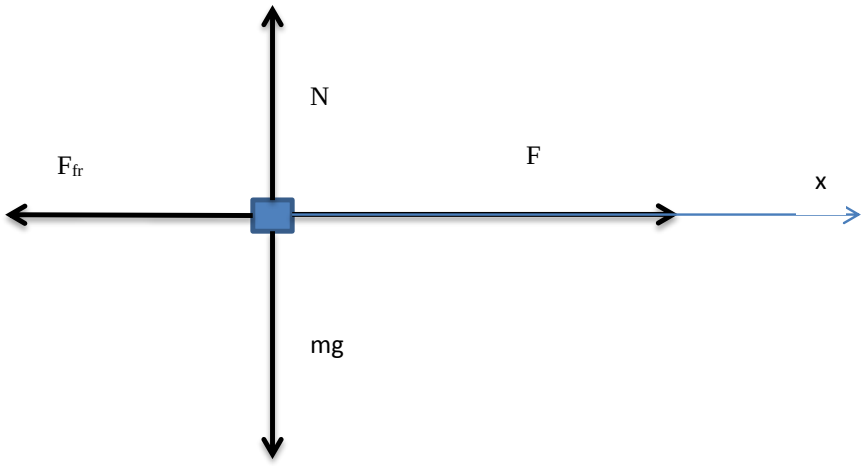
A 214-kg crate is pushed horizontally with a force of 719 N. If the coefficient of friction is 0.20, calculate the acceleration of the crate.



F_{fr} – friction force

F – pulling force

Newton's second law of motion:

$$x: F - F_{fr} = ma$$

$$y: N = mg$$

Friction force equals $F_{fr} = \mu N = \mu mg$, μ - coefficient of friction.

Therefore:

$$a = \frac{F - \mu mg}{m} = \frac{719\ N - 214 * 9.8 * 0.2\ N}{214\ kg} = 1.4 \frac{m}{s^2}$$

Answer: $1.4 \frac{m}{s^2}$