

# PHYS 211 College Physics I

## Exam 3A

October 25, 2017

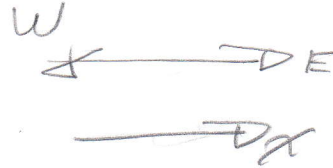
Name J. C. Daly

1. A 1520 kg car is moving due east with an initial speed of 28.0 m/s. After 9.00 s the car has slowed down to 16.0 m/s.

Find the magnitude and direction of the force that produces the deceleration.

a. Magnitude 2030 N

b. Direction West ( $-\hat{x}$ )



$$m = 1520 \text{ kg}$$

$$v_0 = 28.0 \hat{x} \text{ m/s}$$

$$t = 9 \text{ s}$$

$$v = 16.0 \text{ m/s}$$

$$\vec{F} = m\vec{a}$$

$$a = \frac{\Delta v}{t} = \frac{v - v_0}{t} = \frac{16 - 28}{9} = -\frac{12}{9}$$

$$F = 1520 * \left(-\frac{12}{9}\right) = -2026.7$$

$$\vec{F} = -2030 \hat{x}$$

### Grades

100	99
	88, 88, 88
	87
	86
	85
	84
90	90
	88, 88, 88
	87
	86
	85
	84
80	80
	78, 78
	77
	76, 76, 76
	73, 73
	72
70	70
	68, 68

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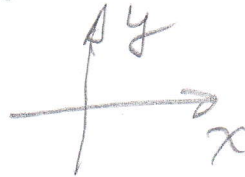
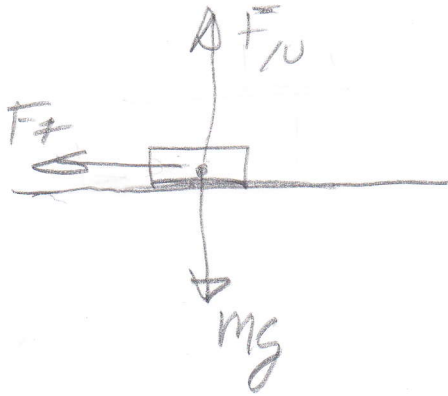
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2. A 0.75 kg hockey puck is sliding on ice. The coefficient of kinetic friction is 0.150.

a. What is the friction force acting on the puck?  $-1.10 \text{ N } \hat{x}$

b. What is the acceleration of the puck?  $-1.47 \hat{x} \text{ m/s}^2$



$$\sum F_y = F_N - mg = 0$$

$$F_N = mg$$

$$\sum F_x = -F_f = -\mu_k F_N = -\mu_k mg$$

$$F_f = \mu_k mg = 0.15 * 0.75 * 9.8$$
$$= -1.10 \text{ N } \hat{x}$$

$$F = ma$$

$$a = \frac{F}{m} = \frac{1.10}{0.75} = 1.47 \text{ m/s}^2$$

$$\vec{a} = -1.47 \text{ m/s}^2 \hat{x}$$

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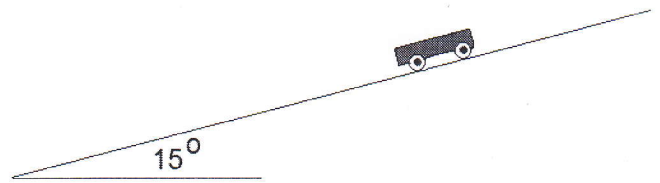
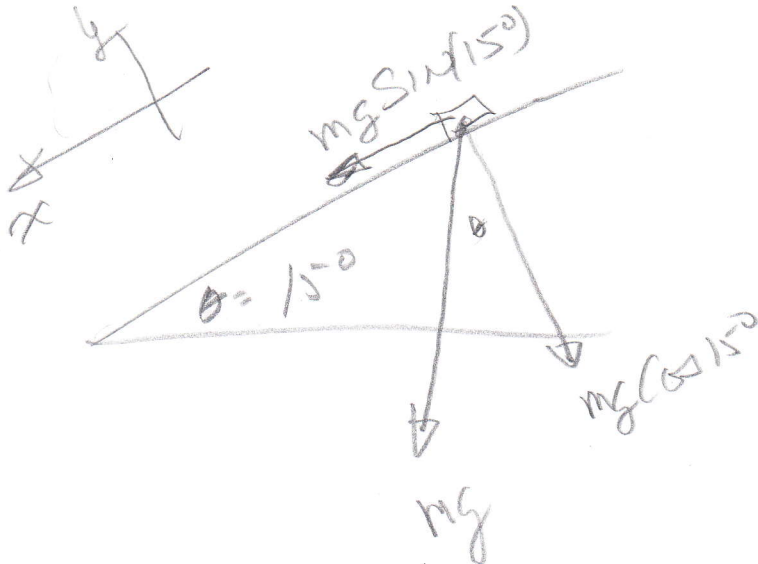


Figure 3

3. A 2.50 kg cart is rolling down the frictionless incline shown in Figure 3.

a. What is its acceleration? 2.54 m/s<sup>2</sup>

b. Starting from rest, how long does it take for it to travel 1.50 m? 1.09 s



$$\sum F_x = mg \sin(15^\circ) = ma_x$$

$$a = a_x = g \sin(15^\circ) = 9.8 \sin(15^\circ)$$

$$a = 2.54 \text{ m/s}^2$$

$$x = \frac{1}{2} a t^2$$

$$t = \sqrt{\frac{2x}{a}} = \sqrt{\frac{2 \times 1.5}{2.54}} = 1.0876$$
$$= 1.09 \text{ s}$$