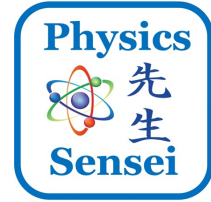


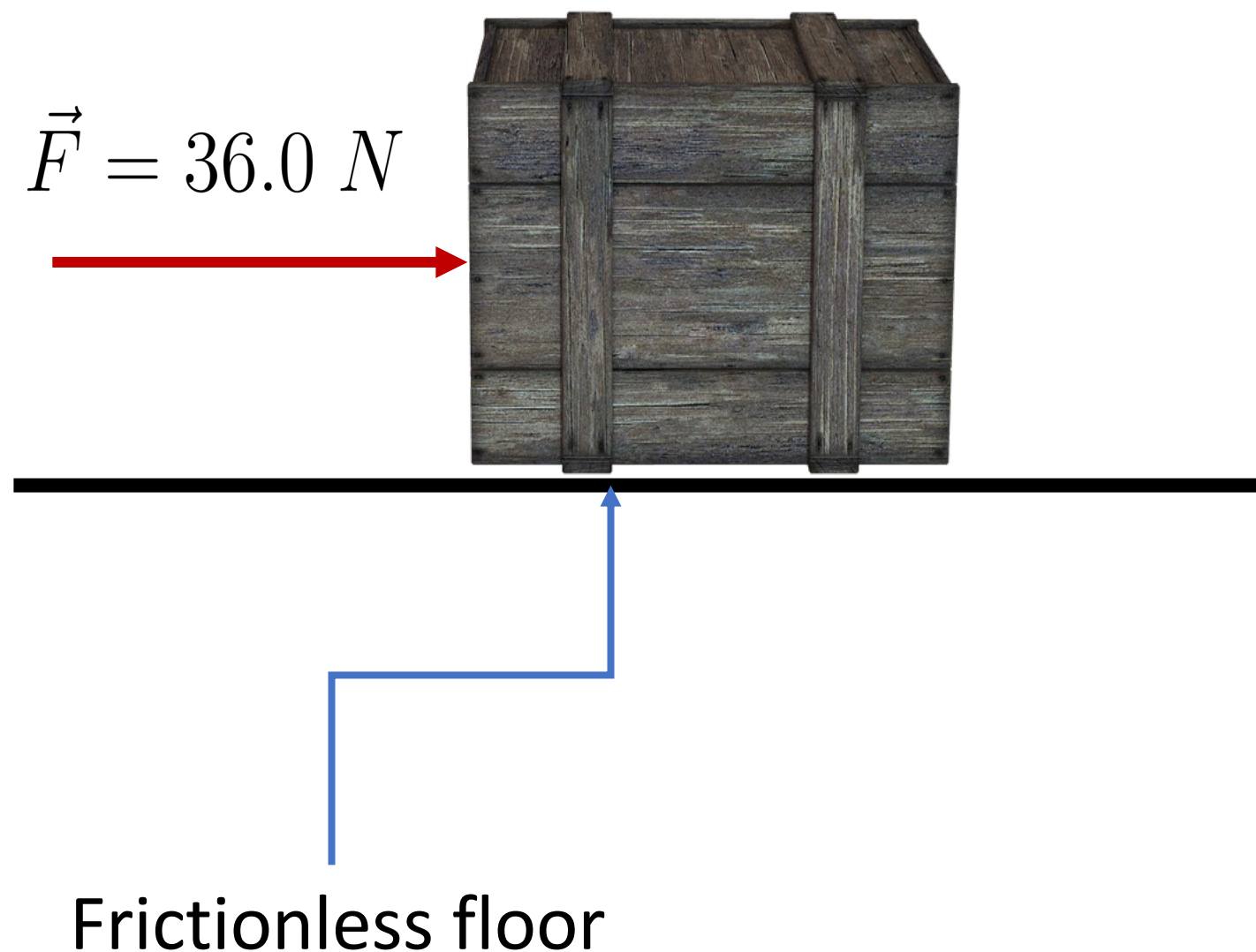


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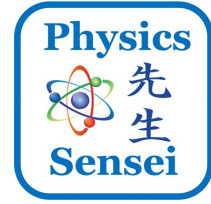
Object Moving on a Frictionless Floor

A wooden crate, mass 6.00 kg, is being pushed by a force of 36.0 N magnitude as shown below, on a frictionless floor. The force acts horizontally as indicated. Find the crate's acceleration.





