February 15, Week 5

Today: Chapter 4, Newton's Laws of Motion

Written Homework #3 in boxes this afternoon.

Homework #4, Due February 20.
Mastering Physics: 9 problems from chapters 1 and 3
Written Question: 3.56

Exam #2, Next Friday, February 24
Review Session, Thursday, February 23, 7:30PM

Exam #1 in boxes. Circled numbers are problems missed on multiple choice. Percentage on top is *with* 5-point curve included.

Newton's First Law

First Law - The Law of Inertia

An object at rest stays at rest, an object in uniform motion stays if uniform motion if (and only if) the net force acting on the object is zero.

Uniform motion - Straight line and constant speed, *i.e*, constant velocity.

Inertia - The property of all matter to stay in motion if already in motion; to stay at rest if already at rest.

Newton's Second Law

Forces cause acceleration

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$$N = kg \cdot m/s^2$$

Quiz Review

A $700\,kg$ minivan is traveling at $30\,m/s$ and accelerating at $1\,m/s^2$ on a horizontal road. If there is a $350\,N$ frictional force acting against the car, what force is the engine exerting on the car?

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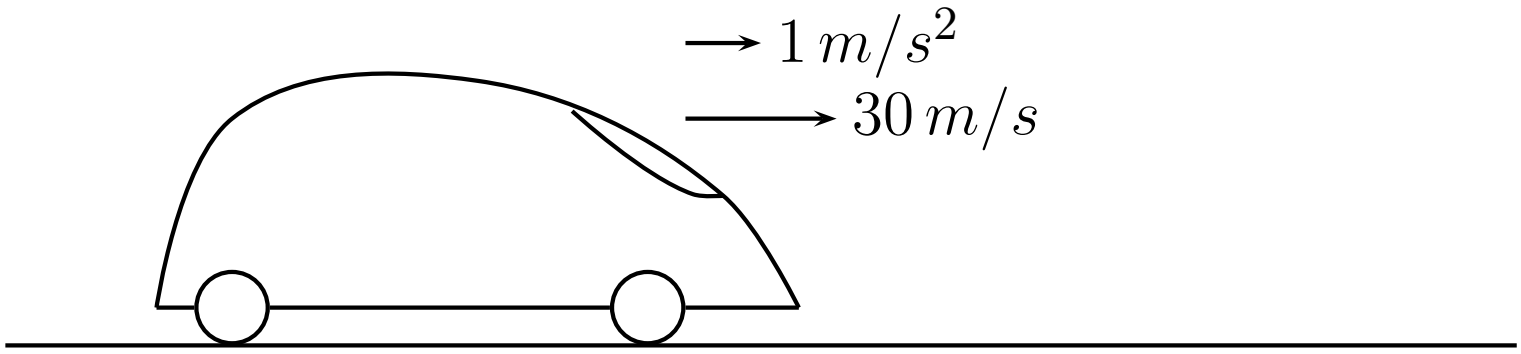

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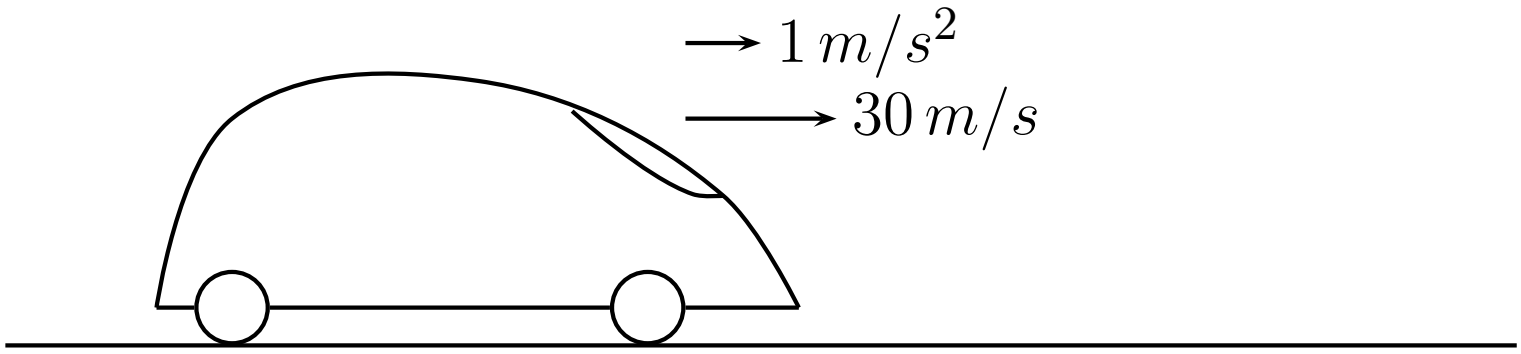

