

February 25, Week 7

Today: Chapter 5, Applying Newton's Laws

Homework Assignment #5 - Due March 1.

Mastering Physics: 10 problems from chapters 4 and 5.

Written Questions: 5.74

Thursday Office Hours: 12:00-2:30, 4:00-5:00(???)

Exam #2, Next Friday, March 8

Maximum Static Friction

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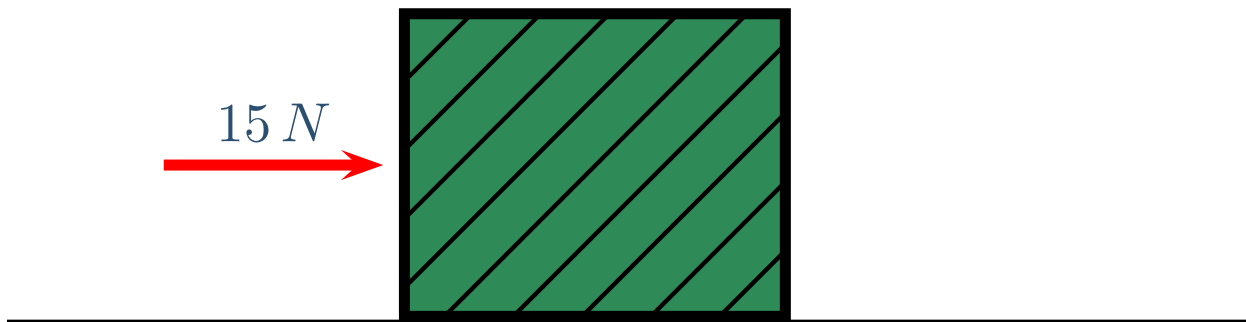
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Example: A wooden block is placed on a wooden ramp which is initially horizontal. When the ramp is slowly raised, at what angle will the block begin to slide?

Static Friction Exercise

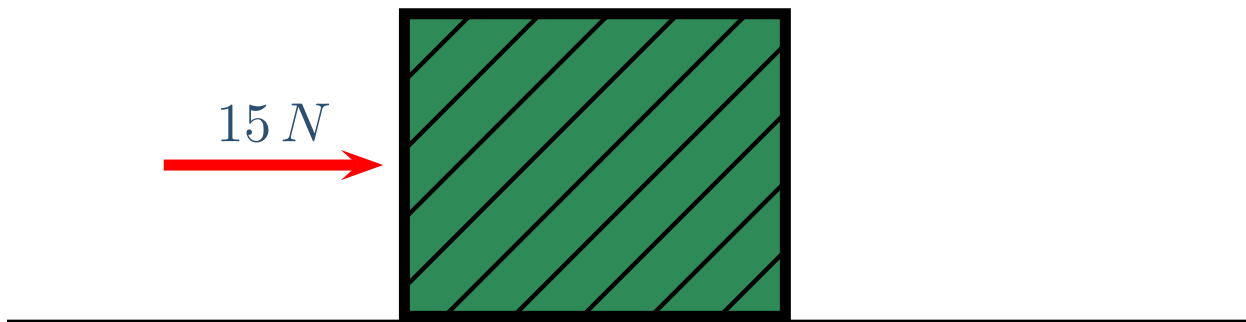
A 50 N crate is placed on a horizontal surface. The coefficient of static friction between the crate and the table is 0.5 . A horizontal force of 15 N is applied to the crate. It does not move. How much static friction is acting on the crate?



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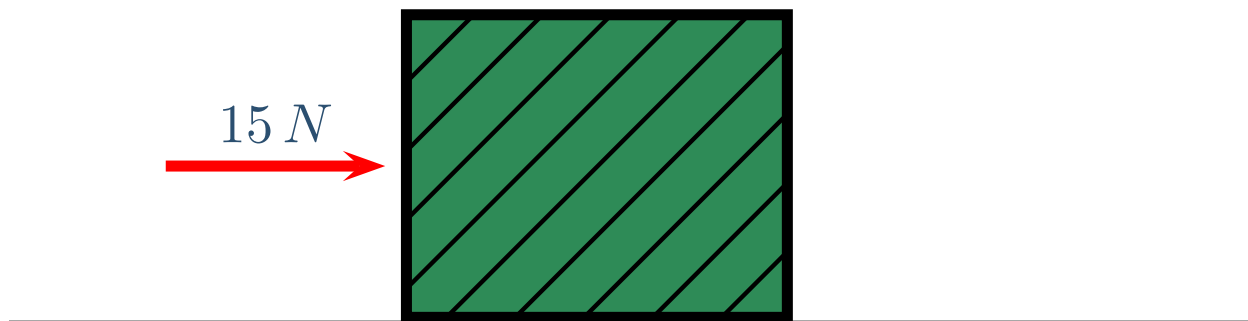