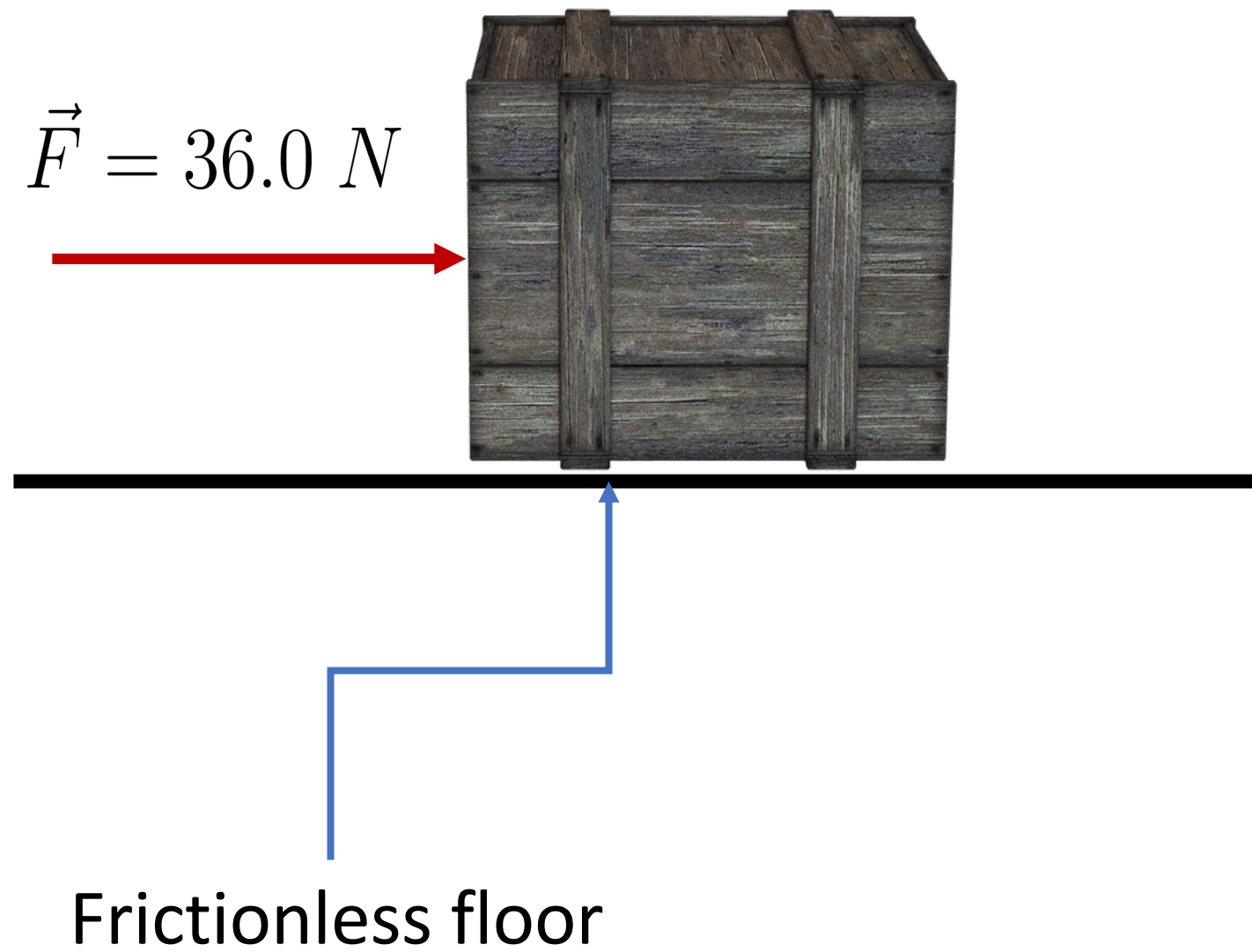
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Find the crate's acceleration

