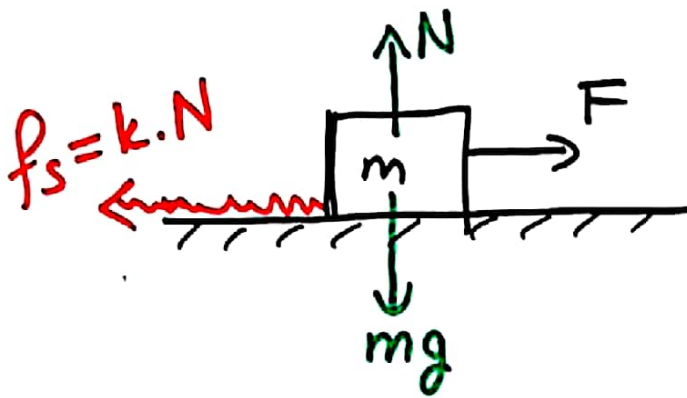
$$\boxed{Tepki = 40}$$

Ü.6 yolu

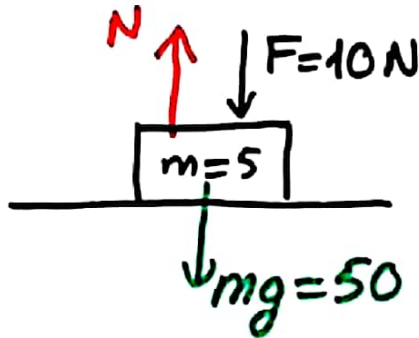
50 N ~~X~~ 10 kg'ı iterse
?(etki) 8 kg'ı iter

$$etki = 40$$



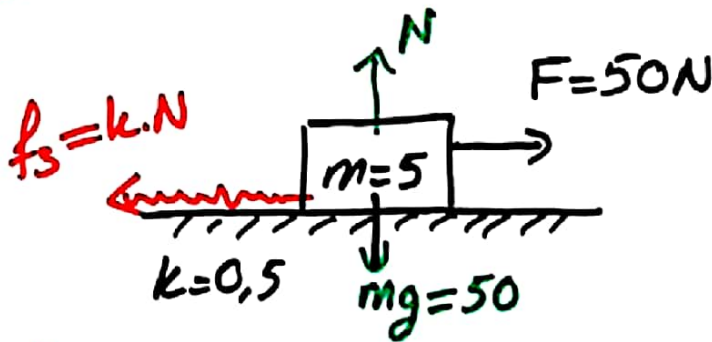
Sürtünmeli Sistemler;

⚠ NOT: N her zaman mg 'ye eşit değildir.



$$\begin{aligned} N &= F + mg \\ N &= 10 + 50 \\ N &= 60 \end{aligned}$$

Soru:

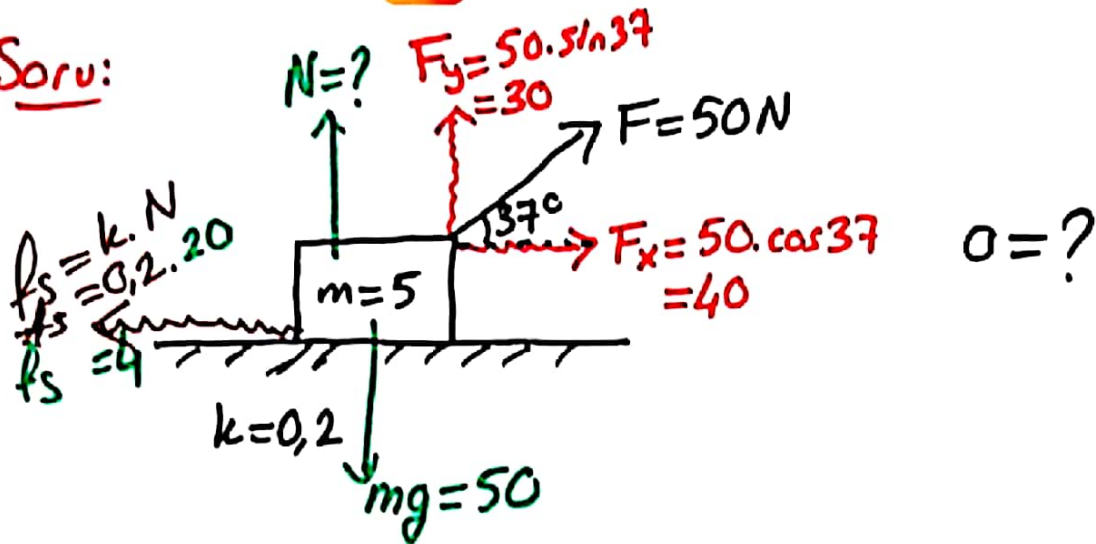


$$a = ?$$

$$\begin{aligned} f_s &= 0,5 \cdot 50 \\ &= 25 \end{aligned}$$

$$\begin{aligned} F_{\text{net}} &= m \cdot a \\ (F - f_s) &= m \cdot a \\ 50 - 25 &= 5 \cdot a \\ \boxed{a = 5} \end{aligned}$$