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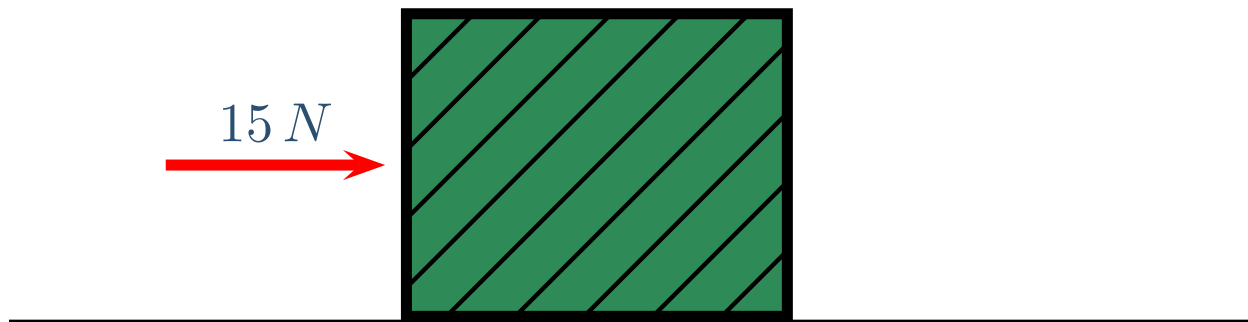
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(c) 25 N



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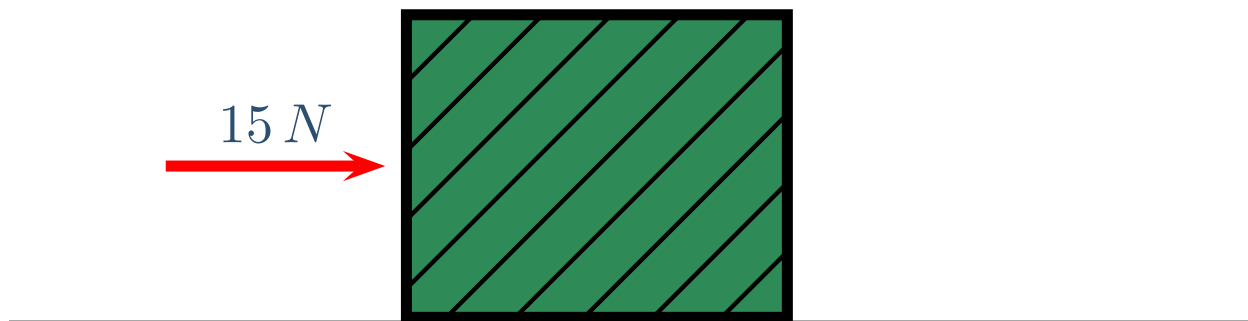
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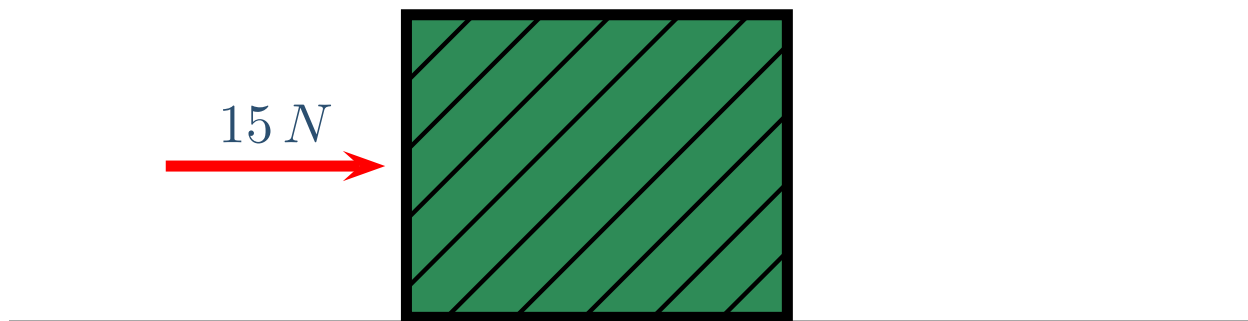
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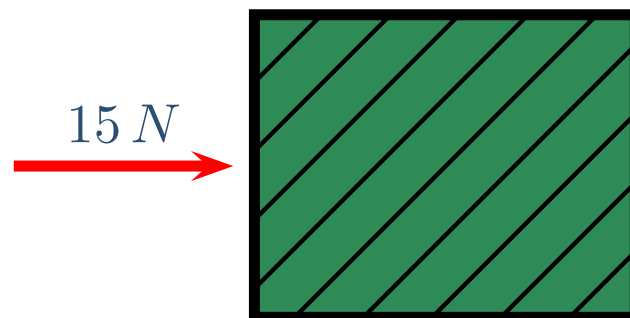
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Problem never specified that f_s at max

