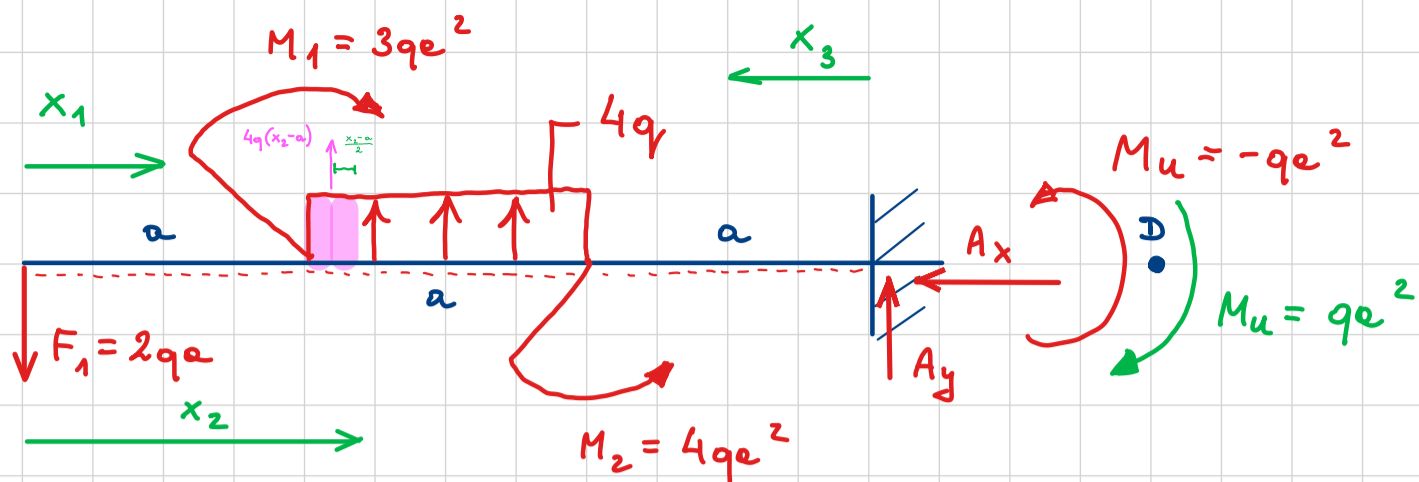


Belka utwierdzona



$$3n - r = 0$$

$$1) \sum F_x: A_x = 0$$

$$2) \sum F_y: -F_1 + 4qa + A_y = 0$$

$$3) \sum M^A: -F_1 \cdot 3a + M_1 + 4qa \cdot 1,5a - M_2 - M_u = 0$$

$$-6qa^2 + 3qa^2 + 6qa^2 - 4qa^2 = M_u$$

$$M_u = -qa^2$$

$$A_y = F_1 - 4qa = -2qa$$

SPRAWDZENIE

$$\sum M^D: -F_1 \cdot 4a + M_1 + 4qa \cdot 2,5a - M_2 + A_y a + M_u = 0$$

$$-8qa^2 + 3qa^2 + 10qa^2 - 4qa^2 - 2qa^2 + qa^2 = 0$$

$$-14qa^2 + 14qa^2 = 0 \quad \text{ok!}$$

Przedział I

$$Mg': -F_1 x_1$$

