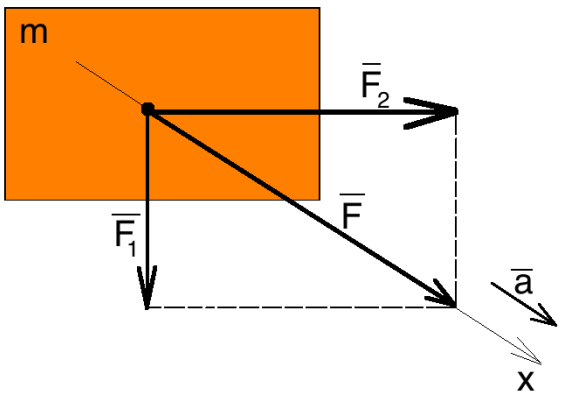
Forces of 8.85 N and 2.21 N act at right angles on a stack. What is the mass of the stack if it accelerates at a rate of 4.4 m/s^2?

**Solution:**

$F_1 = 8.85\ \text{N} - \text{first force};$

$F_2 = 2.21\ \text{N} - \text{second force};$

$a = 4.4\frac{m}{s^2} - \text{acceleration of the stack};$




The resultant force F of the triangle ABC:

$$\vec{F} = \vec{F}_1 + \vec{F}_2;\ |\vec{F}| = \sqrt{|\vec{F}_1|^2 + |\vec{F}_2|^2}$$

$$F = \sqrt{F_1^2 + F_2^2} \qquad (1)$$

Newton's second law for the stack:

$$\vec{F} = m\vec{a}$$

$$x: F = ma$$

$$m = \frac{F}{a} \qquad (2)$$

$(1)\text{in}(2)$:

$$m = \frac{F}{a} = \frac{\sqrt{F_1^2 + F_2^2}}{a} = \frac{\sqrt{(8.85\ \text{N})^2 + (2.21\ \text{N})^2}}{4.4\frac{m}{s^2}} = 2.07\ \text{kg}$$

**Answer:** mass of the stack is 2.07 kg.

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