$$\sum F_x = 0 \Rightarrow f_s - 15\text{ N} = 0$$

Kinetic Friction

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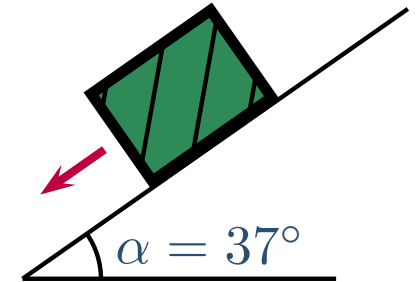
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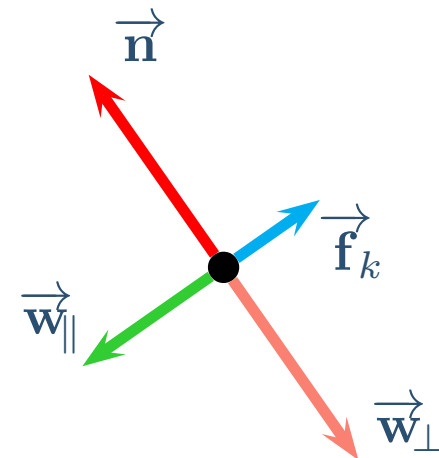
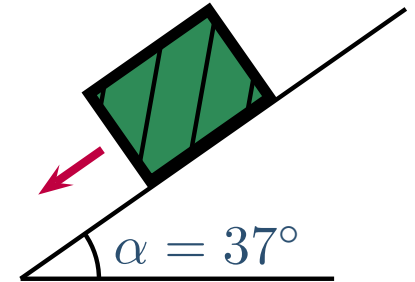
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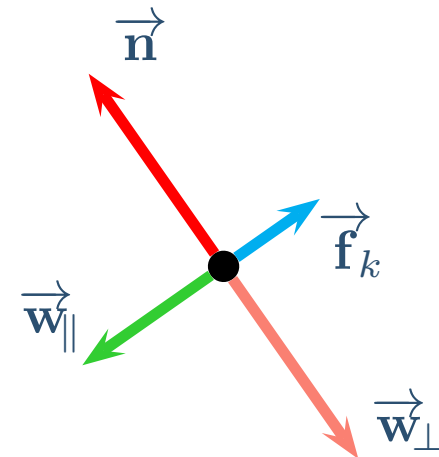
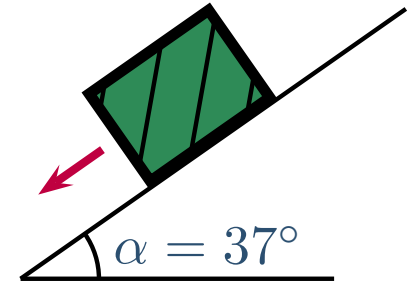
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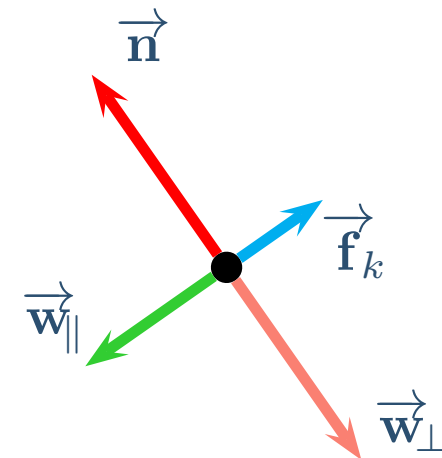
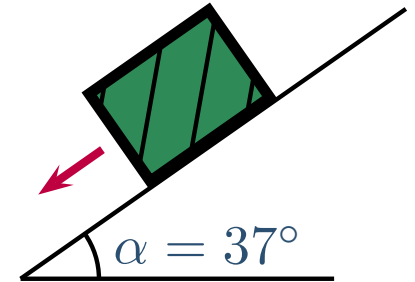


