Question 1

A $1.0\,\mathrm{kg}$ object lies on a frictionless horizontal surface. A $4.0\,\mathrm{N}$ force pushes directly east and a $3.0\,\mathrm{N}$ force pushes directly west. Both forces are parallel to the surface.

Which of the following best represents the magnitude of the acceleration of the object?

1. $a = 0.0\,\mathrm{m/s^2}$
2. $a = 1.0\,\mathrm{m/s^2}$
3. $a = 3.0\,\mathrm{m/s^2}$
4. $a = 4.0\,\mathrm{m/s^2}$
5. $a = 7.0\,\mathrm{m/s^2}$

Question 2

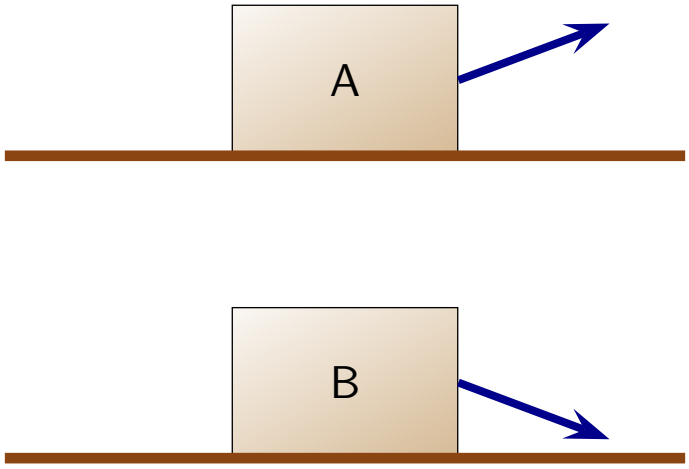
A $1.0\,\mathrm{kg}$ object lies on a frictionless horizontal surface. A $4.0\,\mathrm{N}$ force pushes directly east and a $3.0\,\mathrm{N}$ force pushes at an angle midway between north and east. Both forces are parallel to the surface.

Which of the following best represents the magnitude of the acceleration of the object?

1. $a = 1.0\,\mathrm{m/s^2}$
2. $1.0\,\mathrm{m/s^2} < a < 5.0\,\mathrm{m/s^2}$
3. $a = 5.0\,\mathrm{m/s^2}$
4. $5.0\,\mathrm{m/s^2} < a < 7.0\,\mathrm{m/s^2}$
5. $a = 7.0\,\mathrm{m/s^2}$

Question 3

Two identical blocks are on the same surface. Forces with identical magnitudes act on the blocks at different angles.

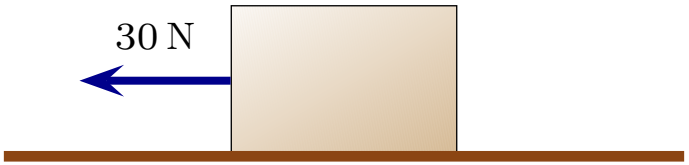


Which of the following is true?

1. μ_k is same for both.
2. μ_k is larger for A.
3. μ_k is smaller for A.

Question 4

A $10\,\mathrm{kg}$ box is at rest on a horizontal surface while a rope pulls on it as illustrated. The coefficient of static friction between the block and surface is $\mu_s = 0.50$.

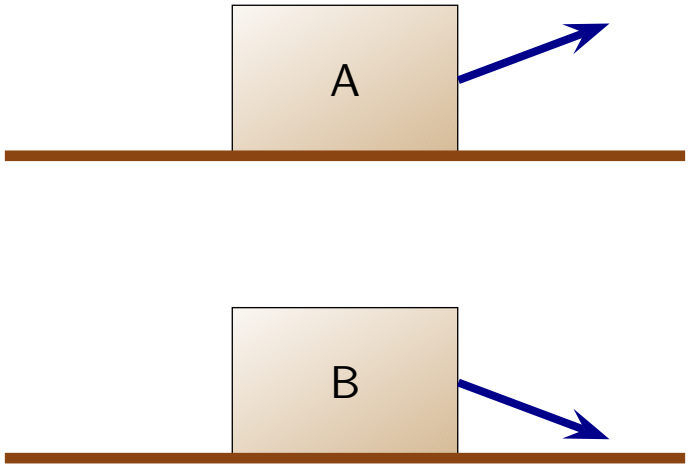


Which of the following is true?

1. The static friction force is less than $30\,\mathrm{N}$.
2. The static friction force is $30\,\mathrm{N}$.
3. The static friction force is $0.50\,\mathrm{N}$.
4. The static friction force is $49\,\mathrm{N} (= \mu_s mg)$.

Question 5

Two identical blocks are on the same surface. Forces with identical magnitudes act on the blocks at different angles.

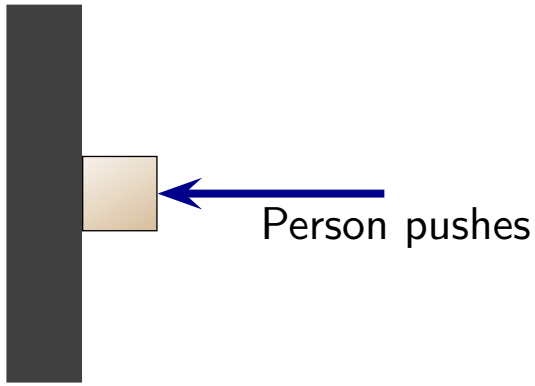


Which of the following is true?

1. f_k is same for both.
2. f_k is larger for A.
3. f_k is smaller for A.

Question 6

A person pushes horizontally on a block in order to hold it against a vertical wall. The block is at rest.



Which of the following is true?

1. As the person pushes harder, the friction force stays the same.
2. As the person pushes harder, the friction force increases.
3. As the person pushes harder, the friction force decreases.
4. Angels are holding the block up.