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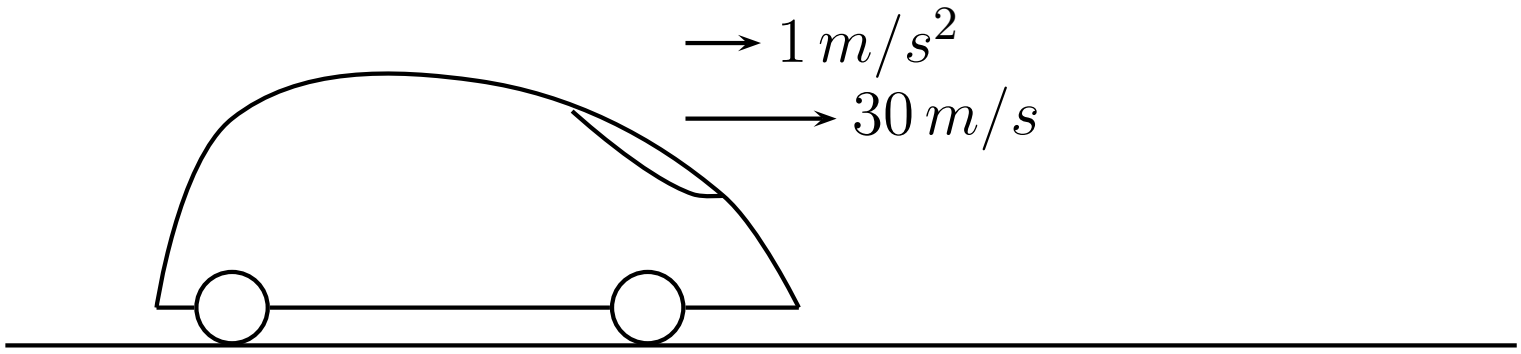

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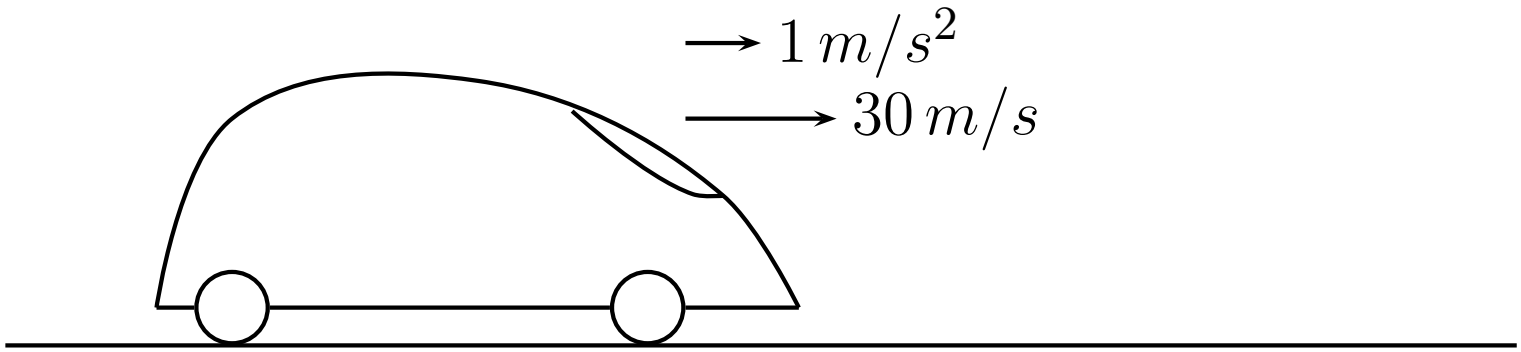

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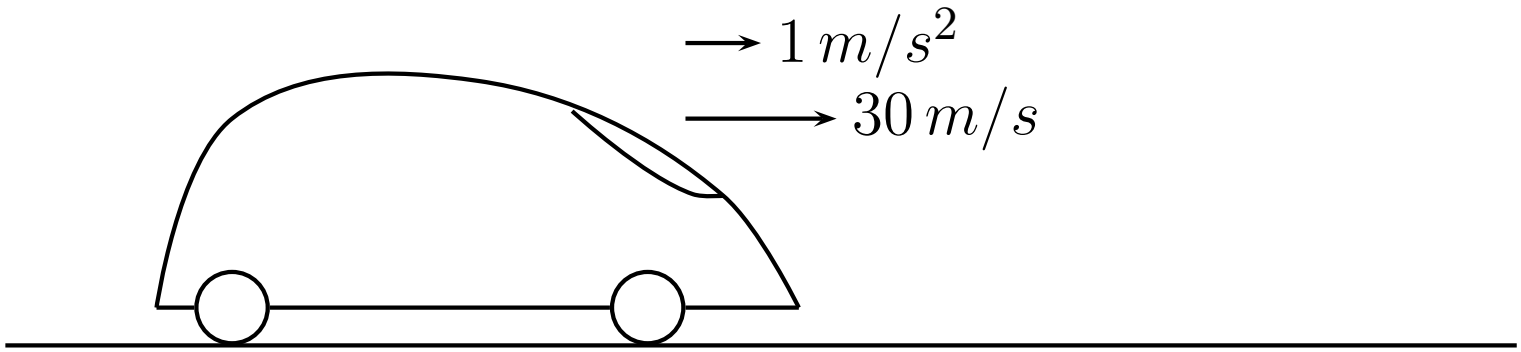

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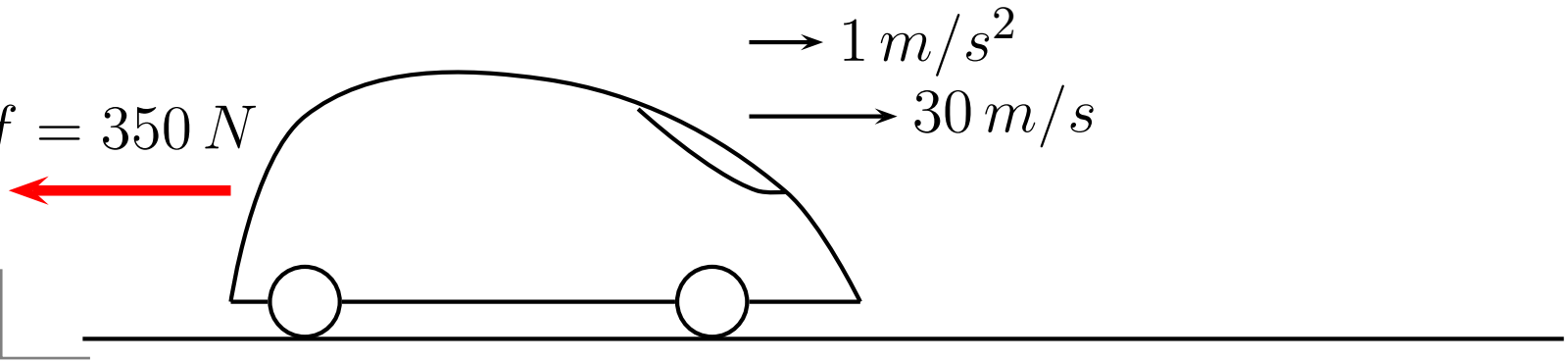

