

A uniform rod of length 50 cm. and weight 120 gm. wt. is suspended at its two ends freely by two strings, their other two ends are fixed at one point. If the lengths of the two strings are 30 cm. and 40 cm. respectively. Find the magnitude of the tension in each of the two strings.

$$AC^2 + CB^2 = 30^2 + 40^2 = 2500$$

$$AB^2 = 50^2 = 2500$$

$$\therefore AB^2 = AC^2 + BC^2$$

$$\therefore \angle ACB = 90^\circ$$

$$\sin A = \frac{40}{50}$$

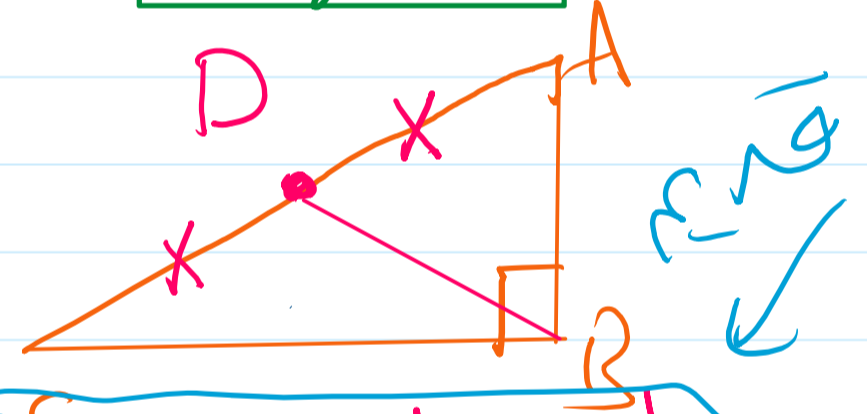
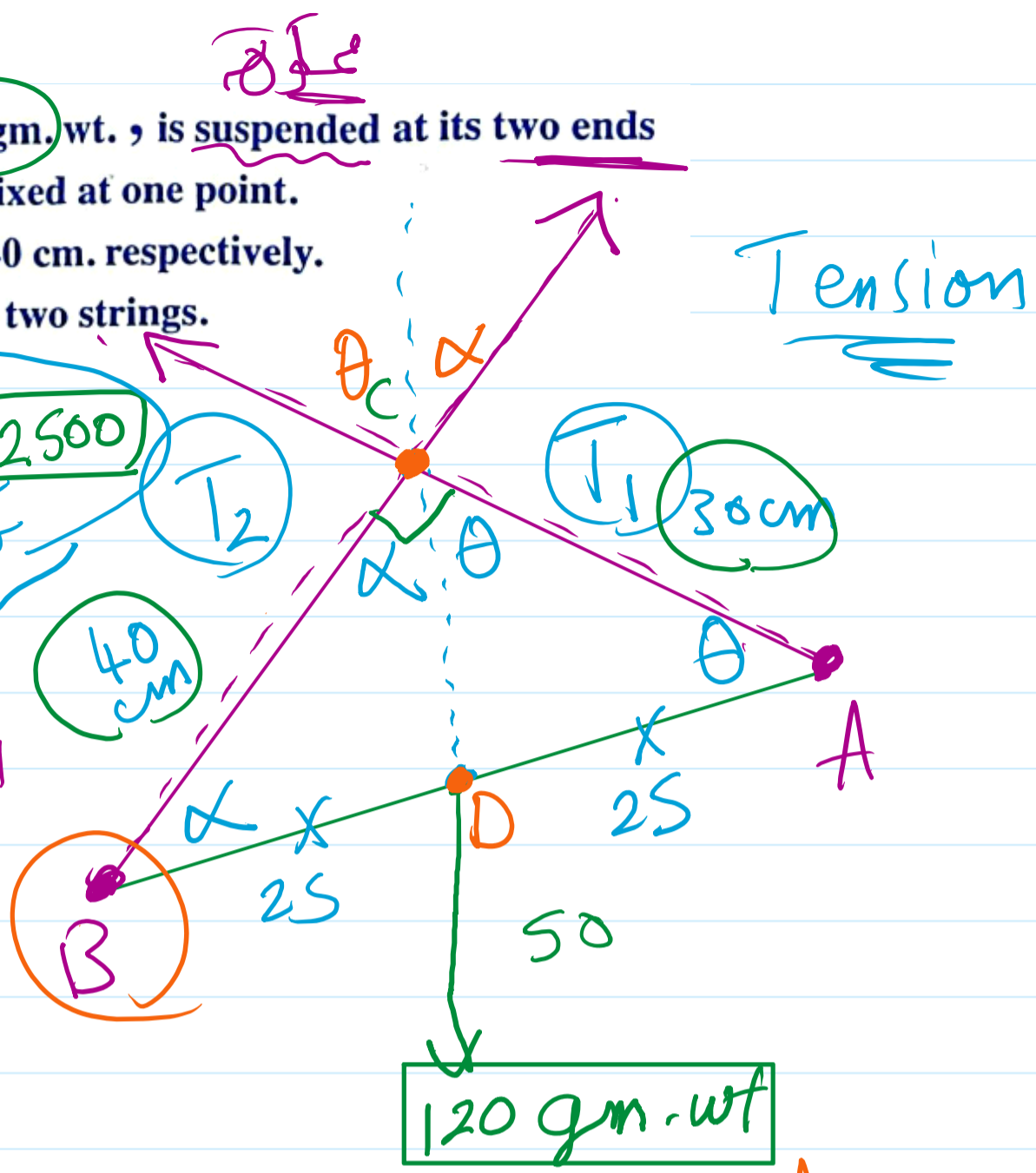
$$\sin B = \frac{30}{50}$$

