

PhysicsQuiz 1Construct the ~~the~~ vectors using your medipol ID:

$$\vec{A} = \begin{pmatrix} \text{1st \& 2nd digits} \\ \text{-3rd \& 4th digits} \\ \text{last two digits} \end{pmatrix}$$

$$\vec{B} = \begin{pmatrix} \text{Last two digits} \\ \text{first two digits} \\ \text{-6th \& 7th digits} \end{pmatrix}$$

$$\underline{\underline{ID = 64200040}}$$

$$\vec{A} = \begin{pmatrix} 64 \\ -20 \\ 40 \end{pmatrix} \quad \vec{B} = \begin{pmatrix} 40 \\ 64 \\ -4 \end{pmatrix}$$

Calculate the following:

$$① \vec{A} - 2\vec{B}$$

$$(64\hat{i} - 20\hat{j} + 32\hat{k}) - 2(40\hat{i} + 64\hat{j} - 4\hat{k})$$

$$64\hat{i} - 20\hat{j} + 32\hat{k} - 80\hat{i} - 128\hat{j} + 8\hat{k}$$

$$-16\hat{i} - 148\hat{j} + 40\hat{k} \Rightarrow \sqrt{(-16)^2 + (-148)^2 + (40)^2} = 37.89$$

$$② \vec{A} \cdot \vec{B}$$

$$(64)(40) + (-20)(64) + (40)(-4)$$

$$= \underline{\underline{1120}}$$

$$③ |\vec{B}|$$

$$|\vec{B}| = \sqrt{B_x^2 + B_y^2 + B_z^2} = \sqrt{40^2 + 64^2 + 4^2}$$

$$= \underline{\underline{75.58}}$$



ID  $\Rightarrow$ 

64200040

Quiz 2

$$X=0$$

$$Y=4$$

$$Z=4$$

$$W=2$$

$$x(t) = (5\text{m} + (6\text{m/s})t + (X\text{m/s}^2)t^2 + (Y\text{m/s}^3)t^3)$$

$$y(t) = (8\text{m} - (Z\text{m/s})t + (21\text{m/s}^2)t^2 - (W\text{m/s}^3)t^3)$$

$$t=5$$

$$a) \frac{dx}{dt}(t) = 0 + (6\text{m/s})(1) + (X\text{m/s}^2)2t + (Y\text{m/s}^3)3t^2$$

$$= 6\text{m/s} + (0\text{m/s}^2)2t + (4\text{m/s}^3)3t^2$$

$$= 6\text{m/s} + (4\text{m/s}^3)[3(5)^2]$$

$$= 6\text{m/s} + (4\text{m/s}^3)(75)$$

$$= \underline{\underline{306\text{m/s}}}$$

$$t=5$$

$$\frac{dy}{dt}(t) = 0 - (4\text{m/s})(1) + (21\text{m/s}^2)2t - (2\text{m/s}^3)3t^2$$

$$= -4\text{m/s} + (21\text{m/s}^2)2(5) - (2\text{m/s}^3)[3(5)^2]$$

$$= -4\text{m/s} + 210\text{m/s}^2 - 150\text{m/s}^3$$

$$= \underline{\underline{56\text{m/s}}}$$

$$b) 5 + 6t + (0)t^2 + (4)t^3 = 8 - 4t + 21t^2 - 2t^3$$

$$5 + 6t + 4t^3 = 8 - 4t + 21t^2 - 2t^3 \quad (\text{Shift solve})$$

$$t = 3.015 \approx 3.02$$

$$c) \frac{dx}{dt}(t) = 12t^2 + 6$$

$$t=4$$

$$\frac{dx}{dt}(v) = 24t = 24(4) = \underline{\underline{96\text{m/s}^2}}$$

$$\frac{dy}{dt}(t) = -6t^2 + 42$$

$$\frac{dy}{dt}(v) = -12t = -12(4) = \underline{\underline{-48\text{m/s}^2}}$$

Derivative of velocity



# Physics

## Quiz 3

17/11/2020

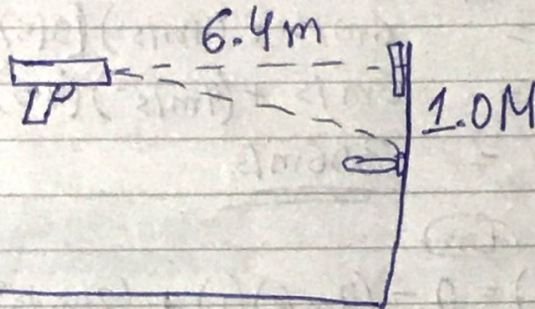
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$$X = (6)(4+0) = 6.4$$

$$Y = 1.(0) = 1.0$$

$$g = 10 \text{ m/s}^2$$

What's the initial velocity?



final V

$$\rightarrow 0 = (v_i)^2 - 2g(\Delta d)$$

$$0 = (v_i)^2 - 2(10)(6.4 - 1)$$

$$0 = (v_i)^2 - 108$$

$$(v_i)^2 = 108$$

$$v_i = 10.39 \text{ m/s}$$

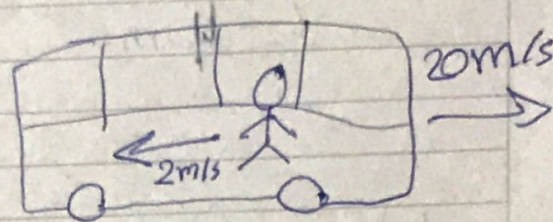
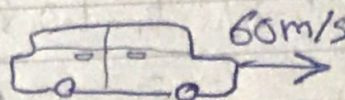


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$$X = (6)(0) = 60 \text{ km/h}$$

$$Y = (2)(0) = 20 \text{ km/h}$$

$$Z = (2) = 2 \text{ m/s} \rightarrow 7.2 \text{ km/h}$$



(\*) Velocity of bus to passenger?

$$\vec{V}_{BP} = \vec{V}_B - \vec{V}_P$$

~~$$= 20 - 2$$~~  
~~$$= 18 \text{ m/s}$$~~

The bus is still  
in perspective of passenger

so

$$\underline{V_{BP} = 0 \text{ km/h}}$$

(\*) Velocity of Bus to car?

$$V_{BC} = V_B - V_C$$

$$= 20 - (60)$$

$$= -40 \text{ km/h}$$

$$\left( 40 \text{ km/h} \right. \\ \left. \text{backwards} \right)$$

Velocity of  
Car to Bus?

$$V_{CB} = 60 - 20$$

$$= 40 \text{ km/h}$$

~~$$= 40 \text{ km/h}$$~~

(\*) Velocity of passenger to car?

$$V_{CP} = \left( \underset{V_B}{20} + \underset{V_P}{7.2} \right) - \underset{V_C}{(60)} = \underline{\underline{-32.8 \text{ km/h}}}$$

(\*) Velocity of Car to Passenger

$$V_{CP} = 60 - (20 + 7.2) = \underline{\underline{32.8 \text{ km/h}}}$$