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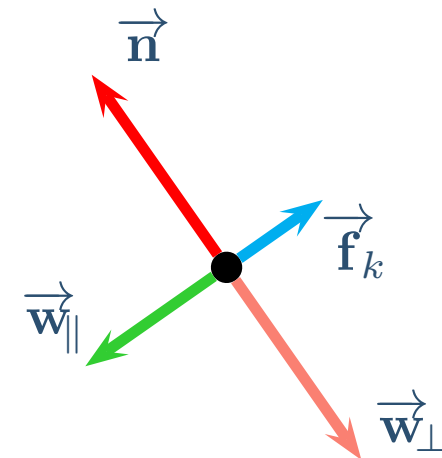
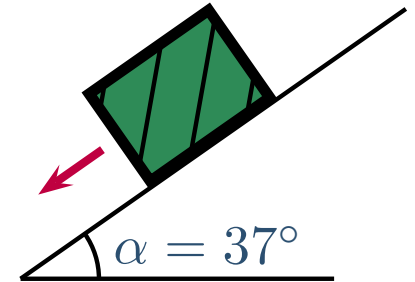
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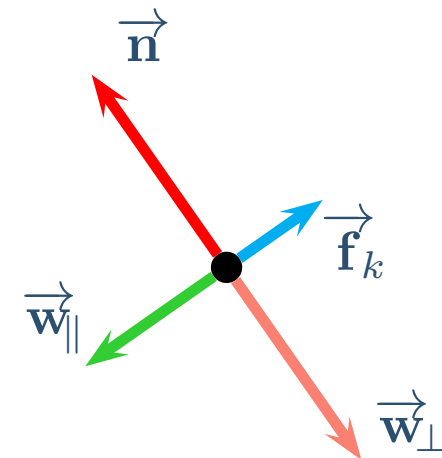
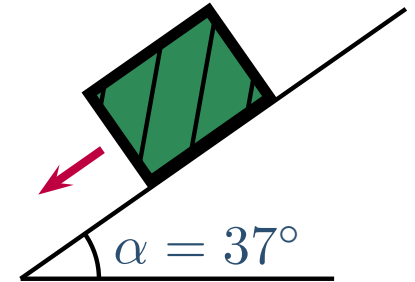
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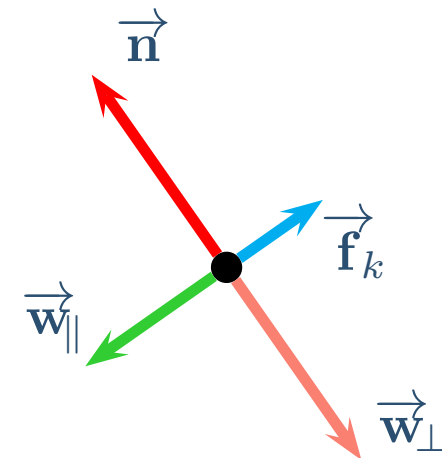
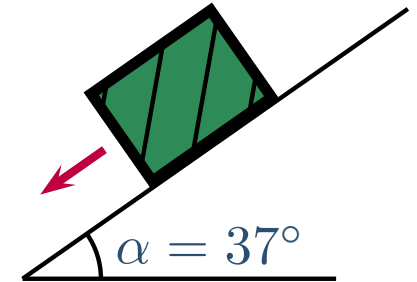
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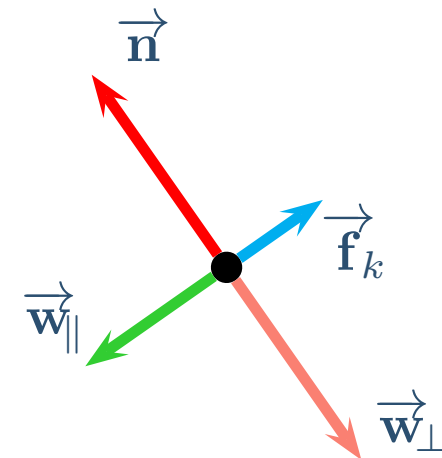
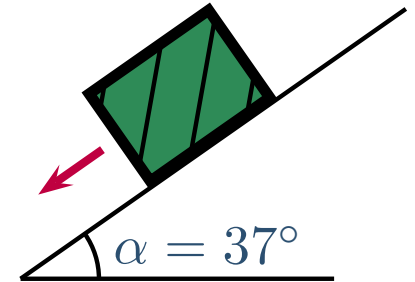
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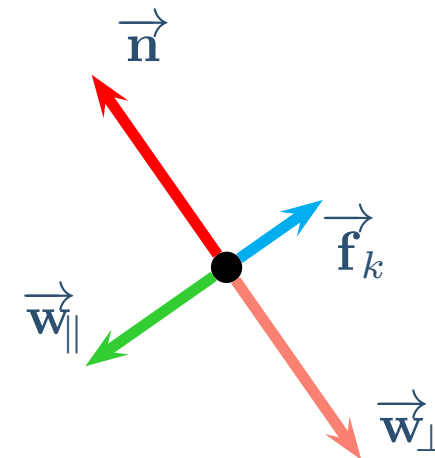
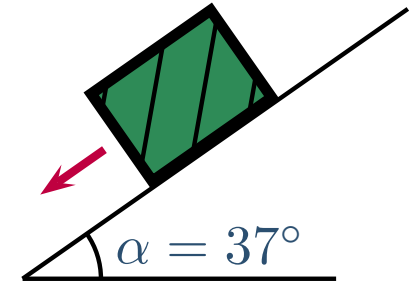
$$(b) a = g (\sin \alpha - \mu_k \cos \alpha) = 4.33 \text{ m/s}^2$$