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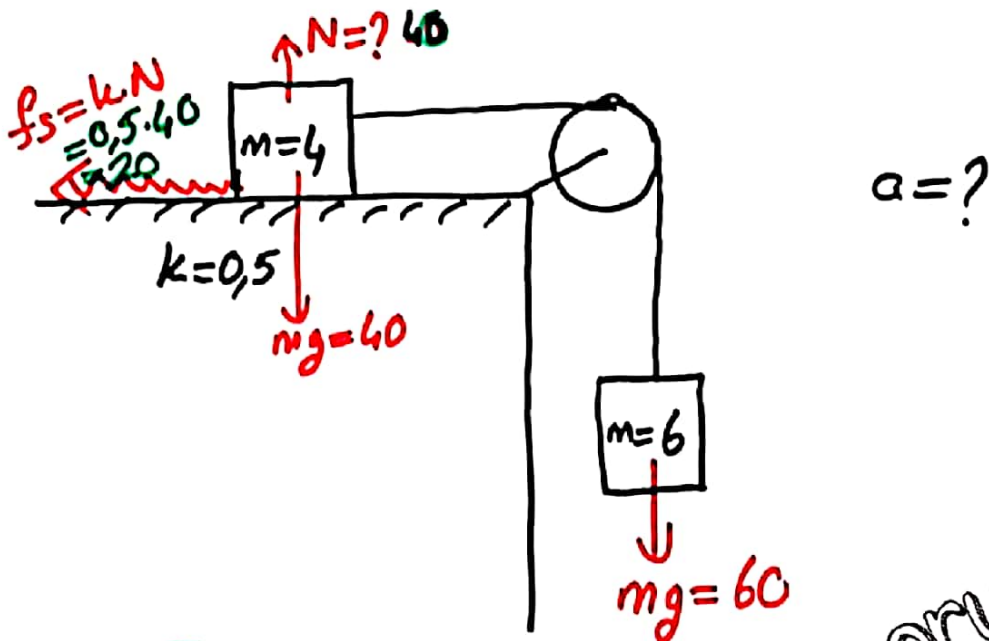
Soru:

$$F_{\text{net}} = m \cdot a$$

$$(F_x - f_s) = m \cdot a$$

$$40 - 4 = 5 \cdot a$$

$$a = \frac{36}{5}$$

Soru:

$$F_{\text{net}} = m_T \cdot a$$

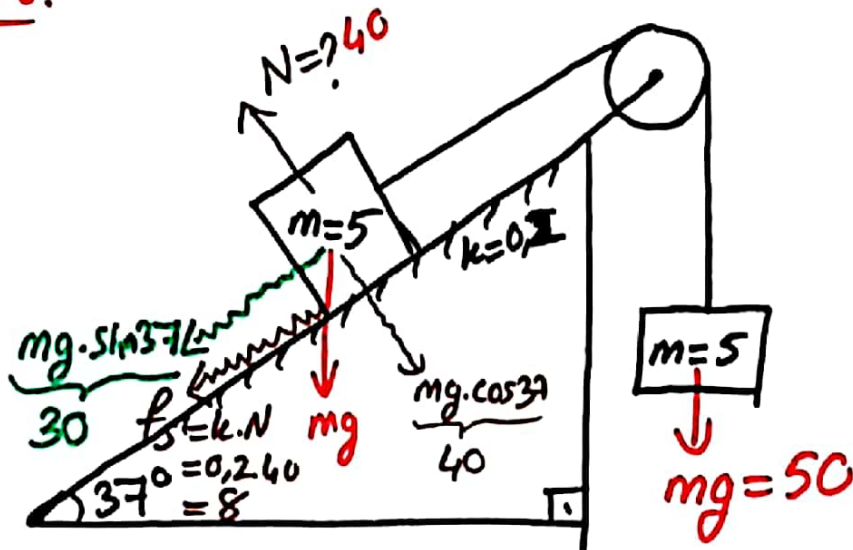
$$(60 - f_s) = (6 + 4) \cdot a$$

$$60 - 20 = 10 \cdot a$$

$$a = 4$$

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Soru:



$a = ?$

$$F_{net} = m_T \cdot a$$

$$50 - (30 + f_s) = (5 + 5) \cdot a$$

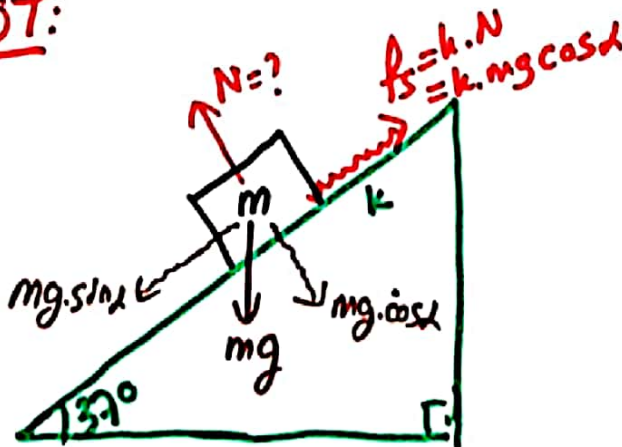
$$50 - (30 + 8) = 10 \cdot a$$

$$a = \frac{12}{10}$$

$$a = 1,2$$

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! NOT:



$$F_{net} = m \cdot a$$

$$mg \cdot \sin \alpha - f_s = m \cdot a$$

$$\cancel{mg \cdot \sin \alpha} - \cancel{k mg \cdot \cos \alpha} = \cancel{m \cdot a}$$

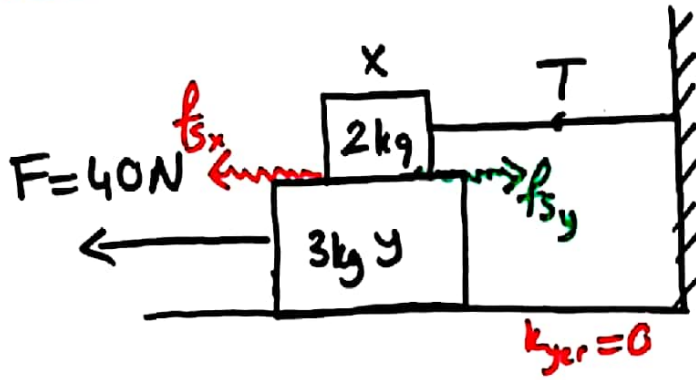
* Eğik düzlemde kütle önemsiz.

Soru:



$$a_1 = a_2$$

Soru:

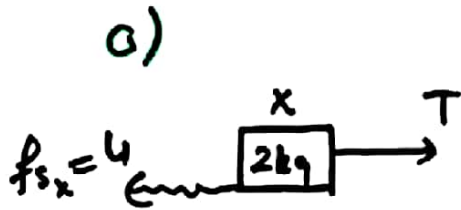


X ile Y arasındaki
sürtünme katsayısı 0,2
olduğuna göre;
a) $T=?$
b) Y cisminin ivmesi?

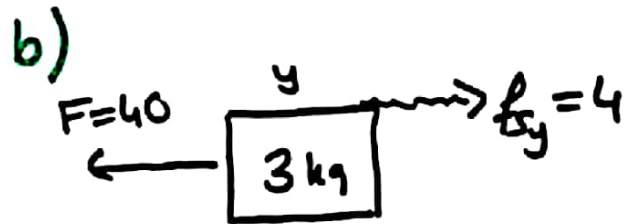
! NOT: * f_{sx} X cismine etki eden ve ipli gereken kuvvet.

* f_{sy} Y cisminin hareketini zorlaştıran kuvvet.

$$f_{sx} = f_{sy} = k \cdot N \\ = 0,2 \cdot 20 \\ = 4$$



$$T = 4$$

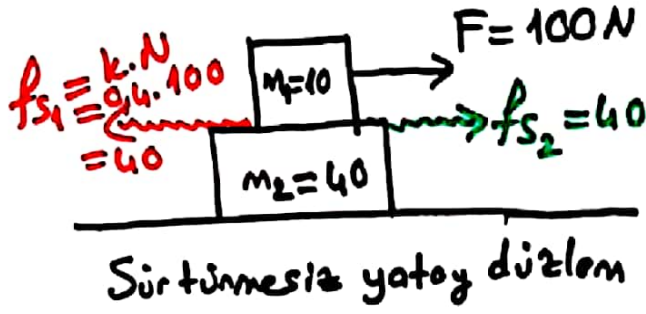


$$F_{net} = m \cdot a$$

$$(40 - 4) = 3 \cdot a$$

$$a = 12$$

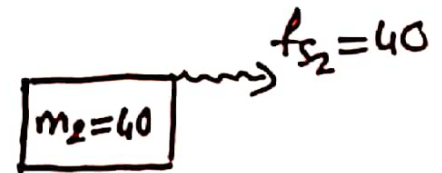
Soru:



$a_1 = ?$ **6**

$a_2 = ?$ **1**

(Cisimler arası sürtünme katsayısı 0,4)



$F_{\text{net}} = m \cdot a$

$100 - 40 = 10 \cdot a_1$

$a_1 = 6$

$F = m \cdot a$

$40 = 40 \cdot a_2$

$a_2 = 1$

⚠ Kuvvetin uygulandığının ivmesi büyük çıkorsa NO problem.