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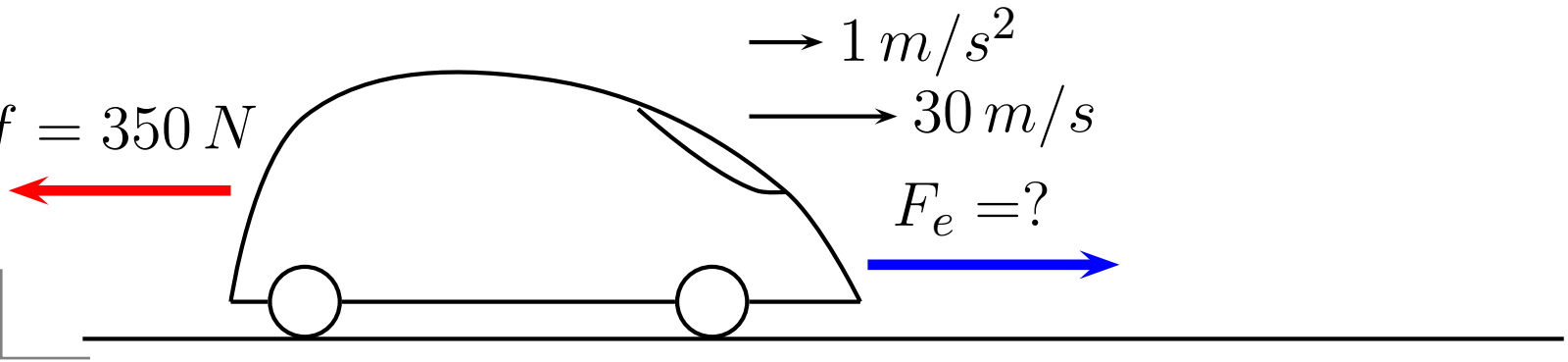

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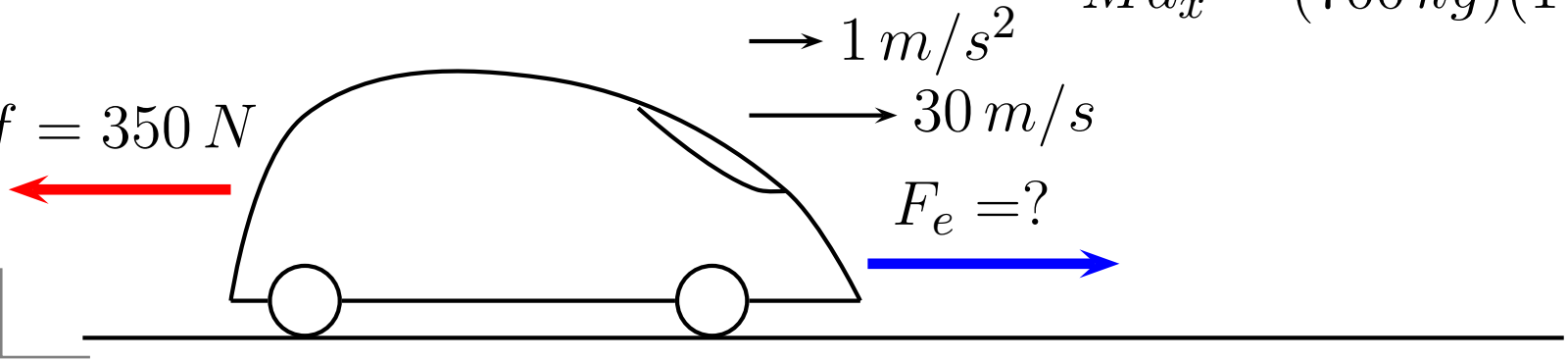

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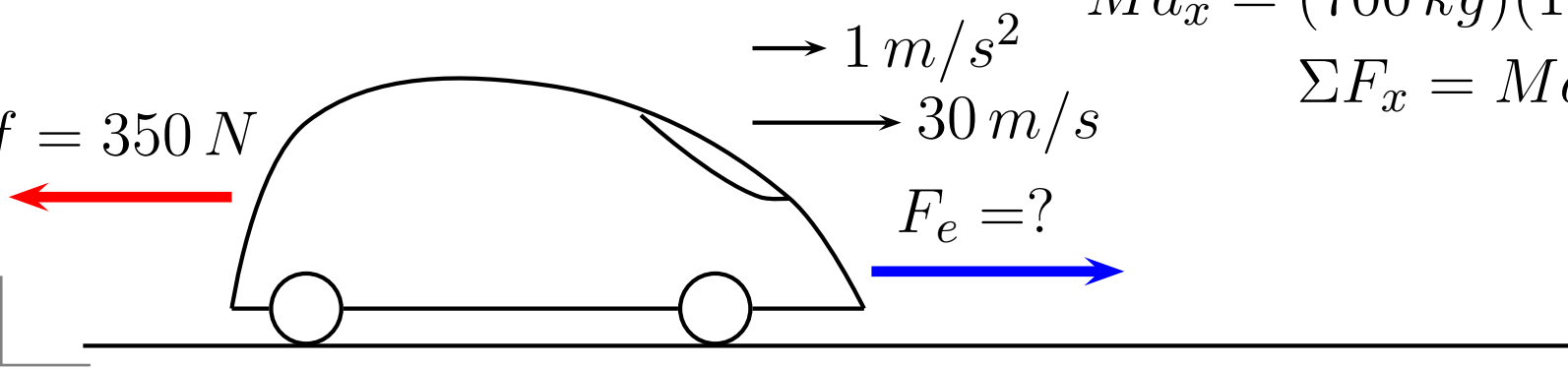