$$\sum F_{\perp} = Ma_{\perp} \Rightarrow n - w_{\perp} = 0$$

$$\Rightarrow n = w_{\perp} = Mg \cos \alpha$$

$$\sum F_{\parallel} = Ma_{\parallel} \Rightarrow w_{\parallel} - f_k = Ma$$

$$\Rightarrow Mg \sin \alpha - \mu_k Mg \cos \alpha = Ma$$



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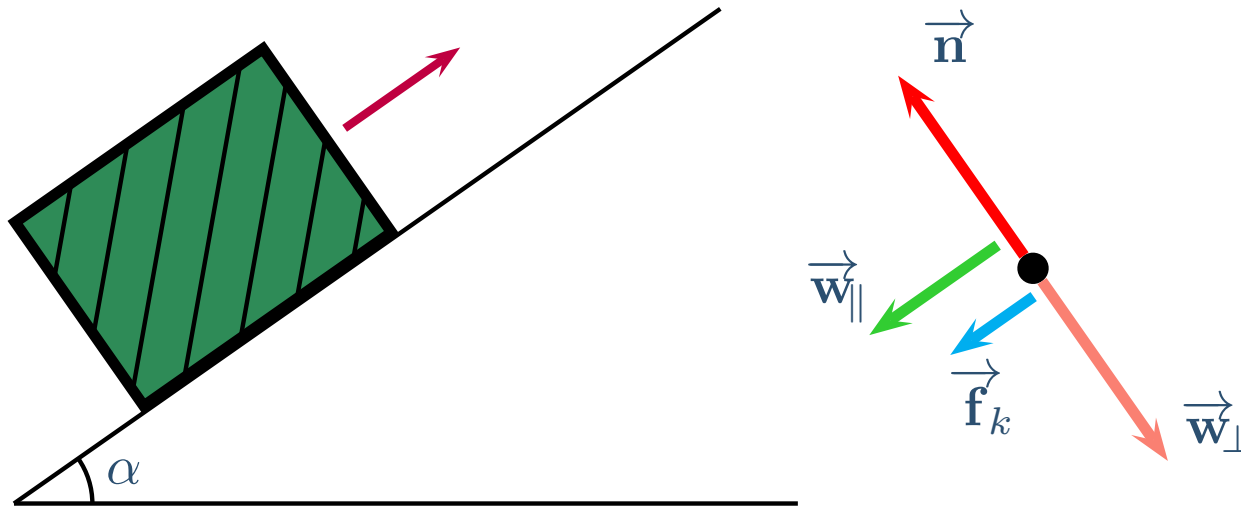
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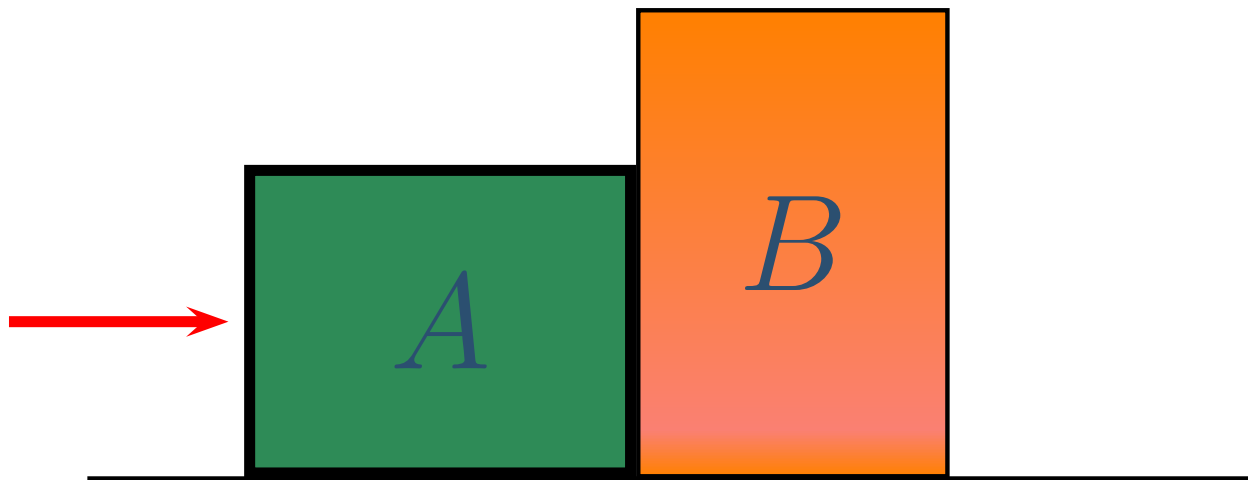


Objects in Contact

When objects are in contact with each other and being pushed, they must have an equal acceleration.