$$\frac{T_1}{\sin \alpha} = \frac{T_2}{\sin \theta} = \frac{120}{\sin 90}$$

$$\frac{T_1}{\frac{30}{50}} = \frac{T_2}{\frac{40}{50}} = 120$$

$$T_1 = \frac{30 \times 120}{50} =$$

$$T_2 = \frac{40 \times 120}{50} =$$



$\therefore D$  is midpoint  
 $\therefore DB$  is median  
 $\therefore DB = DC = AD$   
 $\therefore \angle DCB = \angle DBC$

$\overline{AB}$  is a uniform rod of length 140 cm. and weight 480 gm.wt., its end A is attached to a hinge fixed on a vertical wall. A force  $\vec{F}$  acts horizontally at the other end B to make the rod at rest at a position in which the rod inclines to the horizontal at an angle of measure  $30^\circ$

Find the magnitude of  $\vec{F}$ , and the magnitude and the direction of the reaction of the hinge at A

$\therefore m(\angle B) = 30^\circ$  &  $m(\angle C) = 90^\circ$   
 $\therefore AC = \frac{1}{2} AB = 70 \text{ cm}$

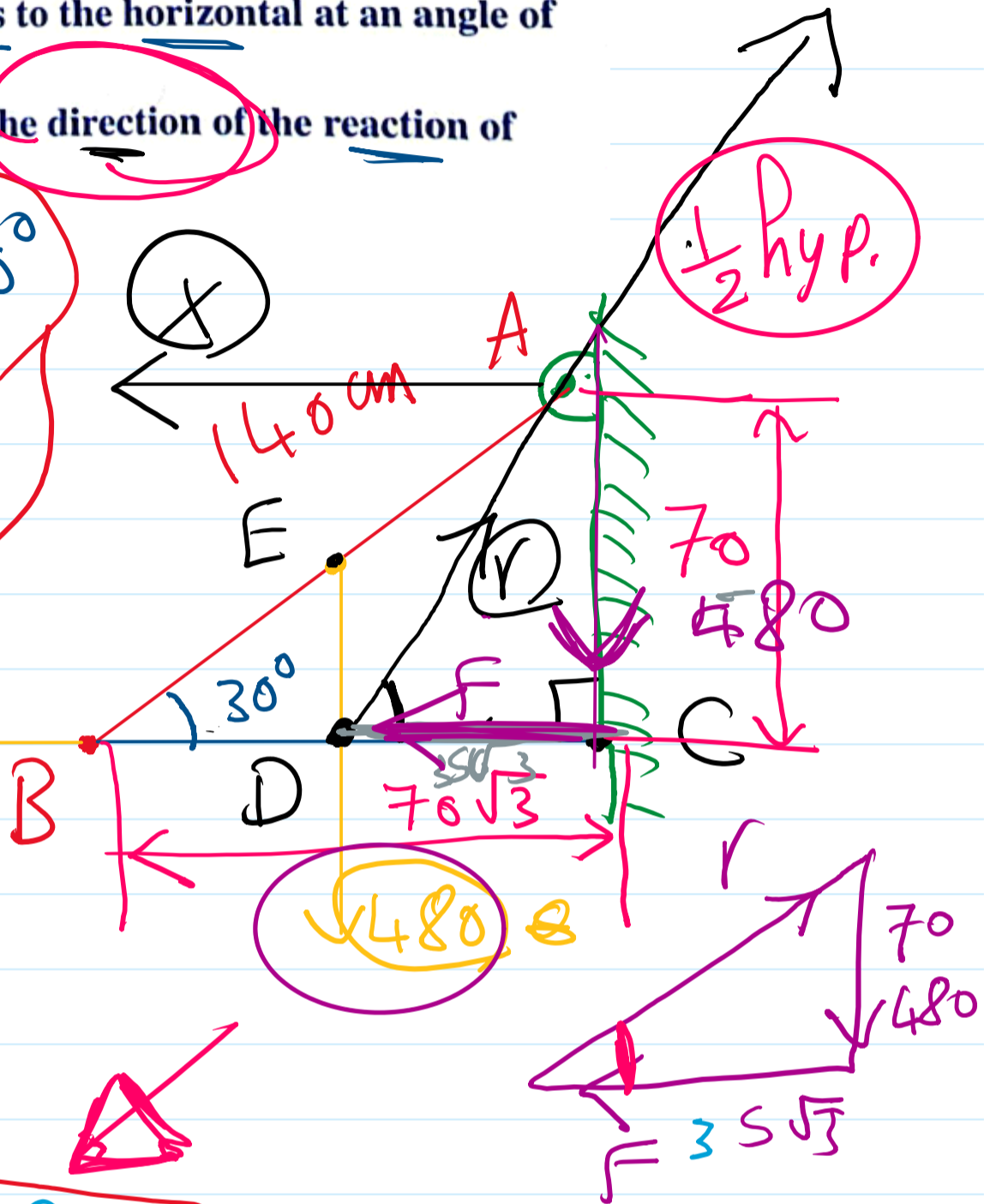
$\therefore BC = \frac{\sqrt{3}}{2} AB = 70\sqrt{3} \text{ cm}$

$\therefore D$  is midpoint

$\therefore DC = 35\sqrt{3} \text{ cm}$

$AD = \sqrt{(70)^2 + (35\sqrt{3})^2} =$

$AD = 35\sqrt{7} \text{ cm}$



$\frac{480}{70} \times \frac{F}{35\sqrt{3}} = \frac{r}{35\sqrt{7}}$

2 sec

3rd prep

$F = \frac{480 \times 35\sqrt{3}}{70} =$

$r = \frac{480 \times 35\sqrt{7}}{70} =$

$\tan \theta = \frac{70}{5\sqrt{3}}$

$\sin \theta = \frac{70}{35\sqrt{7}}$

$\theta = \tan^{-1} \frac{70}{5\sqrt{3}}$

$\theta = \checkmark$

A uniform rod rests with its two ends on two smooth planes incline to the horizontal at two angles of measures  $60^\circ$  and  $30^\circ$ . Find the measure of the angle which the rod makes with the horizontal at the equilibrium position and if the weight of the rod equals 24 newton. Determine the magnitudes of the two reactions of the two planes.

