

$$v_{0y} = 6.9$$

$$\sigma = 2.0$$

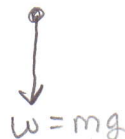
Quiz #4: Forces and Newton's Laws of Motion

Problem 1 (2 points)

You throw a ball straight upward in the absence of air resistance. After you have released it, just before it reaches its maximum height, what force(s) are acting on the ball?

A

- a) Gravity (down)
- b) Gravity (down) and inertia (up)
- c) Gravity (down) and the force of the throw (up)
- d) Inertia (up)



Problem 2 (2 points)

A 5.0 kg block has an acceleration of 0.20 m/s² when a force is exerted on it. A second block has an acceleration of 0.10 m/s² when subject to the same force. What is the mass of the second block? Justify your answer.

$$F = ma = (5.0 \text{ kg})(0.20 \text{ m/s}^2) = 1.0 \text{ N}$$

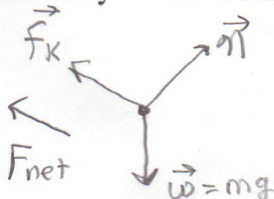
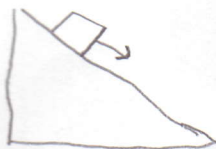
$$m_2 = F/a_2 = 1.0 \text{ N} / 0.10 \text{ m/s}^2 = 10. \text{ kg}$$

note: since acceleration was cut in half, the mass must be 2x bigger.

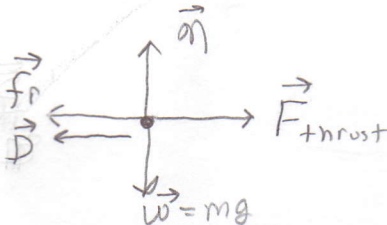
Problem 3 (2 points) (3 points)

For the situations described below, draw a free-body diagram.

- a) You've slammed on the brakes and your car is skidding to a stop while going down a 20° hill.



- b) A jet plane is speeding down the runway during takeoff. Air resistance is not negligible.



Problem 4 (3 points)

An elevator suspended by a cable is moving upward and slowing to a stop. Draw a motion diagram and a free-body diagram of the situation. Air resistance is negligible.

(In your free-body diagram, indicate the relative magnitude of the forces by the lengths of the arrows that you draw. Also show the direction of the net force vector.)