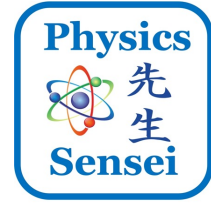
$$m_{\text{crate}} = 6.00 \text{ kg}$$

$$\vec{F} = 36.0 \text{ N}$$





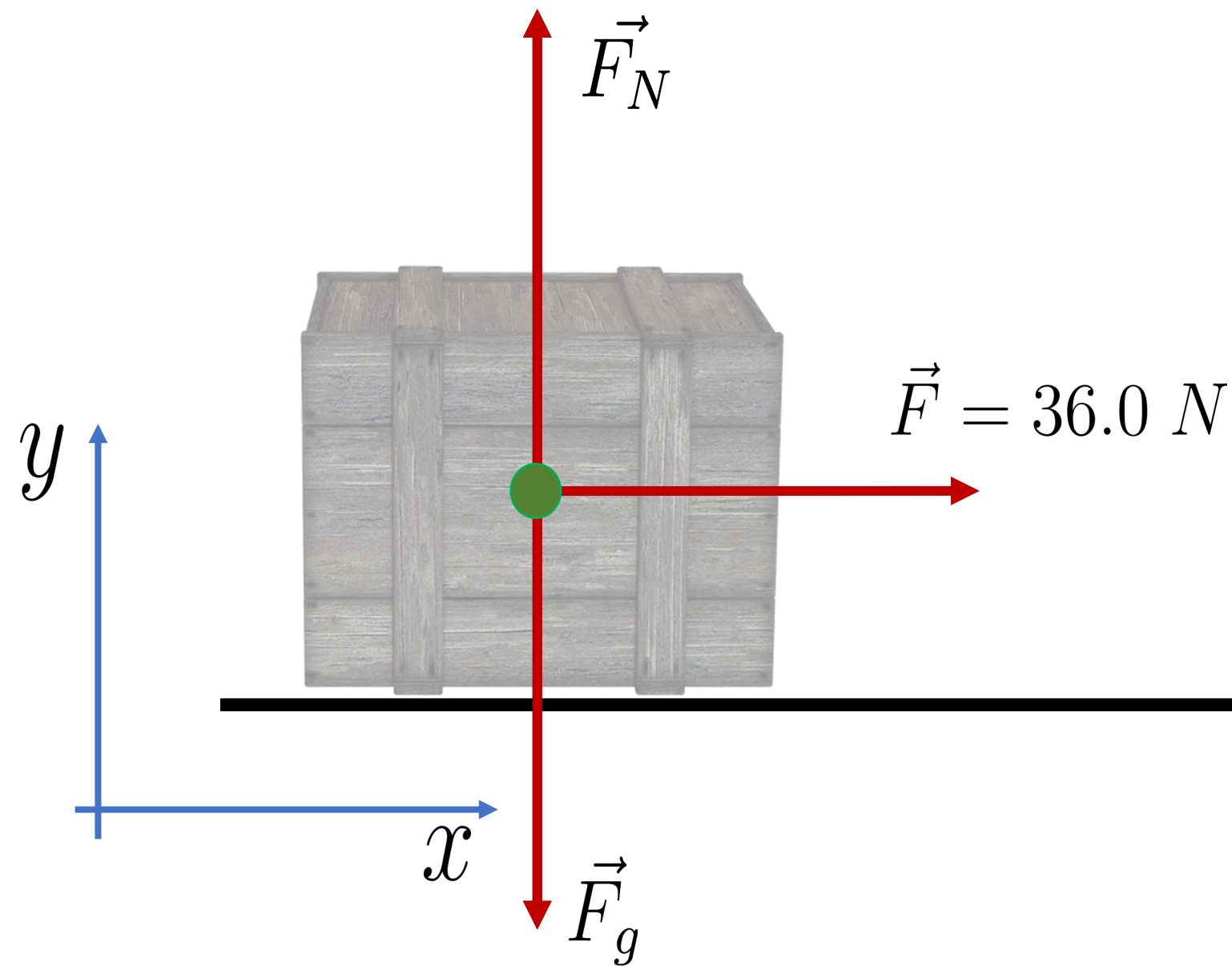
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Free Body Diagram (FBD)