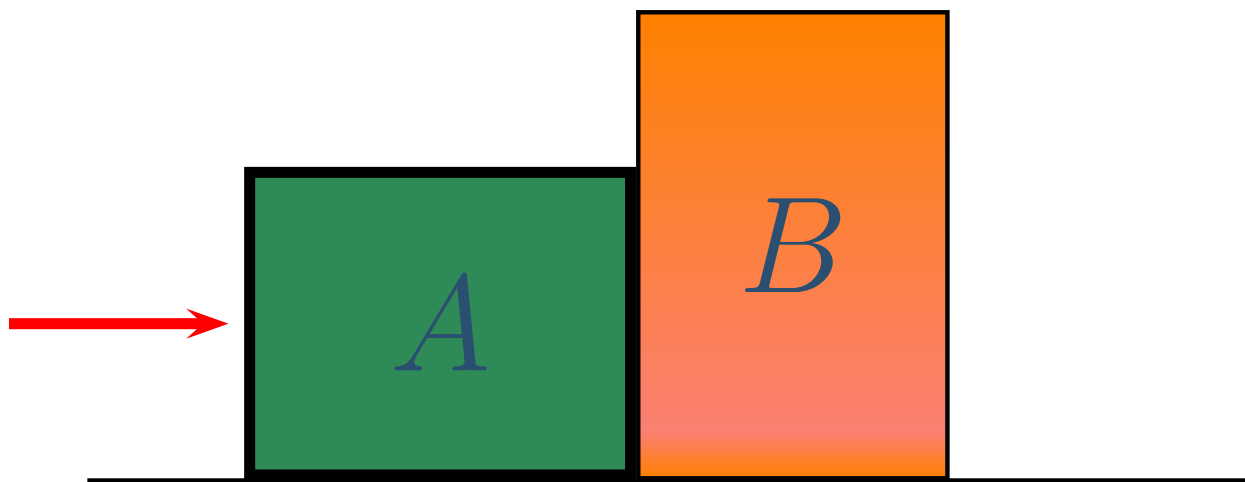
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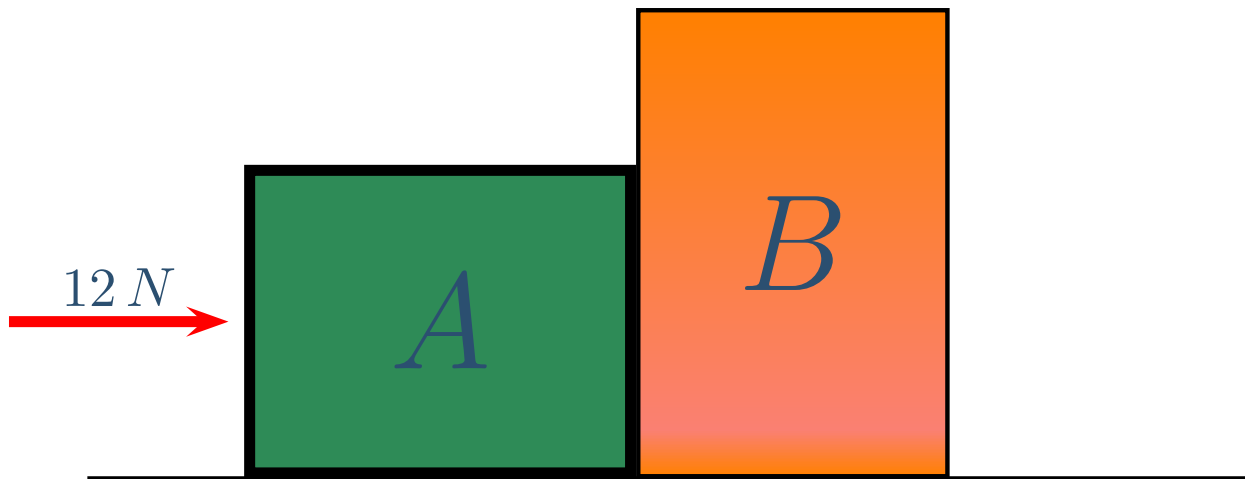
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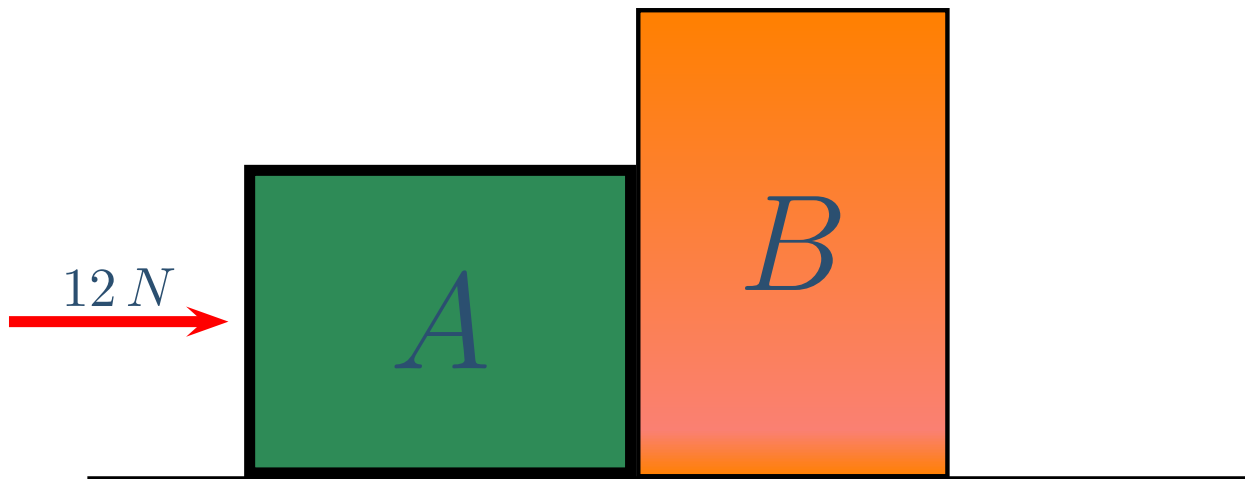
