

FYZIKA VII. - Páka - příklady

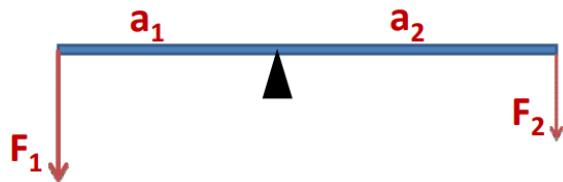
1. Urči velikost síly F_1 , jestliže $a_1 = 40 \text{ cm}$, $F_2 = 60 \text{ N}$ a $a_2 = 30 \text{ cm}$.

$$a_1 = 40 \text{ cm} = 0,4 \text{ m}$$

$$F_2 = 60 \text{ N}$$

$$a_2 = 30 \text{ cm} = 0,3 \text{ m}$$

$$\underline{F_1 = ? \text{ (N)}}$$



$$M_1 = M_2 \Rightarrow F_1 \cdot a_1 = F_2 \cdot a_2$$

$$F_1 \cdot 0,4 = 60 \cdot 0,3$$

$$0,4 \cdot F_1 = 18 \quad / : 0,4$$

$$F_1 = 45 \text{ N}$$

Hledaná síla má velikost 45 N.

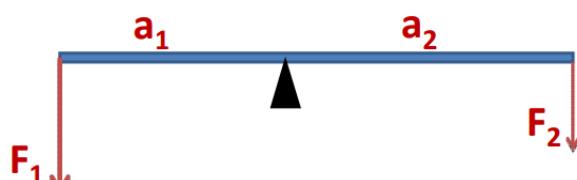
2. Urči velikost síly F_2 , jestliže $a_1 = 80 \text{ cm}$, $F_1 = 500 \text{ N}$ a $a_2 = 100 \text{ cm}$.

$$a_1 = 80 \text{ cm} = 0,8 \text{ m}$$

$$F_1 = 500 \text{ N}$$

$$a_2 = 100 \text{ cm} = 1 \text{ m}$$

$$\underline{F_2 = ? \text{ (N)}}$$



$$M_1 = M_2 \Rightarrow F_1 \cdot a_1 = F_2 \cdot a_2$$

$$500 \cdot 0,8 = F_2 \cdot 1$$

$$F_2 = 400 \text{ N}$$

Hledaná síla má velikost 400 N.

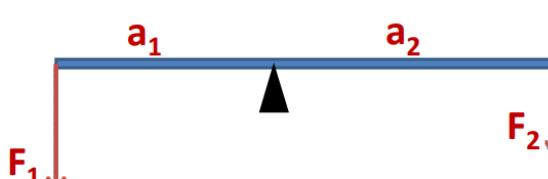
3. Urči velikost ramene a_2 , jestliže $a_1 = 120 \text{ cm}$, $F_1 = 400 \text{ N}$ a $F_2 = 300 \text{ N}$.

$$a_1 = 120 \text{ cm} = 1,2 \text{ m}$$

$$F_1 = 400 \text{ N}$$

$$F_2 = 300 \text{ N}$$

$$\underline{a_2 = ? \text{ (m)}}$$



$$M_1 = M_2 \Rightarrow F_1 \cdot a_1 = F_2 \cdot a_2$$

$$400 \cdot 1,2 = 300 \cdot a_2$$

$$480 = 300 \cdot a_2$$

$$/ : 300$$

$$a_2 = 1,6 \text{ m}$$

Hledané rameno má délku 1,6 m.

4. Urči velikost ramene a_1 , jestliže $a_2 = 180 \text{ cm}$, $F_1 = 500 \text{ N}$ a $F_2 = 600 \text{ N}$.

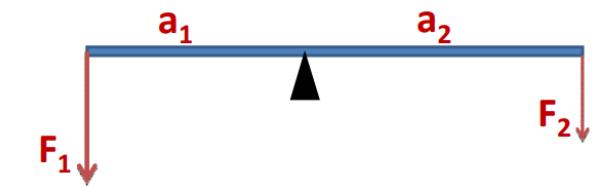
$$a_2 = 180 \text{ cm} = 1,8 \text{ m}$$

$$F_1 = 500 \text{ N}$$

$$F_2 = 600 \text{ N}$$

$$\underline{a_1 = ? \text{ (m)}}$$

$$M_1 = M_2 \Rightarrow F_1 \cdot a_1 = F_2 \cdot a_2$$



$$500 \cdot a_1 = 600 \cdot 1,8$$

$$500 \cdot a_1 = 1080$$

$$a_1 = 2,16 \text{ m}$$

Hledané rameno má délku 2,16 m.

5. Urči hmotnost tělesa m_2 , jestliže $a_1 = 80 \text{ cm}$, $m_1 = 25 \text{ kg}$ a $a_2 = 120 \text{ cm}$.

$$a_1 = 80 \text{ cm} = 0,8 \text{ m}$$

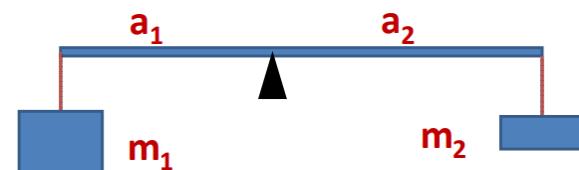
$$m_1 = 25 \text{ kg}$$

$$a_2 = 120 \text{ cm} = 1,2 \text{ m}$$

$$\underline{m_2 = ? \text{ (kg)}}$$

$$M_1 = M_2 \Rightarrow F_1 \cdot a_1 = F_2 \cdot a_2$$

$$F_1 = m_1 \cdot g \Rightarrow F_1 = 25 \cdot 10 \quad F_1 = 250 \text{ N}$$



$$250 \cdot 0,8 = F_2 \cdot 1,2$$

$$200 = 1,2 \cdot F_2 \quad / : 1,2$$

$$F_2 = 166,7 \text{ N} \Rightarrow m_2 = 166,7 : 10 = 16,67 \text{ kg}$$

Hledaná hmotnost tělesa je 16,67 kg.

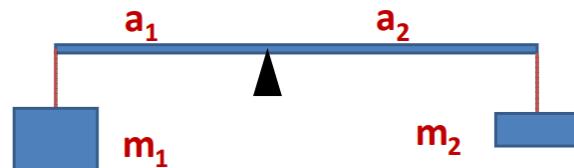
6. Urči hmotnost tělesa m_1 , jestliže $a_1 = 40 \text{ cm}$, $m_2 = 20 \text{ kg}$ a $a_2 = 50 \text{ cm}$.

$$a_1 = 40 \text{ cm} = 0,4 \text{ m}$$

$$m_2 = 20 \text{ kg}$$

$$a_2 = 50 \text{ cm} = 0,5 \text{ m}$$

$$\underline{m_1 = ? \text{ (kg)}}$$



$$M_1 = M_2 \Rightarrow F_1 \cdot a_1 = F_2 \cdot a_2$$

$$F_2 = m_2 \cdot g \Rightarrow F_2 = 20 \cdot 10 \quad F_2 = 200 \text{ N}$$

$$F_1 \cdot 0,4 = 200 \cdot 0,5$$

$$0,4 \cdot F_1 = 100 \quad / : 0,4$$

$$F_1 = 250 \text{ N} \Rightarrow m_1 = 250 : 10 = 25 \text{ kg}$$

Hledaná hmotnost tělesa je 25 kg.