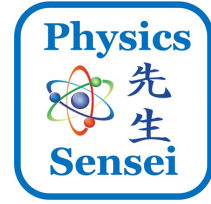
$$m_{\text{crate}} = 6.00 \text{ kg}$$

$$\vec{F} = 36.0 \text{ N}$$





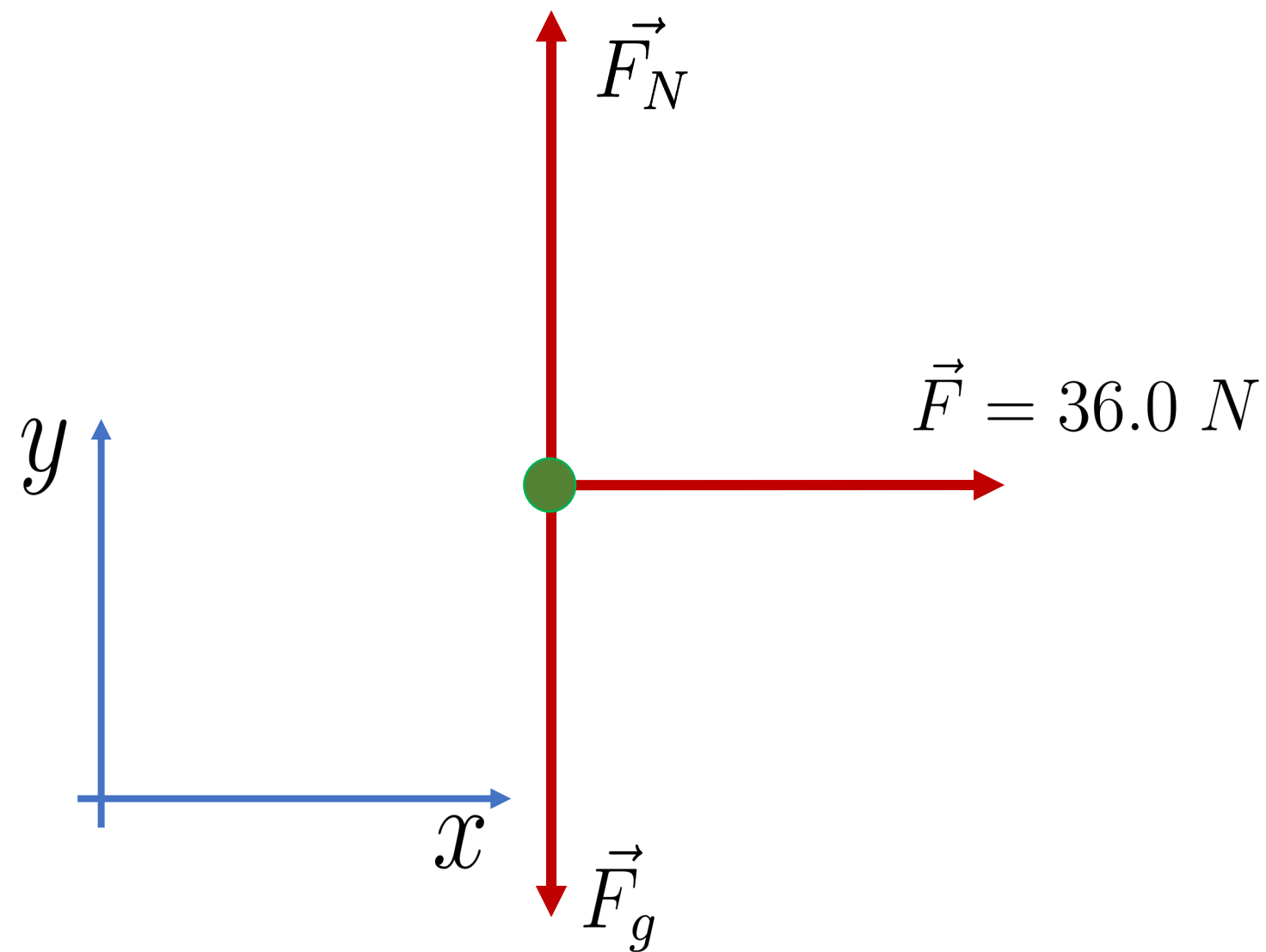
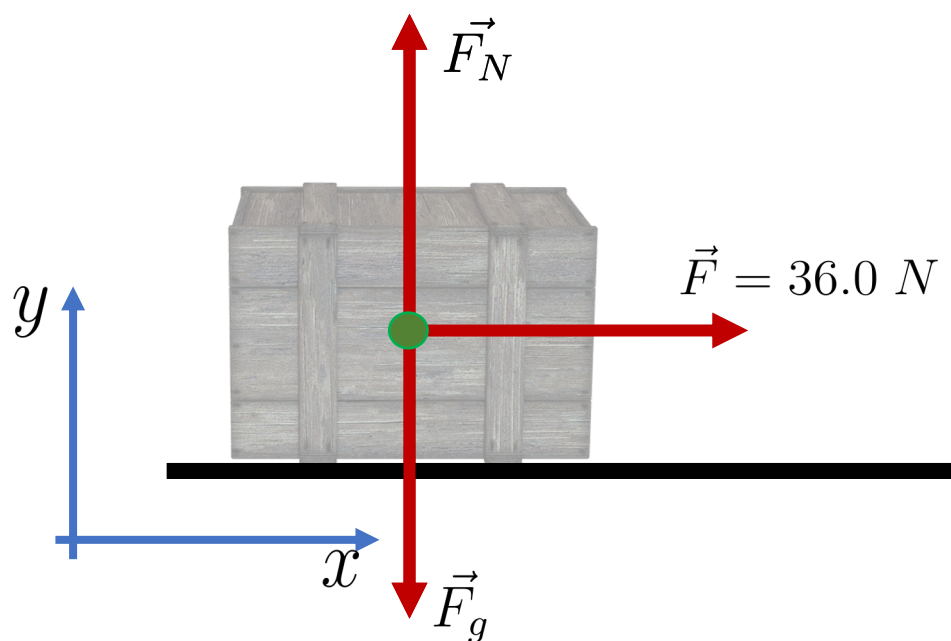
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Free Body Diagram (FBD)