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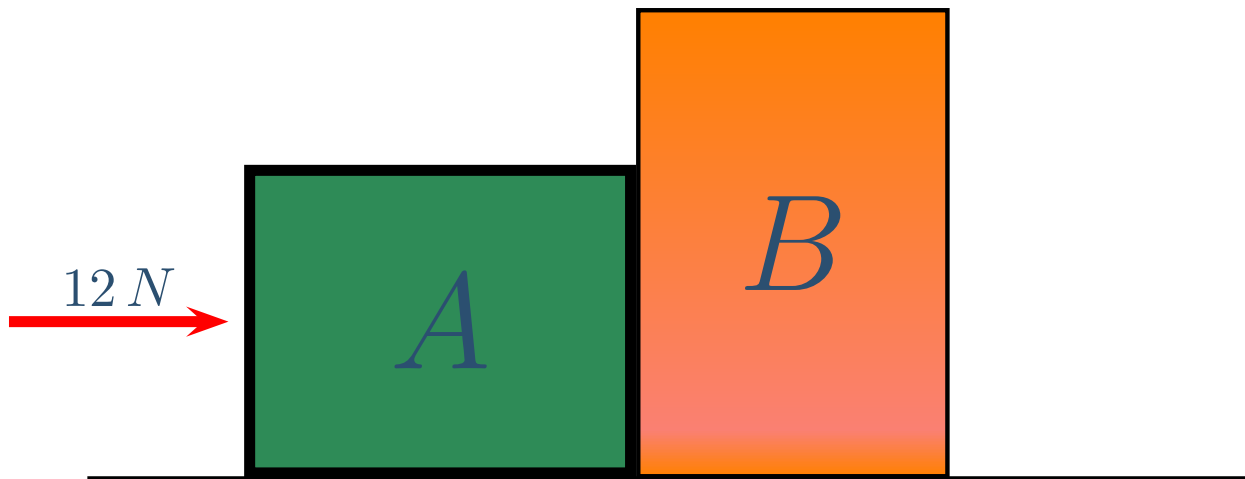
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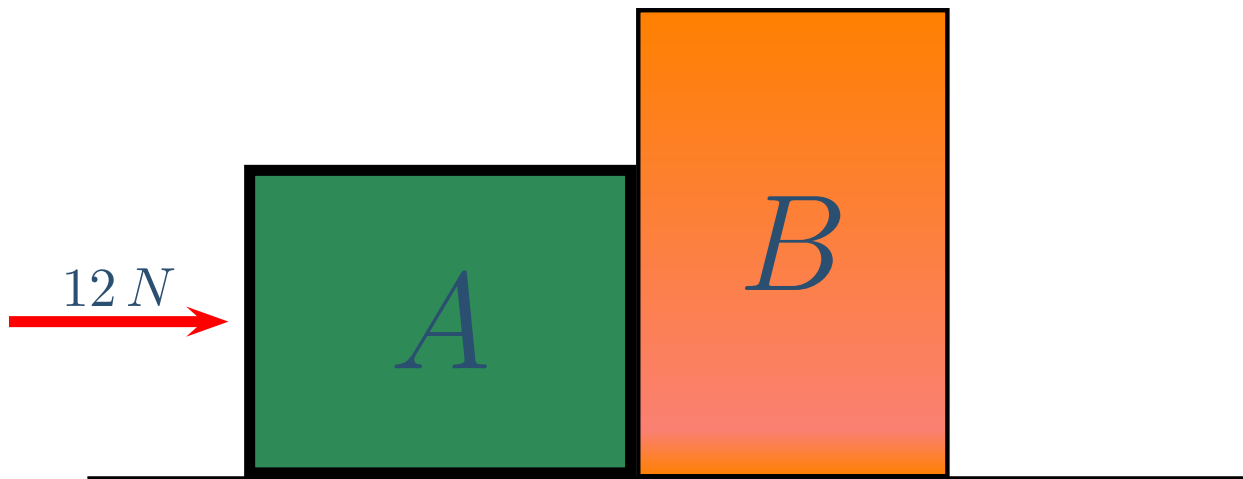
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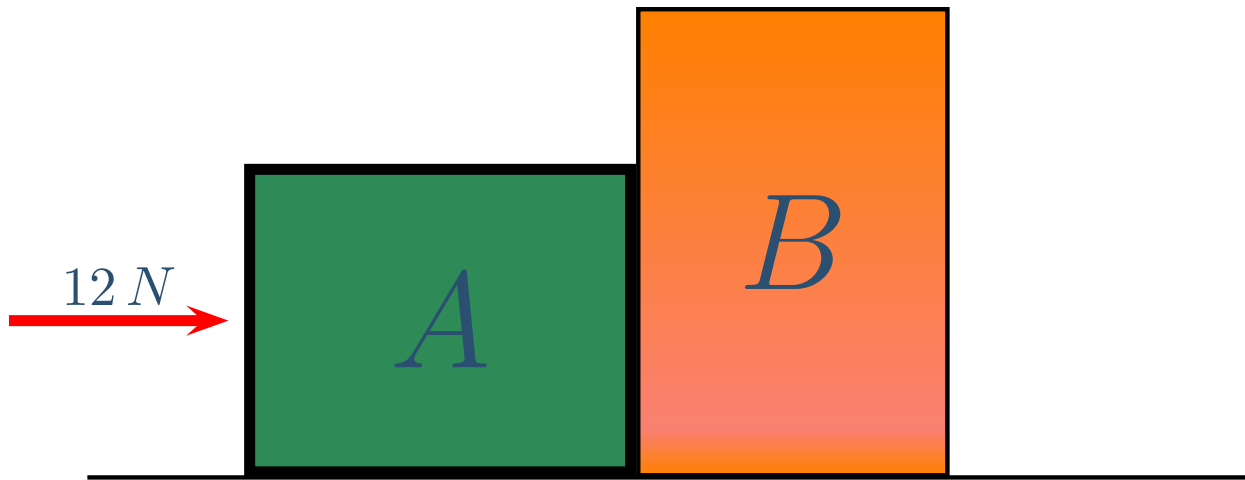