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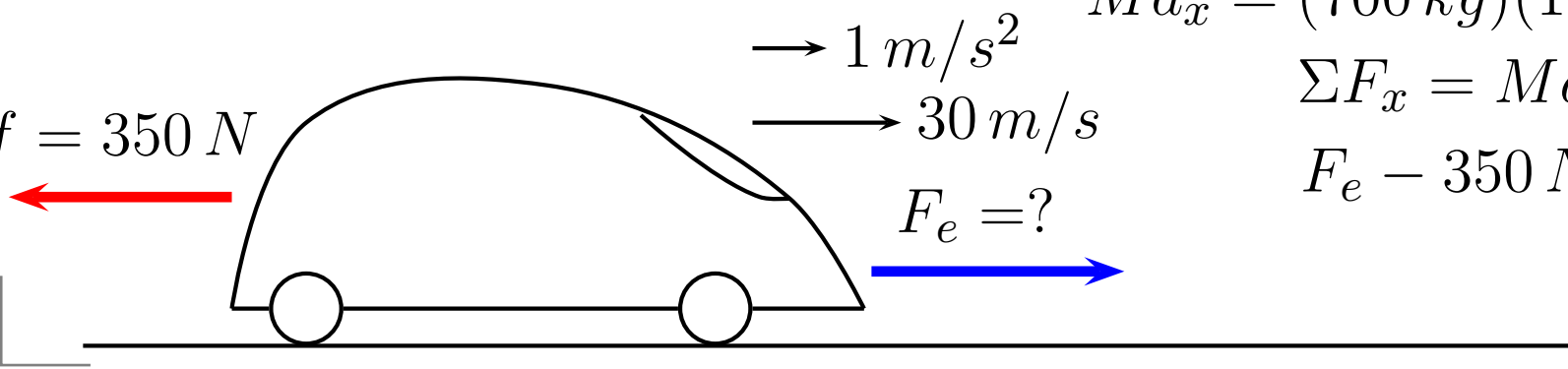

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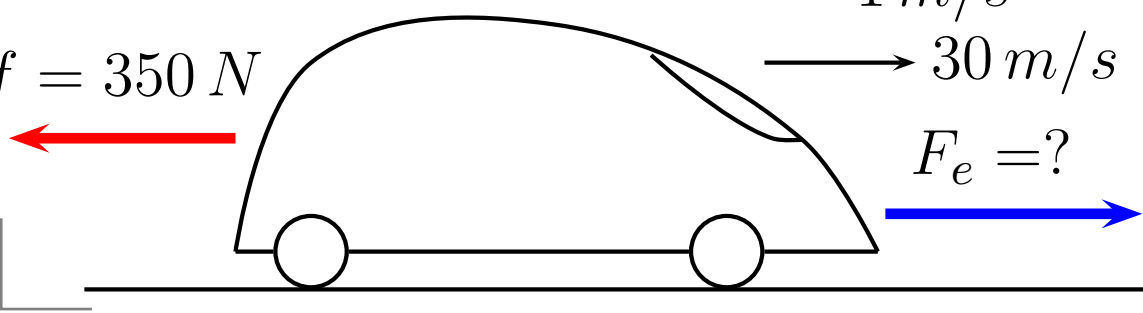

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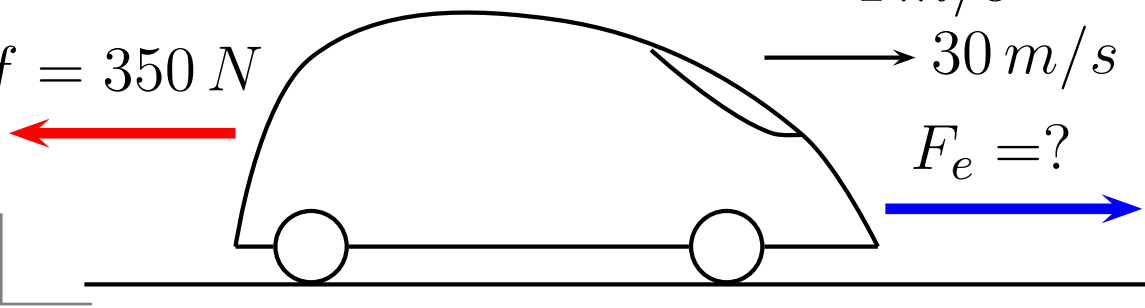