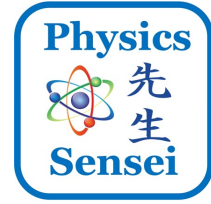
$$m_{\text{crate}} = 6.00 \text{ kg}$$

$$\vec{F} = 36.0 \text{ N}$$



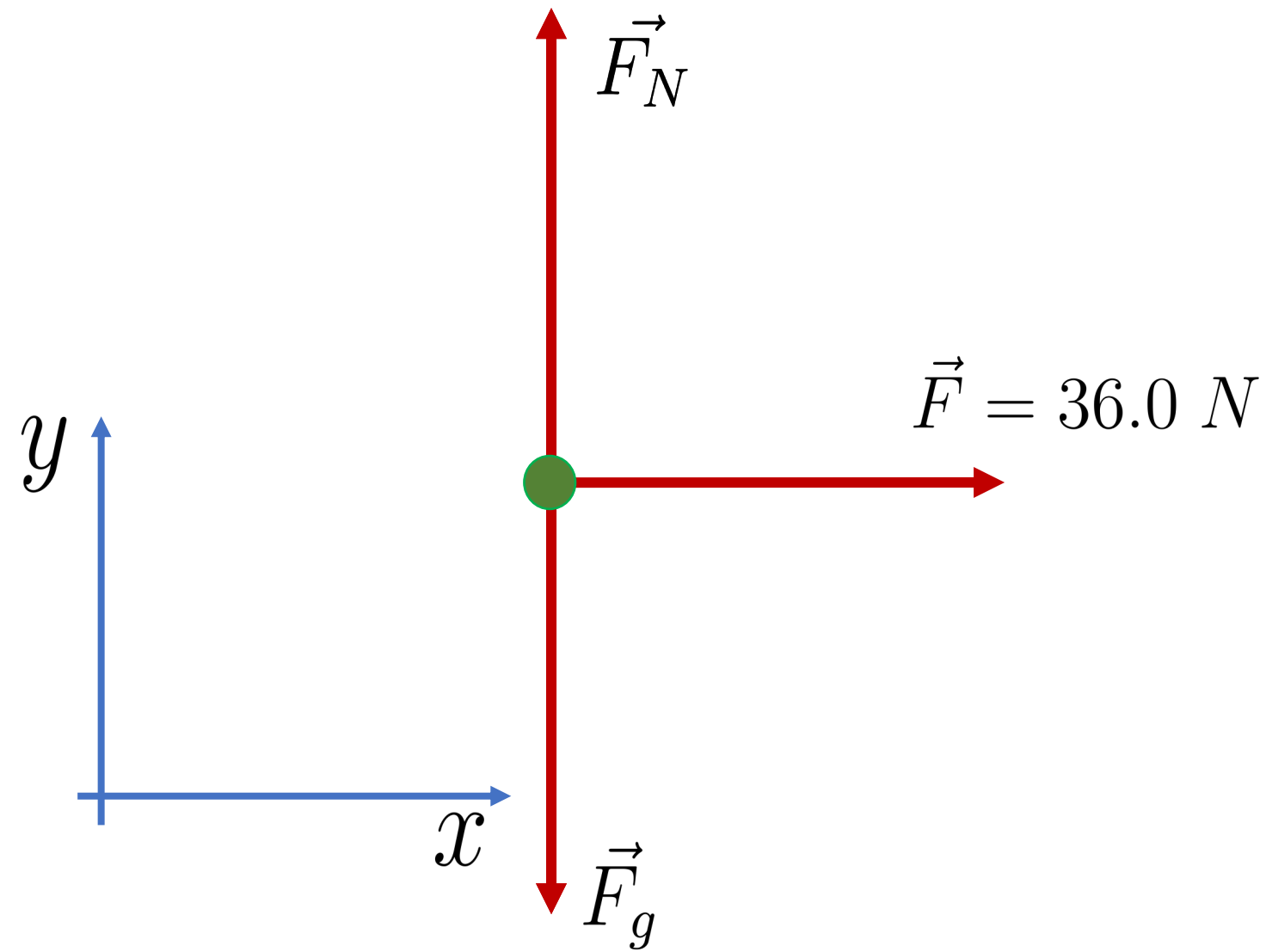
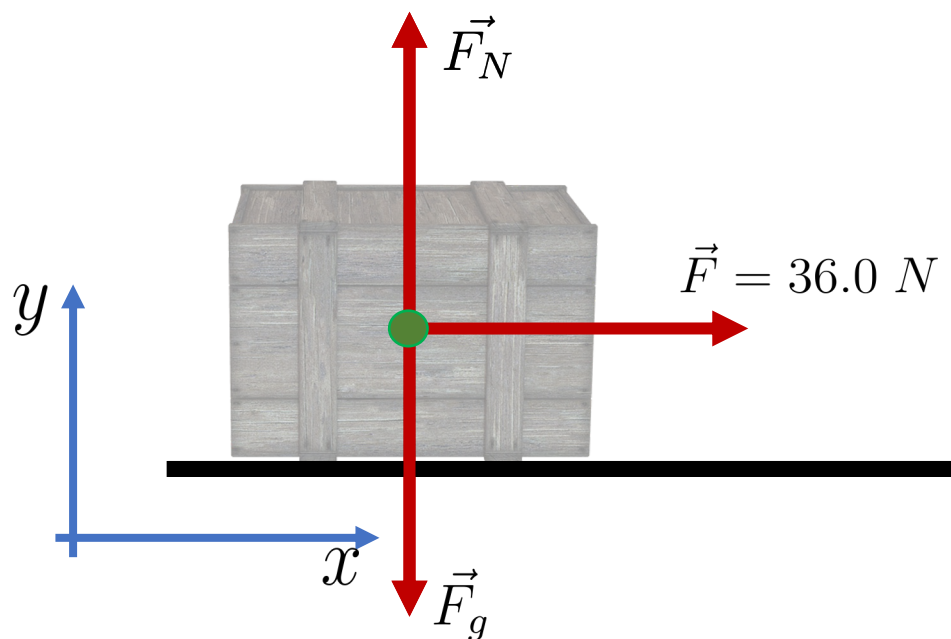