⚠⚠ Kuvvetin uygulandığının ivmesi fazla çıkorsa; Bir sonraki soruyu incele...

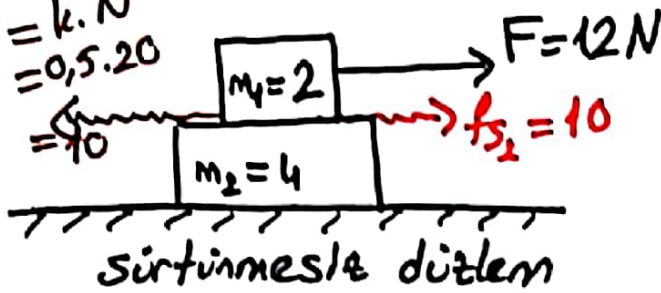
Soru: Very hard



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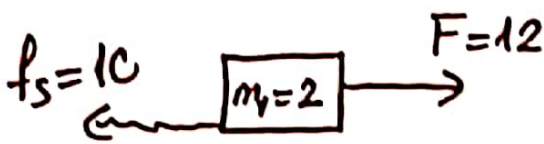
$$f_{s1} = k \cdot N \\ = 0,5 \cdot 20 \\ = 10$$



$$a_1 = ? \quad 2$$

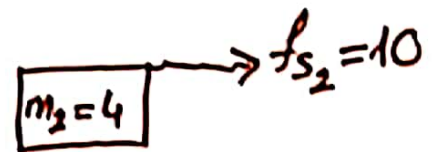
$$a_2 = ? \quad 2$$

(Cisimler arası sürtünme katsayısı 0,5)



$$F_{\text{net}} = m \cdot a \\ (12 - 10) = 2 \cdot a_1$$

$$a_1 = 1$$

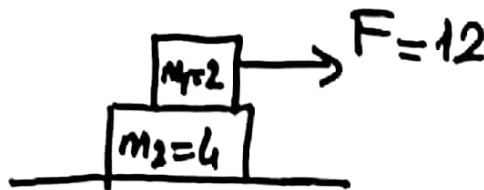


$$F = m \cdot a \\ 10 = 4 \cdot a_2$$

$$a_2 = 2,5$$

Problem Var

⚠ Kuvvetin uygulandığının ivmesi küçük çıkmaz. Çıkarsa; Cisimler birlikte ortak ivme ile hareket eder.



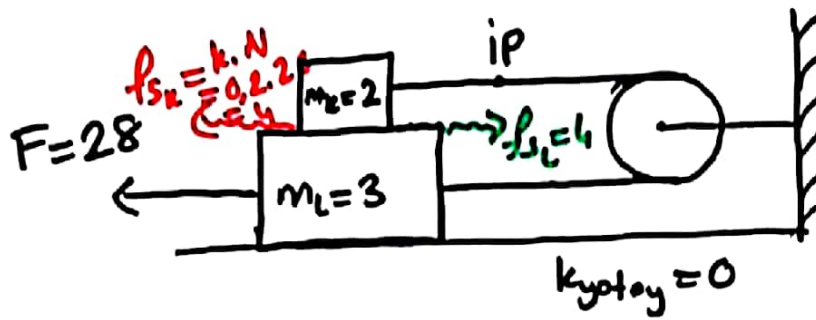
$$F = m_T \cdot a_{\text{ort}} \\ 12 = (4 + 2) \cdot a_{\text{ort}}$$

$$a_{\text{ort}} = 2$$

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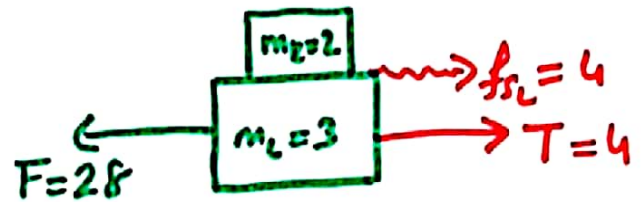


Soru:



NOT: Cisimler birbirine iple bagli ise birlikte hareket eder.

(Cisimler arasi $k=0,2$)



$$F_{\text{net}} = m_T \cdot a_{\text{ort}}$$

$$28 - (4 + 4) = (3 + 2) \cdot a_{\text{ort}}$$

$$a_{\text{ort}} = \frac{20}{5}$$

$$a_{\text{ort}} = 4$$