

- Practice Test -

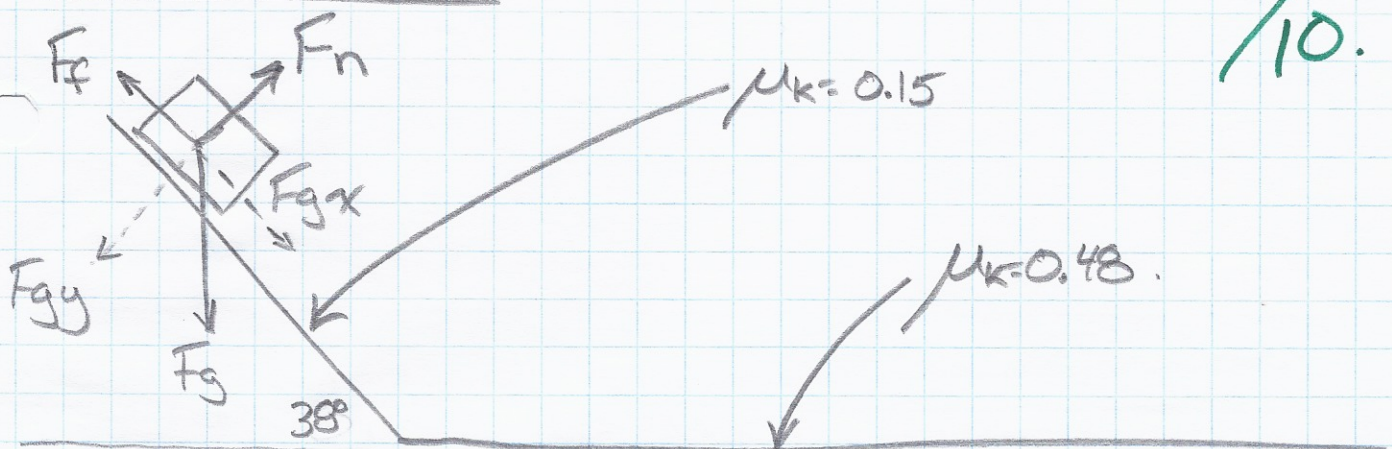
Chevy and the Low Friction Saucer

name _____

Chevy and his saucer have a combined mass of 95.9 kg. They are going to go down a slope that is 52 m long and has a coefficient of friction between the saucer and the hill of only 0.15. The hill has a consistent angle of 38° above the horizontal. The hill ends at a level parking lot that has just been shovelled. The coefficient of friction between the pavement and the saucer is 0.48. Chevy launches himself down the hill with an initial velocity of 3.0 m/s.

How far does Chevy slide along the pavement before stopping? (10 marks)

Practice Quiz



Part 1: find v at bottom of hill

$$F_n = F_g \cos \theta = mg \cos \theta \quad \checkmark$$

$$F_f = \mu mg \cos \theta \quad \checkmark$$

$$F_{net} = F_{gx} - F_f \quad \checkmark$$

$$a = g(\sin \theta - \mu \cos \theta) = 4.88 \text{ m/s}^2 \quad \checkmark$$

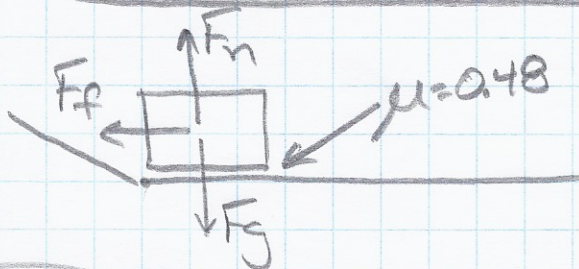
$$v_i = 3.0 \text{ m/s}$$

$$a = +4.88 \text{ m/s}^2$$

$$\Delta d = 52 \text{ m}$$

$$v_2 = \sqrt{v_i^2 + 2a\Delta d} = 22.7 \text{ m/s} \quad \checkmark$$

Part 2: find distance to stop on horizontal



$$F_f = \mu mg \quad \checkmark$$

$$F_{net} = F_f \quad \checkmark$$

$$\therefore ma = \mu mg$$

$$a = \mu g = 4.7 \text{ m/s}^2 \text{ [left]} \quad \checkmark$$

$$v_1 = 22.7 \text{ m/s}$$

$$v_2 = 0 \text{ m/s}$$

$$a = -4.7 \text{ m/s}^2$$

$$\Delta d = ?$$

from (5)

$$\Delta d = \frac{v_2^2 - v_1^2}{2a} = 54.8 \text{ m} \quad \checkmark$$