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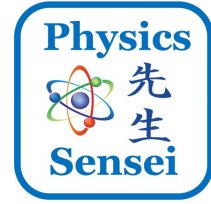
Newton's 2nd law

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





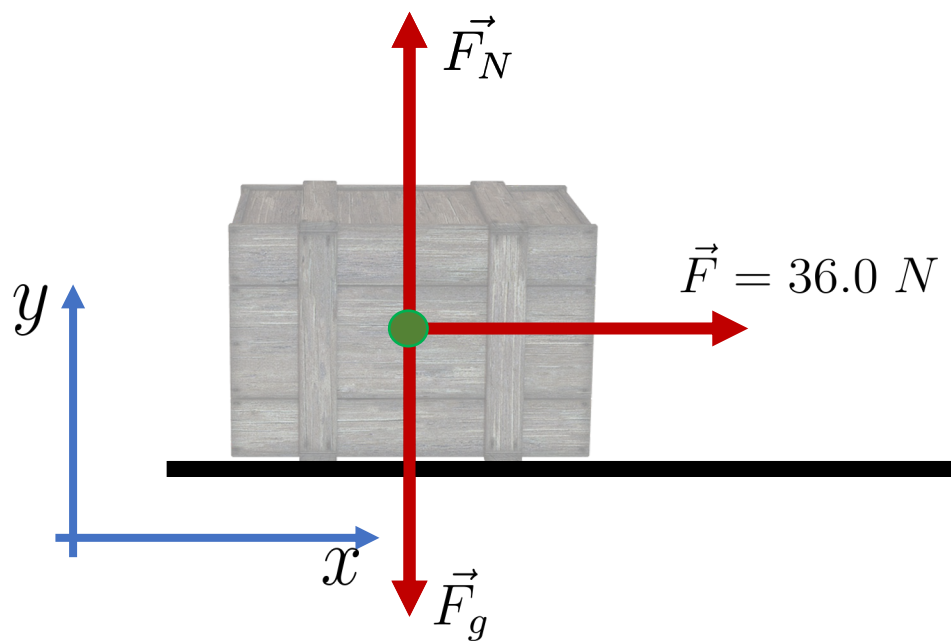
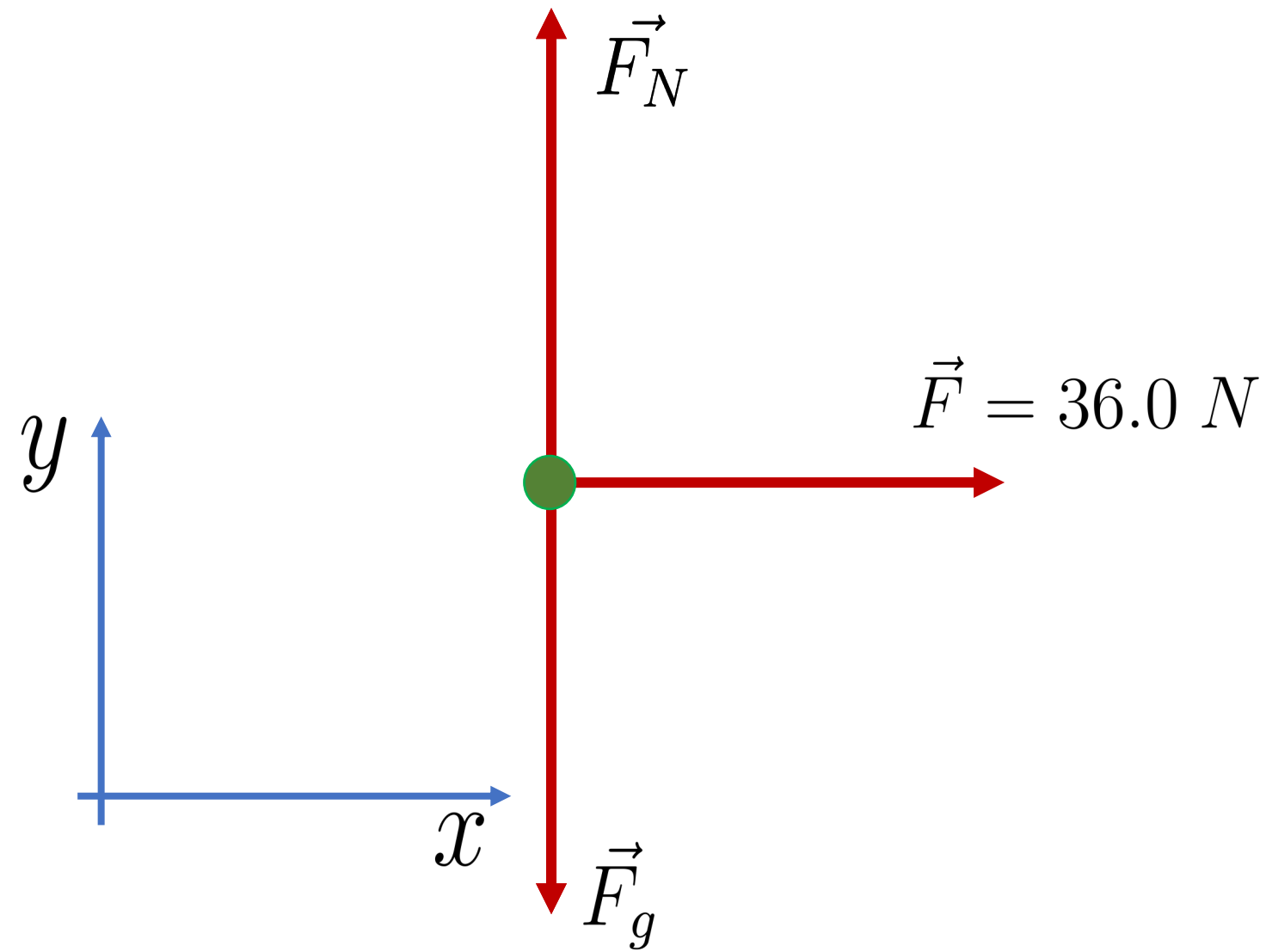
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Newton's 2nd Law

