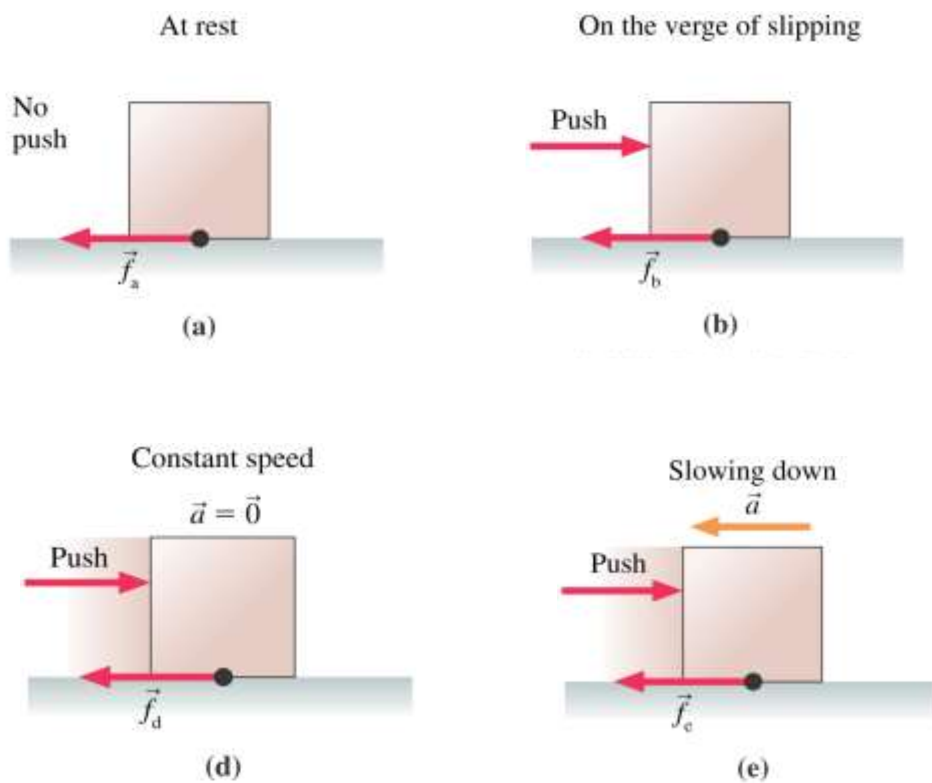
Rank order, from largest to smallest, the size of the friction forces $\vec{f}_a$ to $\vec{f}_e$ in these 5 different situations.

The box and the floor are made of the same materials in all situations.



1. $f_c > f_d > f_e > f_b > f_a$.
2. $f_b > f_c > f_d > f_e > f_a$.
3. $f_a > f_c = f_d = f_e > f_b$.
4. $f_a = f_b > f_c = f_d = f_e$.
5. $f_b > f_c = f_d = f_e > f_a$.

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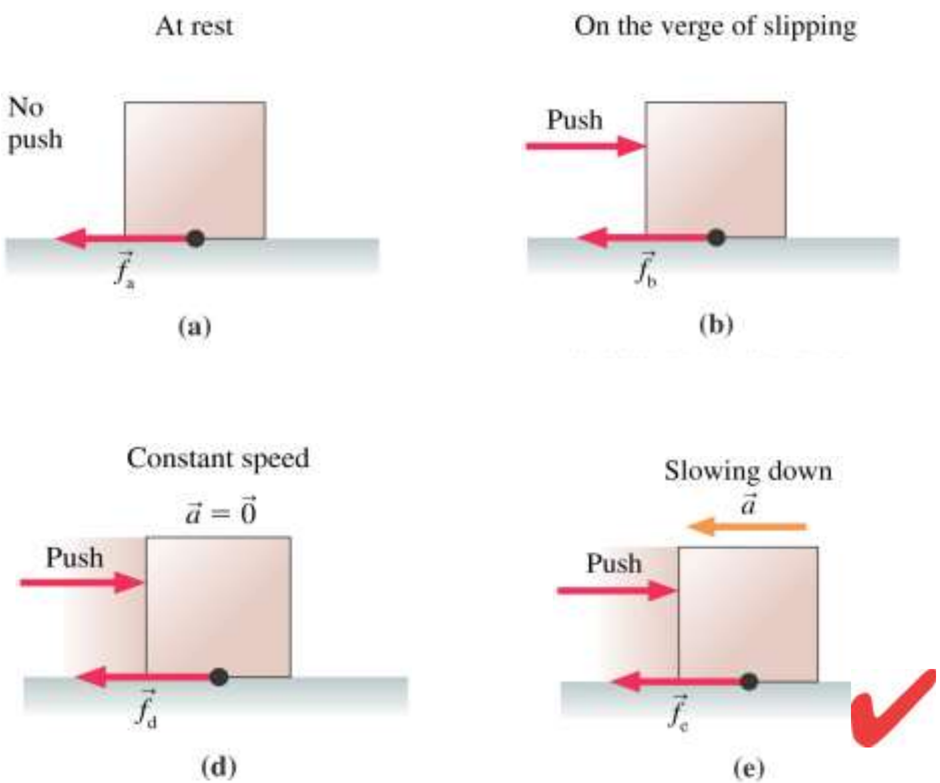

1. $f_c > f_d > f_e > f_b > f_a$.
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5. **$f_b > f_c = f_d = f_e > f_a$.**

A box sits in a pickup truck on a frictionless truck bed. When the truck accelerates forward, the box slides off the back of the truck because:

1) the force from the rushing air pushed it off
2) the force of friction pushed it off
3) no net force acted on the box
4) truck went into reverse by accident
5) none of the above

Generally, the reason that the box in the truck bed would move with the truck is due to friction between the box and the bed. If there is no friction, there is no force to push the box along, and it remains at rest. The truck accelerated away, essentially leaving the box behind!!

Antilock brakes keep the car wheels from locking and skidding during a sudden stop. Why does this help slow the car down?

1) $\mu_k > \mu_s$ so sliding friction is better
2) $\mu_k > \mu_s$ so static friction is better
3) $\mu_s > \mu_k$ so sliding friction is better
4) $\mu_s > \mu_k$ so static friction is better
5) none of the above

Static friction is greater than sliding friction, so by keeping the wheels from skidding, the static friction force will help slow the car down more efficiently than the sliding friction that occurs during a skid.

Your little sister wants you to give her a ride on her sled. On level ground, what is the easiest way to accomplish this?

1) pushing her from behind
2) pulling her from the front
3) both are equivalent
4) it is impossible to move the sled
5) tell her to get out and walk

In Case 1, the force *F* is **pushing down** (in addition to *mg*), so the **normal force is larger**. In Case 2, the force *F* is **pulling up**, against gravity, so the **normal force is lessened**. Recall that the frictional force is proportional to the normal force.