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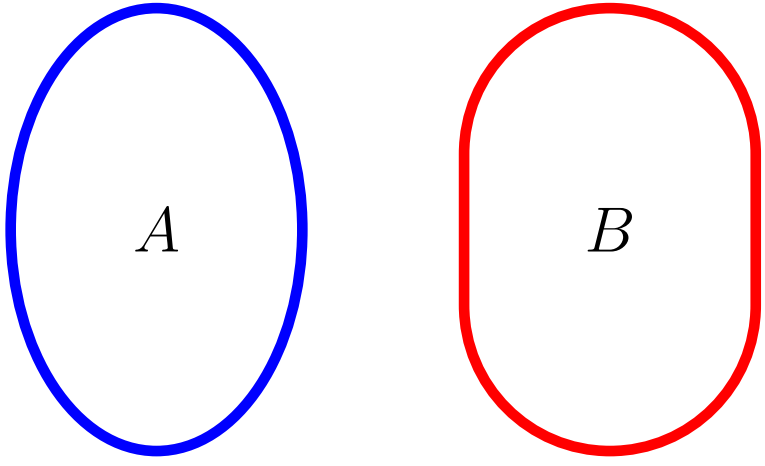

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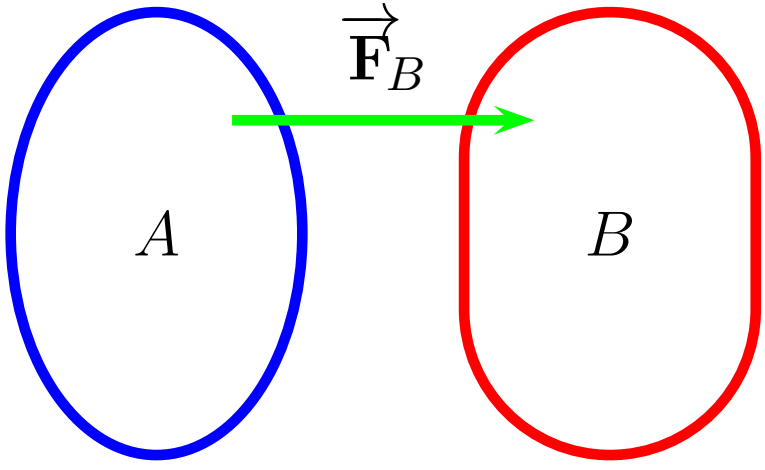

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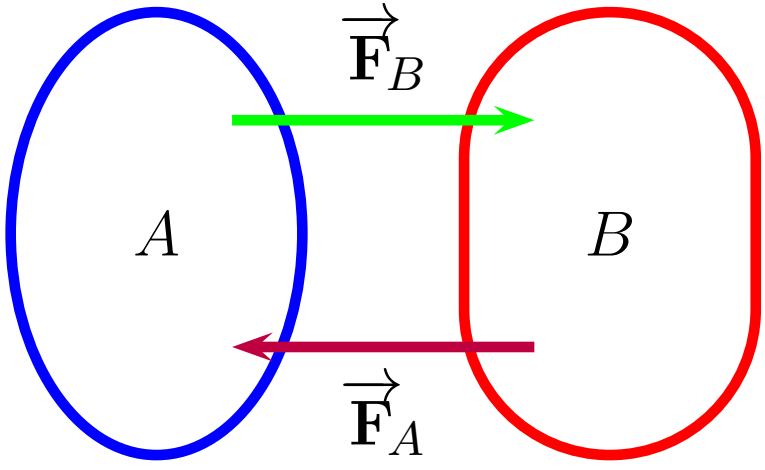

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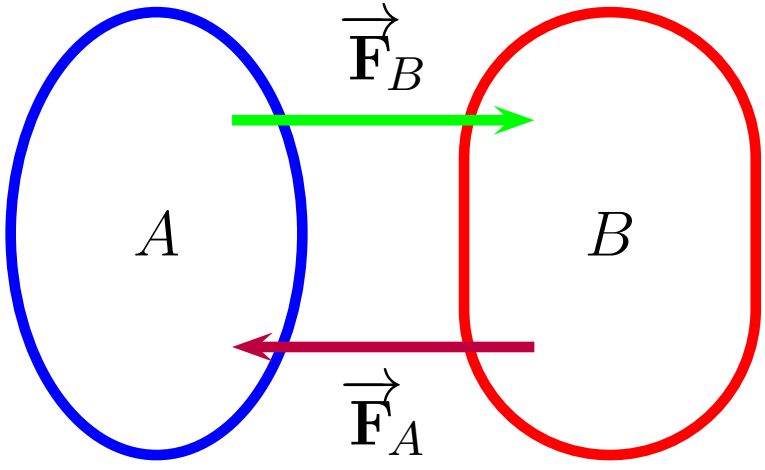

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Third Law : $\overrightarrow{\mathbf{F}}_A = -\overrightarrow{\mathbf{F}}_B$

Third Law Example

Example: A car is traveling at $30\,m/s$. If the engine is exerting a force of $350\,N$, how does the car move forward and what is the engine physically doing?

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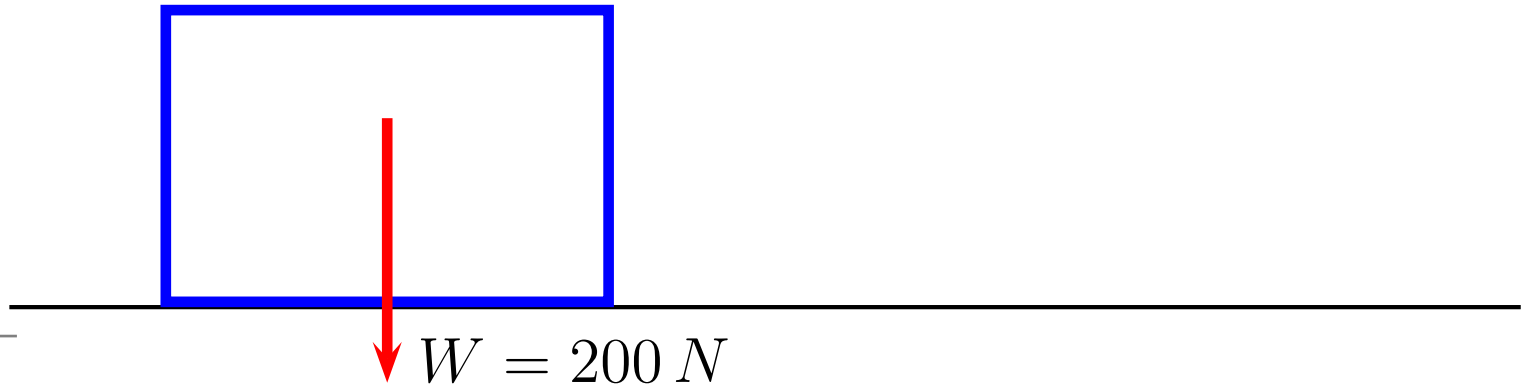
Action and Reaction exerted on different objects! Both of them accelerate.