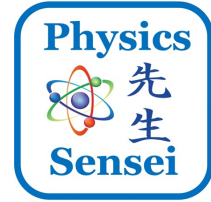
Y axis

$$\sum F_y = 0$$





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Solve for Normal Force

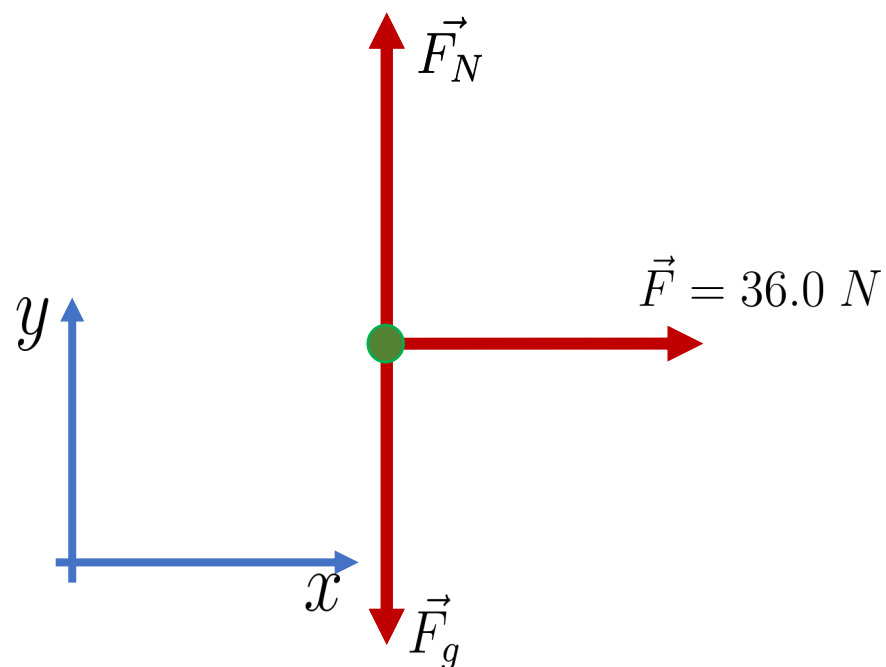
$$\sum F_y = 0$$

$$F_N - F_g = 0$$

$$F_N = F_g$$

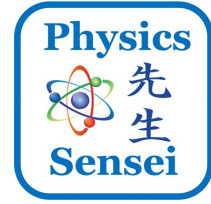
$$F_N = (6.00) \text{ kg} * 9.81 \frac{\text{m}}{\text{s}^2}$$

