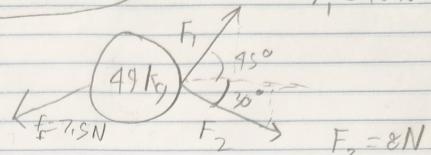


6)

$$1) a = 0.195 \text{ m/s}^2$$

$$F_1 = 10 \text{ N}$$



$$F_{1y} = 10 \sin(45^\circ) = 7.07 \text{ N}$$

$$F_{1x} = 10 \cos(45^\circ) = 7.07 \text{ N}$$

$$F_{2y} = 8 \sin(30^\circ) = 4 \text{ N}$$

$$F_{2x} = 8 \cos(30^\circ) = 6.93 \text{ N}$$

$$(F_{1y} - F_{2y}) + (F_{1x} + F_{2x}) =$$

$$(7.07 - 4) + (7.07 + 6.93) =$$

$$3.07 + 14 = 17.07$$

$$\Sigma F - F_f = ma \quad 17.07 - 7.5 = 9.57$$

$$\Sigma F = ma$$

$$\frac{9.57}{44} = \frac{4.9 \text{ kg}}{44} a$$

$$a = 0.195 \text{ m/s}^2$$

2)

$$1) 1.5 \text{ seconds}$$

$$0.5 \cdot 2 = 1 \text{ km}$$

$$1 \text{ km}$$

$$1.5 \text{ seconds}$$

$$\frac{1000 \text{ m}}{1.5 \text{ seconds}}$$

$$0.667 \frac{\text{km}}{\text{s}} \cdot 3600 = 2400$$

$$a) 666.67 \text{ m/s}$$

$$b) 2400.012 \text{ km/h}$$

$$2) a) 250,000 \text{ cm}^3 \quad 0.25 \text{ m}^3 \cdot 100$$

$$250,000 \quad 0.25 \cdot 100,000 \text{ m}^3$$

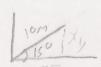
$$b) 277.78 \frac{\text{m}}{\text{s}} \quad \frac{1000 \text{ km}}{1 \text{ h}} \rightarrow \frac{1000,000 \text{ m}}{3600 \text{ s}}$$

$$c) 200 \frac{\text{g cm}}{\text{m s}^2} \quad \frac{2 \text{ kg m}}{\text{s}^2} \cdot \frac{2000 \text{ g m}}{1 \text{ s}^2}$$

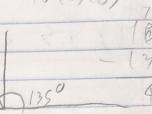
$$\frac{2000 \cdot 0.001}{1000} = 200$$

3)

a) $14.66^{\circ} \hat{i}, 2.59^{\circ} \hat{j}$
b) $14.14^{\circ} \hat{i}, 4.14^{\circ} \hat{j}$



$$\begin{aligned}\sin 135^\circ &= \frac{xy}{10} \\ 10 \sin(135^\circ) &\\ 10 \cos(135^\circ) &\end{aligned}$$



$$\begin{aligned}20 \cos(45^\circ) &= 14.14 \\ 20 \sin(45^\circ) &= 14.14 \\ 10 \cos(135^\circ) &= -14.14\end{aligned}$$

$$0.5 + 0.25 \sin(45^\circ) = y$$

$$0.5 + 0.25 \cos(135^\circ) = x$$

$$0.5^2 + 0.5^2 = c^2$$

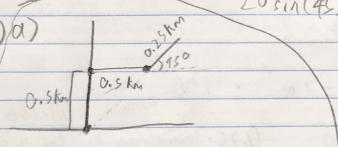
$$0.25 + 0.25 = c^2$$

$$\sqrt{0.5} = \sqrt{c^2}$$

$$c = 0.707$$

c) 0.957 km

2)a)



b) $0.677 \text{ m/s}, 0.677 \text{ m/s}$

c) 0.957 km

4)

a) 16 m

b) $4 \frac{1}{2} \text{ s}$

$$-1 - 4(-2) = x(2)$$

$$-1 + 8 = 7$$

$$(7) - 69 = 16$$

$$-1 - 4(2) =$$

$$-1 - 8 = -9$$

$$\frac{16}{4} = 4 \text{ m/s}$$

$$x(t) = -2(0)t + 7(0)^2 = 0$$

$$x(t) = -2(2)t + 7(2)^2$$

$$-4 + 28 = 24$$

$$\frac{24}{2} = 12 \text{ m/s}$$

a) 12 m/s

b) 20

16

12

8

4

c) 12 m/s

d) $14 \frac{1}{2} \text{ s}$

e) 2 seconds

f) 10 m

g) 11 seconds

$$x(t) = -2t + 17t^2$$

$$x'(t) = -2 + 14t$$

$$v'(t) = -2 + 14(1) = 12$$

$$v_f = a + tv_i$$

$$\frac{v_f}{a} = t + \frac{v_i}{a}$$

$$\frac{10}{2} = t + 2$$

$$x(t) = C_0 + C_1 t + \frac{1}{2} a t^2$$

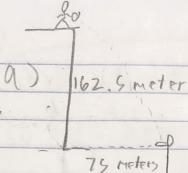
$$\frac{100}{10} = 10 + \frac{1}{2} a t^2$$

$$x(t) = \frac{1}{2} a t^2 + v_i t + C_0$$

$$100 = \frac{1}{2} (2)(10)^2 + 10(10) + 0$$

$$100 = \frac{1}{2} (2)(10)^2 + v_i (10) + C_0$$

$$x(0) = \frac{1}{2} C_0 = 10$$

5) 
15 a) 162.5 meters

b) $V = 38.4 \text{ m/s}$

$$V^2 = V_0^2 + 2g \Delta X$$

$$\frac{V^2}{V_0^2} = g + 2(9.81)(75)$$

$$V = 38.4$$

2) a) 163.1 meters

b) 5.77 seconds.

$$R = \frac{V_0^2 \sin(2\theta_0)}{g}$$

$$R = \frac{40^2 \sin(2 \times 45)}{9.81} = 163.1 \text{ m}$$

$$T = \frac{2V_0 \sin(\theta_0)}{g}$$

$$T = \frac{2(40) \sin(45)}{9.81} = 5.76$$