Clicker Quiz

A 200-N crate is placed on a horizontal surface. The reaction to the force of gravity on the crate is:



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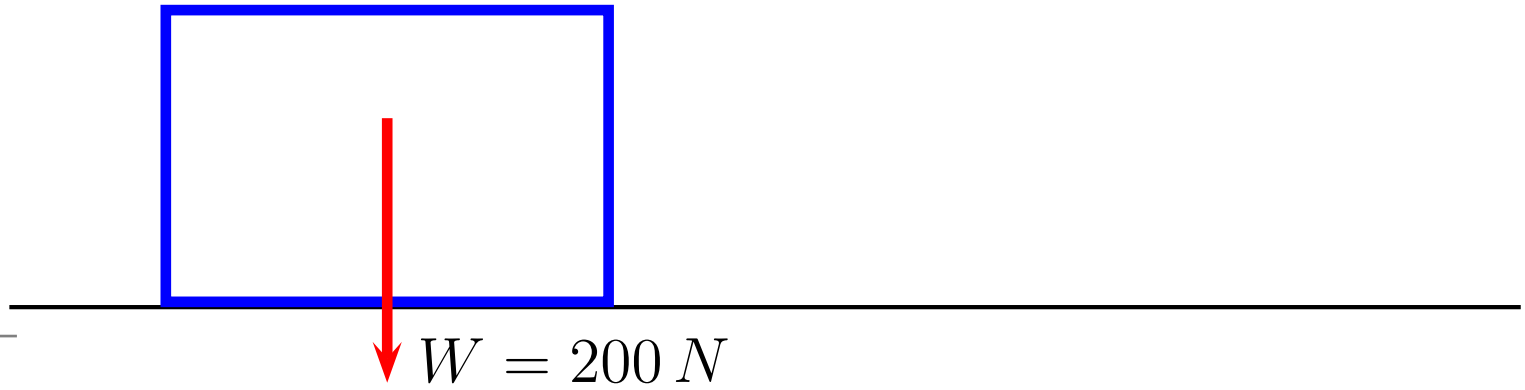

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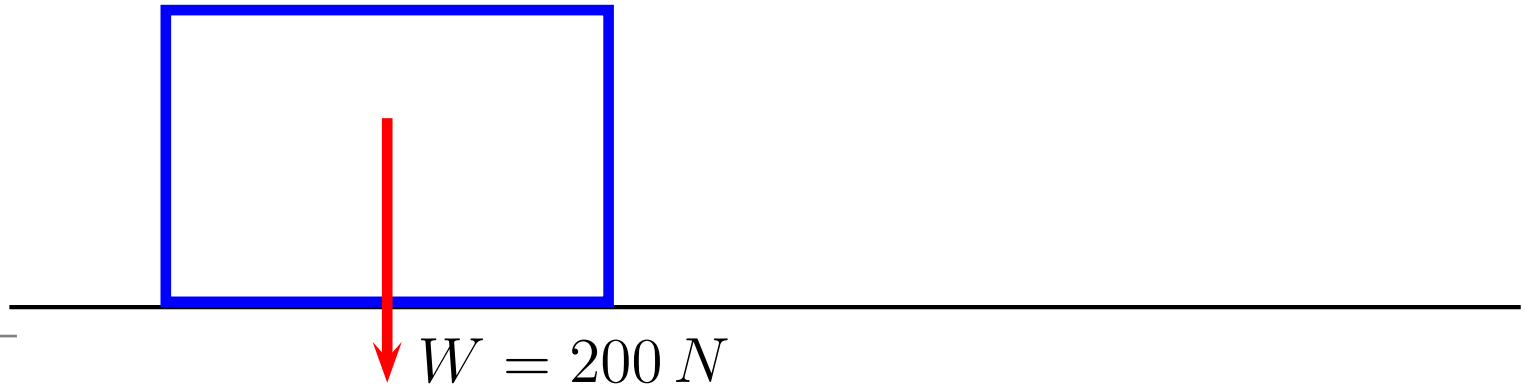

