

Newtonian Mechanics Review Puzzles (Pre-AP)

Name: _____

1. The air exerts a forward force of 10.0 N on the propeller of a 0.20 kg model airplane. If the plane accelerates forward at 2.0 m/s^2 , what is the magnitude of the resistive force exerted by the air on the airplane?

Ans:

2. A 5.0 gram bullet leaves the muzzle of a rifle with a speed of 320 m/s. What force (assumed constant) is exerted on the bullet while it is traveling down the 0.82 m long barrel of the rifle?

Ans:

3. The force of the wind on the sails of a sailboat is 390 N north. The water exerts a force of 180 N east. If the boat, including the crew, has a mass of 270 kg, what are the magnitude and direction of its acceleration?

Ans:

Answer to #4 is $\mu_s = 0.383$, $\mu_k = 0.306$ Answer to #5 is $a = -1.20 \text{ m/s}^2$, $\mu_k = 0.122$, $d = 45.0 \text{ m}$

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4. A dockworker loading crates on a ship finds that a 2.0×10^1 kg crate, initially at rest on a horizontal surface, requires a 75 N horizontal force to set it in motion. However, after the crate is in motion, a horizontal force of 6.0×10^1 N is required to keep it moving at constant speed. Find the coefficients of static and kinetic friction between the crate and floor.

Ans:

Ans:

5. A hockey puck is hit on a frozen lake and starts moving with a speed of 12.0 m/s. 5.00 seconds later, its speed is 6.00 m/s. What is its average acceleration? What is the average value of the coefficient of kinetic friction between puck and ice? How far does the puck travel during this 5.00 s interval?

Ans:

Ans:

Ans:

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6. Block A (mass 8.00kg) is moving up a 30.0 degree incline and is attached by a cord to block B (mass 22.0 kg) hanging over the end of the incline via a pulley. If the coefficient of kinetic friction between block A and the incline is 0.28, find the tension in the cord and the acceleration of the system.

Ans:

Ans:

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Answer to #6 is $F_T = 1.0 \times 10^2 \text{ N}$ and $a = 5.2 \text{ m/s}^2$