$$T': -F_1 = -2qa$$

$$Mg'(x_1 = 0) = 0$$

$$Mg'(x_1 = a) = -2qa^2$$

Przedział II

$$Mg'' : -F_1 x_2 + M_1 + 4q(x_2 - a) \frac{(x_2 - a)}{2}$$

$$Mg'' : -F_1 x_2 + M_1 + 2q(x_2 - a)^2$$

$$T'' : -F_1 + 4q(x_2 - a)$$

$$Mg''(x_2 = a) = -2qa^2 + 3qa^2 = qa^2$$

$$Mg''(x_2 = 2a) = -4qa^2 + 3qa^2 + 2qa^2 = qa^2$$

$$T''(x_2 = a) = -2qa$$

$$T''(x_2 = 2a) = -2qa + 4qa = 2qa$$

różnica o
 $4qa^2$ czyli
tyle ile
wynosi
 M_2

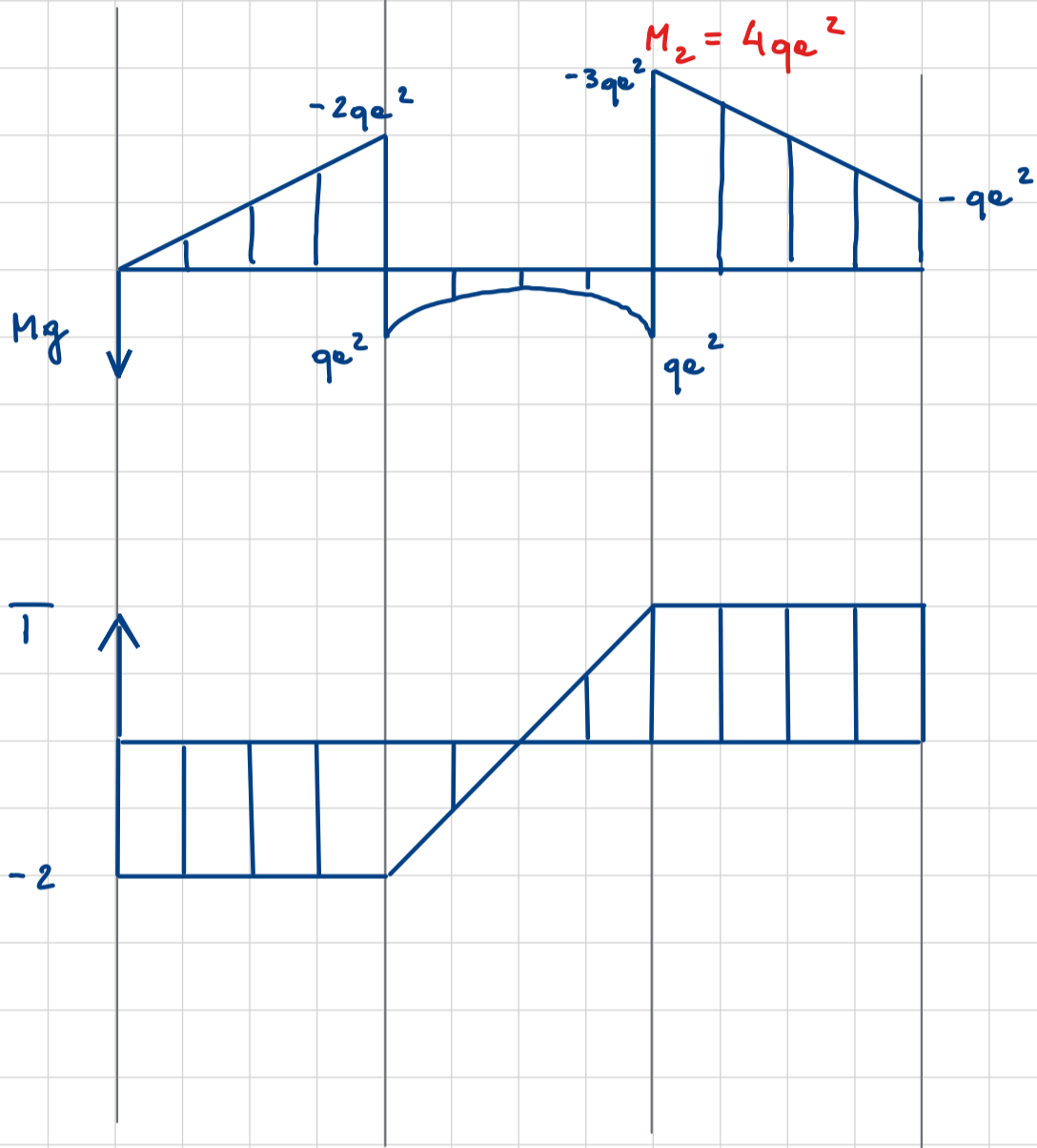
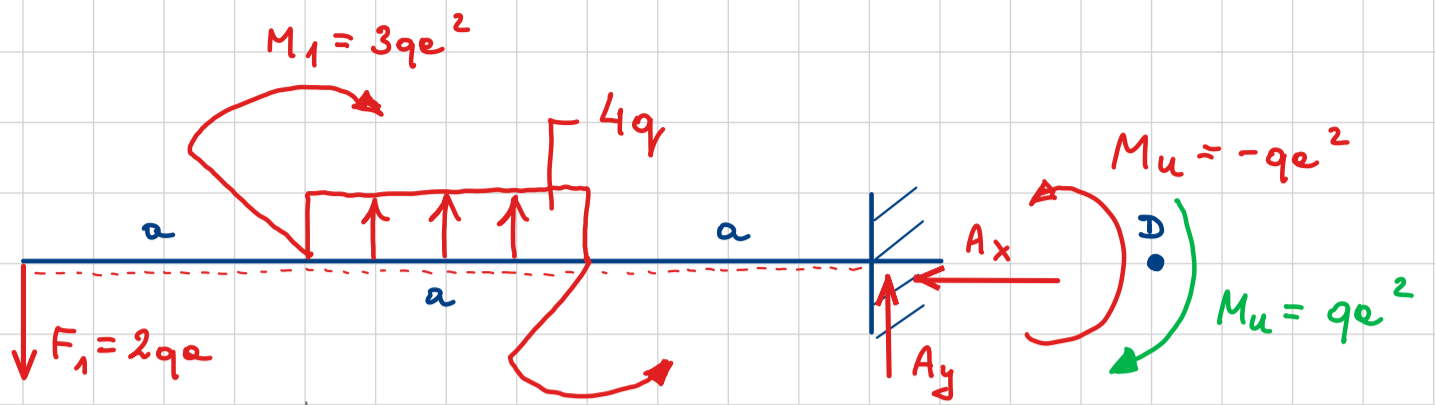
Przedział III