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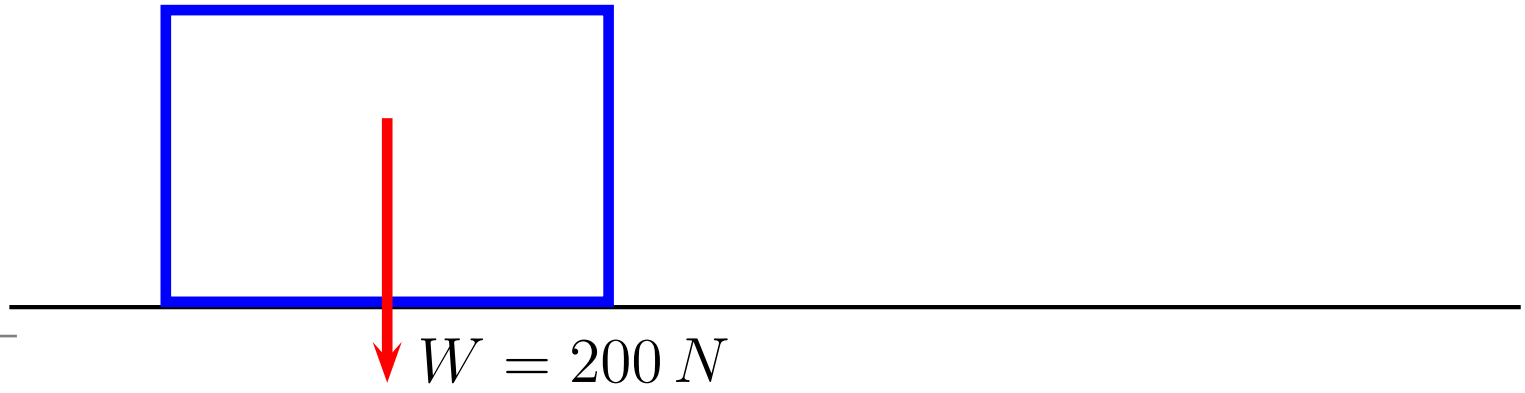
(c) The $200\ N$ downwards force on the earth



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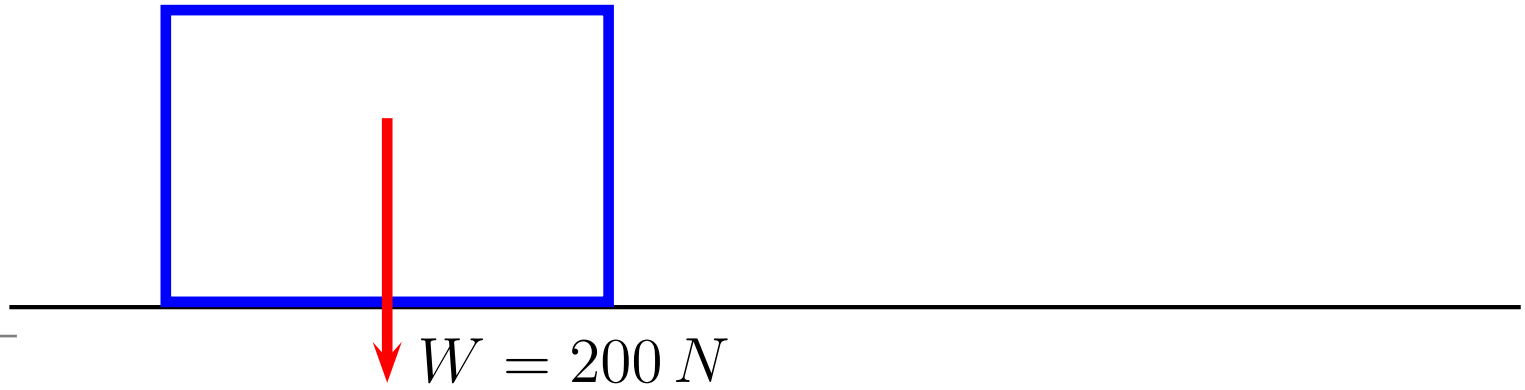

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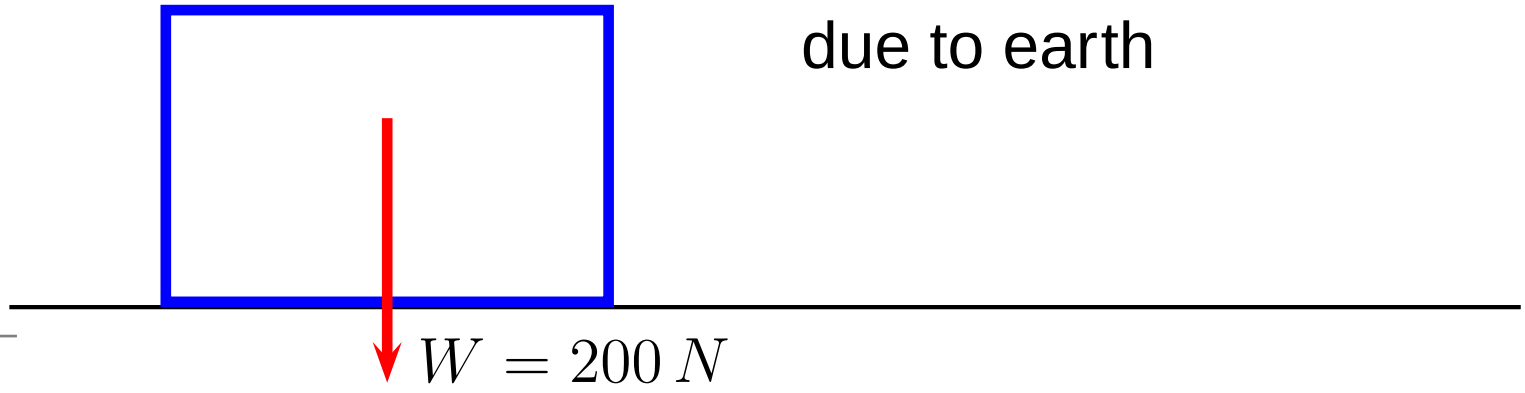