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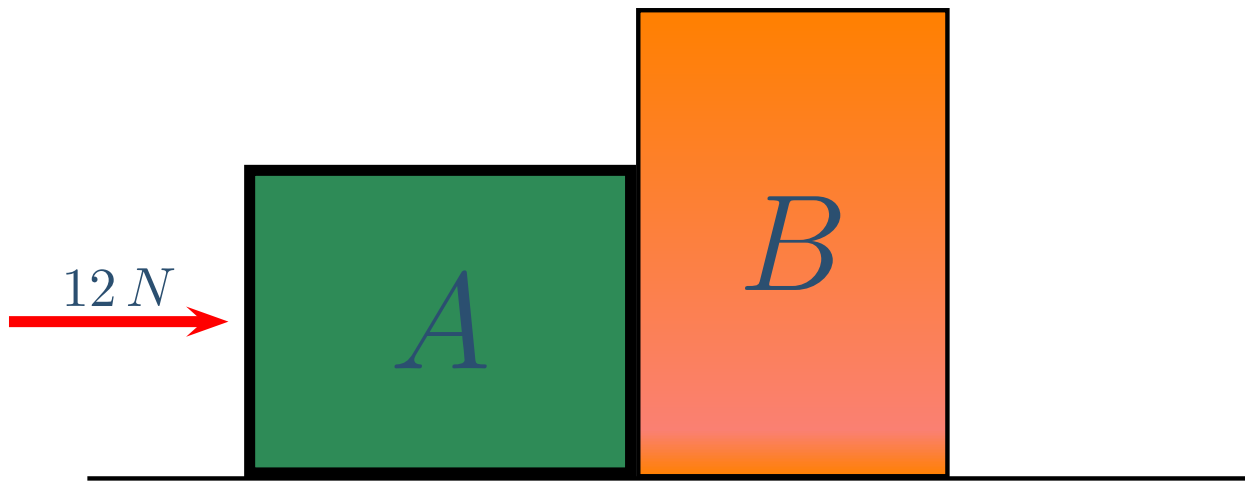
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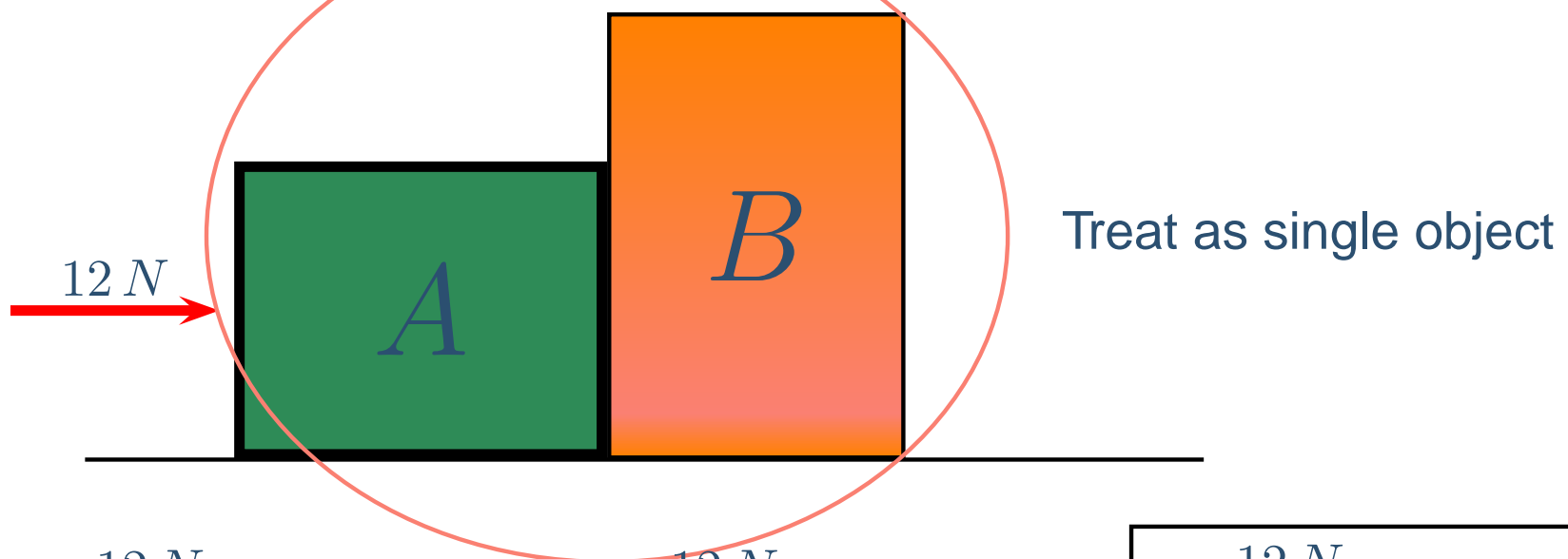
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