$$F_N = 58.9 \text{ N}$$



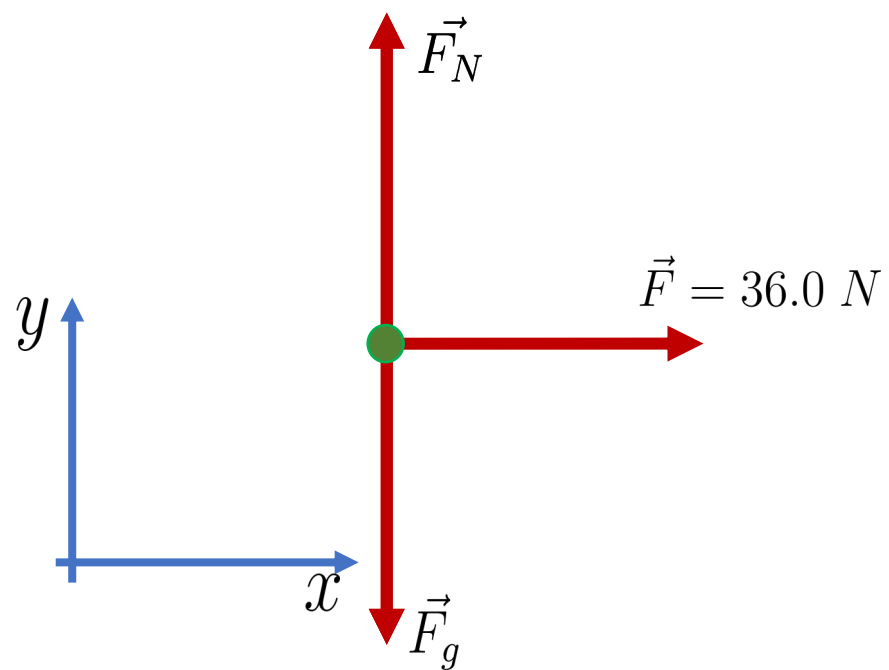


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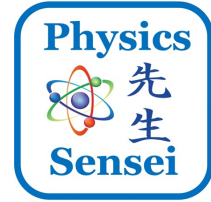
Newton's 2nd Law X axis

$$\sum F_x = m a_x$$





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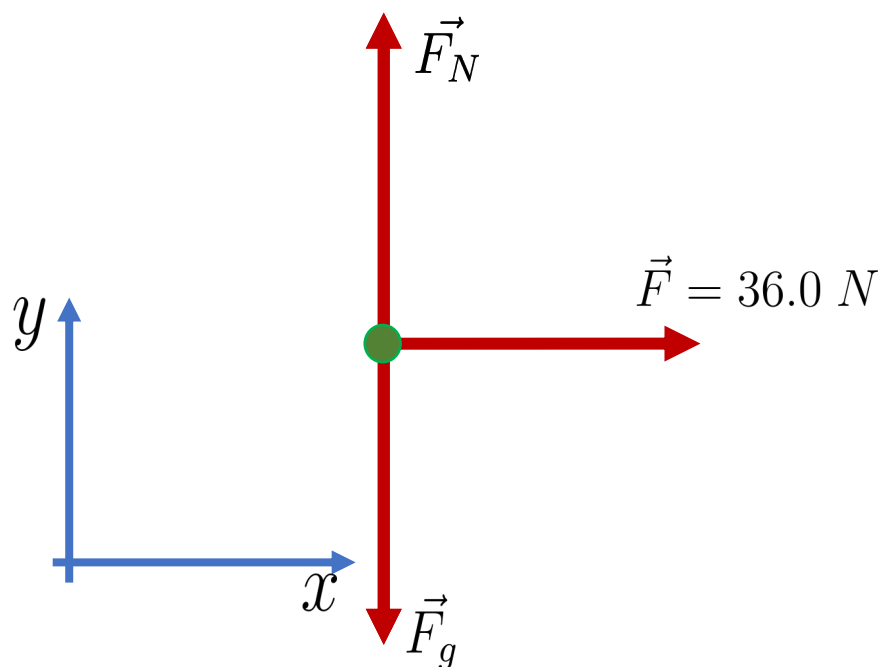
Solve for acceleration

$$\sum F_x = m a_x$$

$$F = m a_x$$

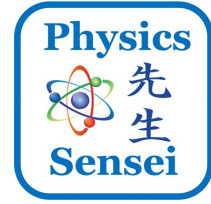
$$36.0 \text{ N} = (6.00 \text{ kg}) a_x$$

$$a_x = 6.00 \frac{\text{m}}{\text{s}^2}$$





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