Weight = downwards force on box due to earth

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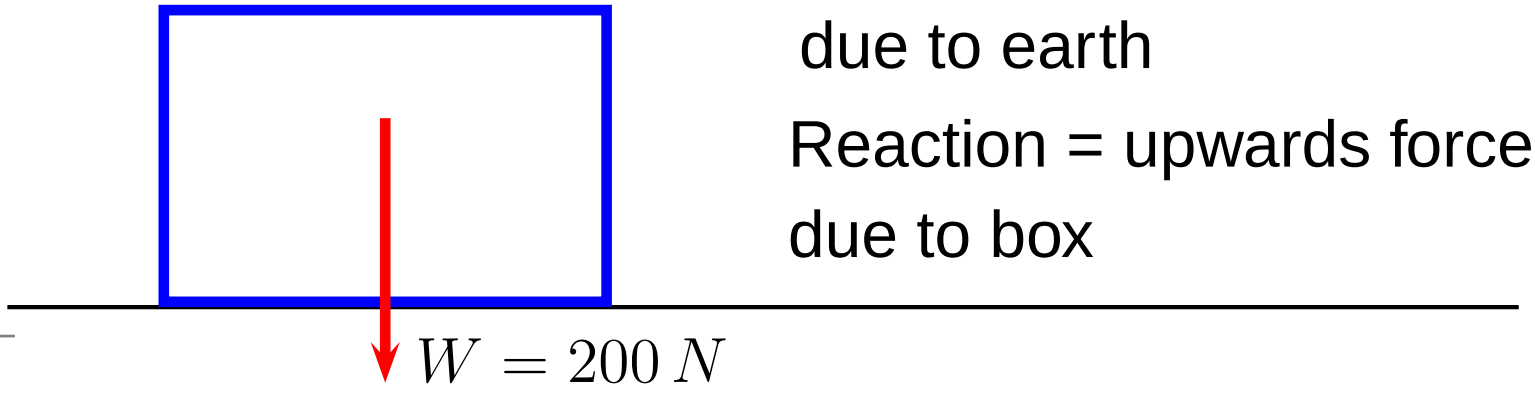

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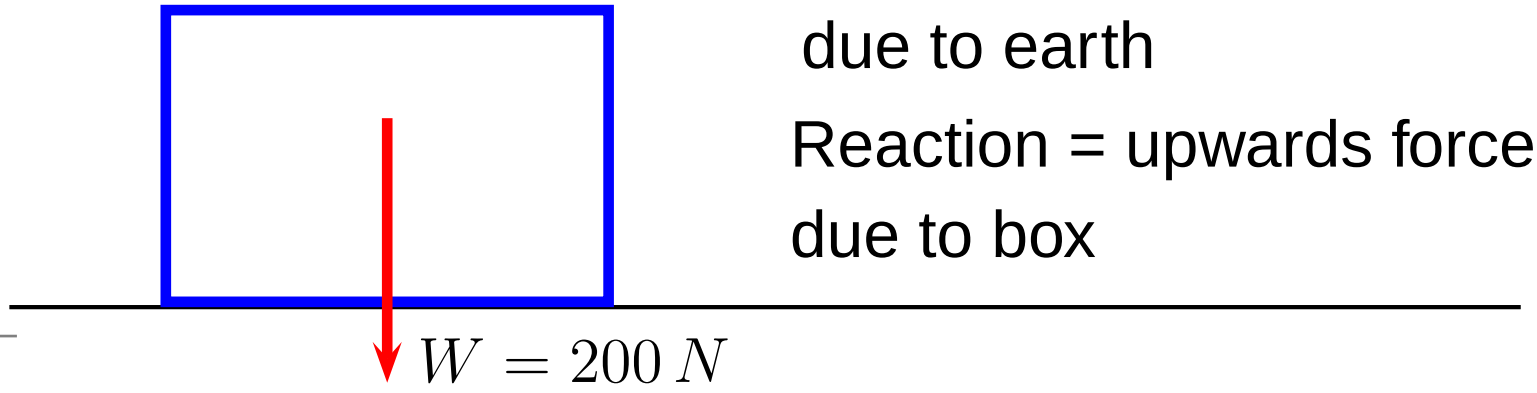

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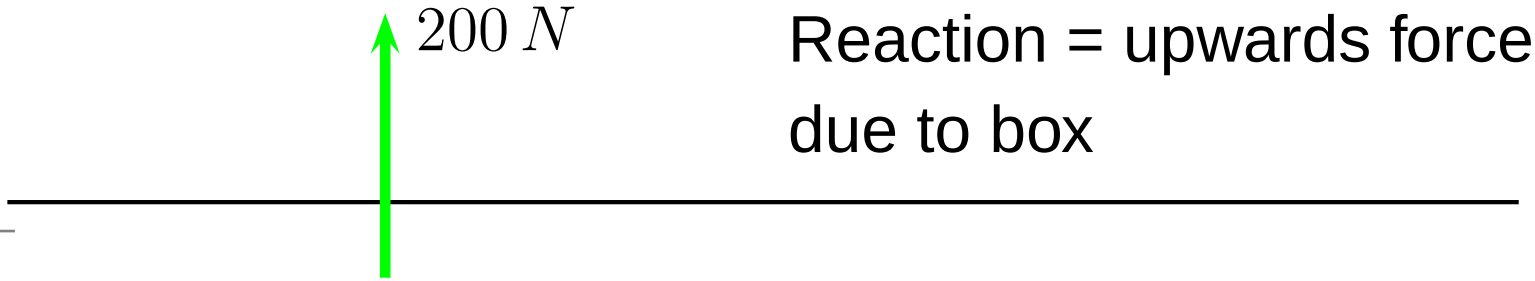

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