$$Mg''' : -M_u + A_y x_3$$

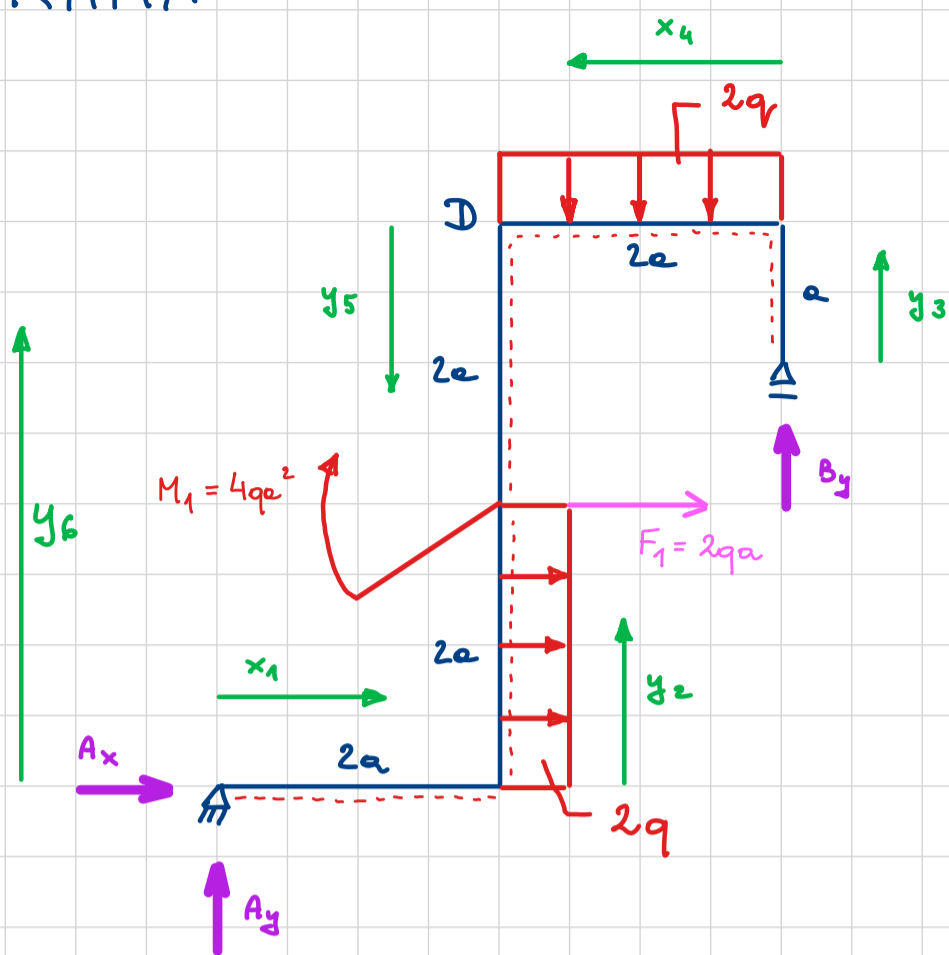
$$T''' : -A_y = 2qa$$

$$Mg'''(x_3 = 0) = -M_u = -qa^2$$

$$Mg'''(x_3 = a) = -M_u + A_y a = -qa^2 - 2qa^2 = -3qa^2$$



RAMA



$$\Sigma F_x: A_x + 2q \cdot 2a + F_1 = 0$$

$$\Sigma F_y: A_y + B_y - 2q \cdot 2a = 0$$

$$\Sigma M^A: 2q \cdot 2a \cdot a + M_1 + F_1 \cdot 2a + 2q \cdot 2a \cdot 3a - B_y \cdot 4a = 0 \quad | :a$$

$$A_x = -F_1 - 4qa$$

$$A_x = -6qa$$

$$4qa + 4qa + 4qa + 12qe = 4B_y$$

$$B_y = 6qa$$

$$A_y = 4qe - B_y$$

$$A_y = -2qa$$

SPRAWDZENIE

$$\Sigma M^D: A_y \cdot 2a - A_x \cdot 4e + M_1 - 4qe \cdot 3a - F_1 \cdot 2a + 4qe \cdot a - B_y \cdot 2a = 0$$

SPRAWDZENIE

$$\Sigma M^D: A_y \cdot 2a - A_x \cdot 4a + M_1 - 4qe \cdot 3a - F_1 \cdot 2a + 4qe \cdot a - B_y \cdot 2a = 0$$
$$- \cancel{4qe^2} + 24qe^2 + \cancel{4qe^2} - 12qe^2 - \cancel{4qe^2} + \cancel{4qe^2} - 12qe^2 = 0$$

OK!

Przedział I

$$Mg': A_y x_1$$

$$T': A_y = -2qe$$

$$Mg'(x_1=0) = 0$$

$$Mg'(x_1=2a) = -2qe \cdot 2a = \underline{-4qe^2}$$

Przedział II

$$Mg'': Mg'(x_2=2a)$$