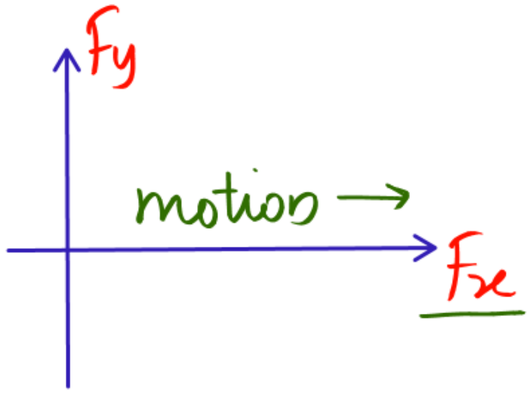
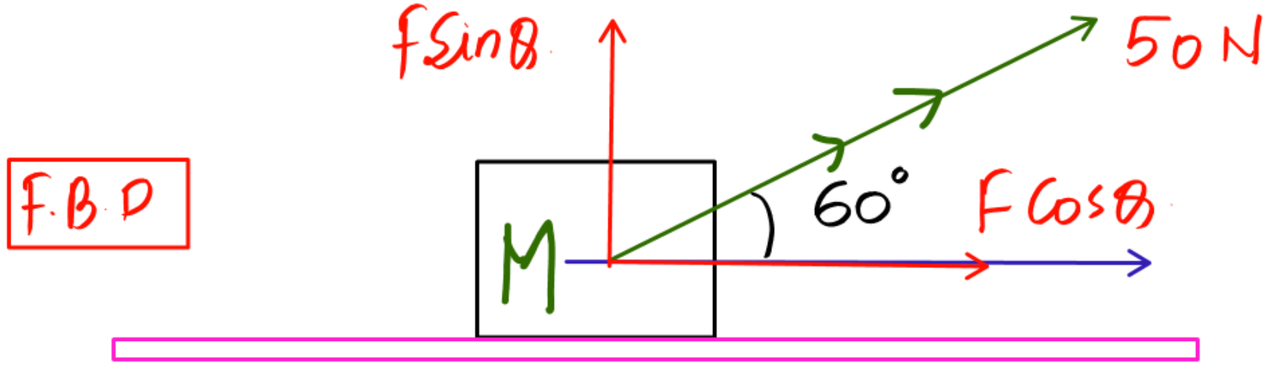
Free-Body-diagram

- Force - Balance - बल - संतुलन





$\vec{d}$ = ? , total कार्य = 200J
WORK

कार्य = WORK = F.d

F.Cosθ logic.

WORK = F.Cosθ $\vec{d}$

200J = 50 × Cos60 × $\vec{d}$

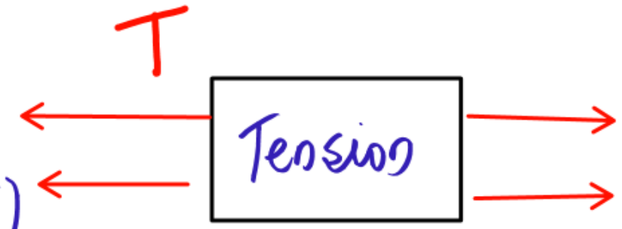
200J = 50 × $\frac{1}{2}$ × d

40 = 5 × d

d = 8m

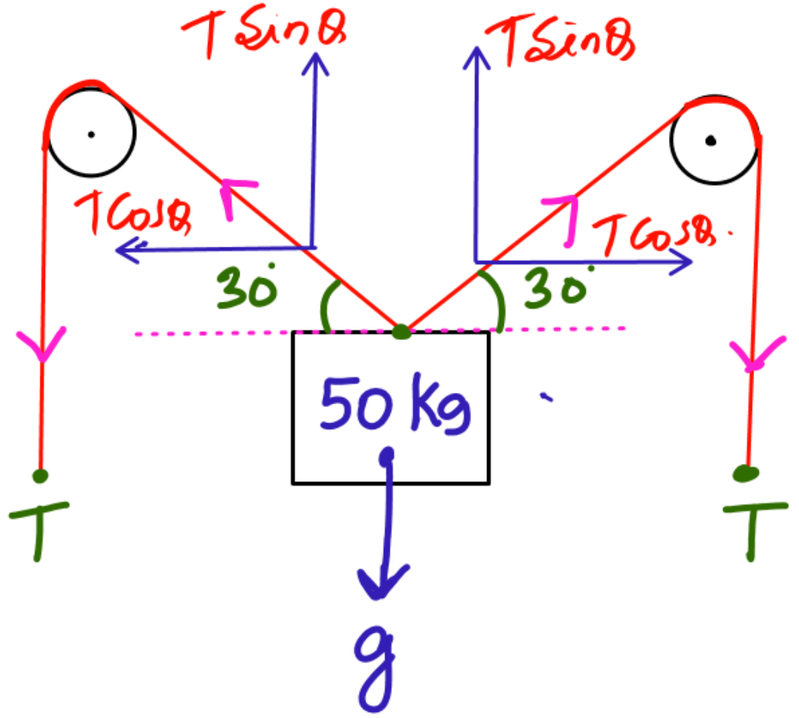
Force - Body बल

- Tension - तनाव
- Compression (संपीड़न)



तनाव.

— Wire - Break down



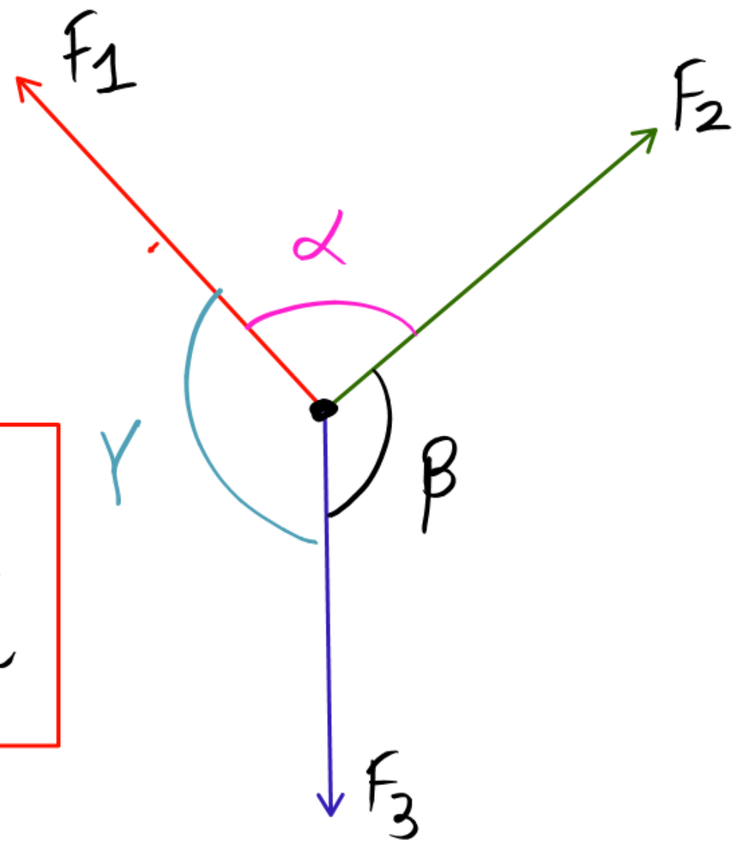
$$2T\sin\theta = mg$$

$$2 \cdot T \cdot \frac{1}{2} = 50 \times 10$$

$$T = 500\,N$$

: Lammi's Theoram

Balanced Force
equilibrium



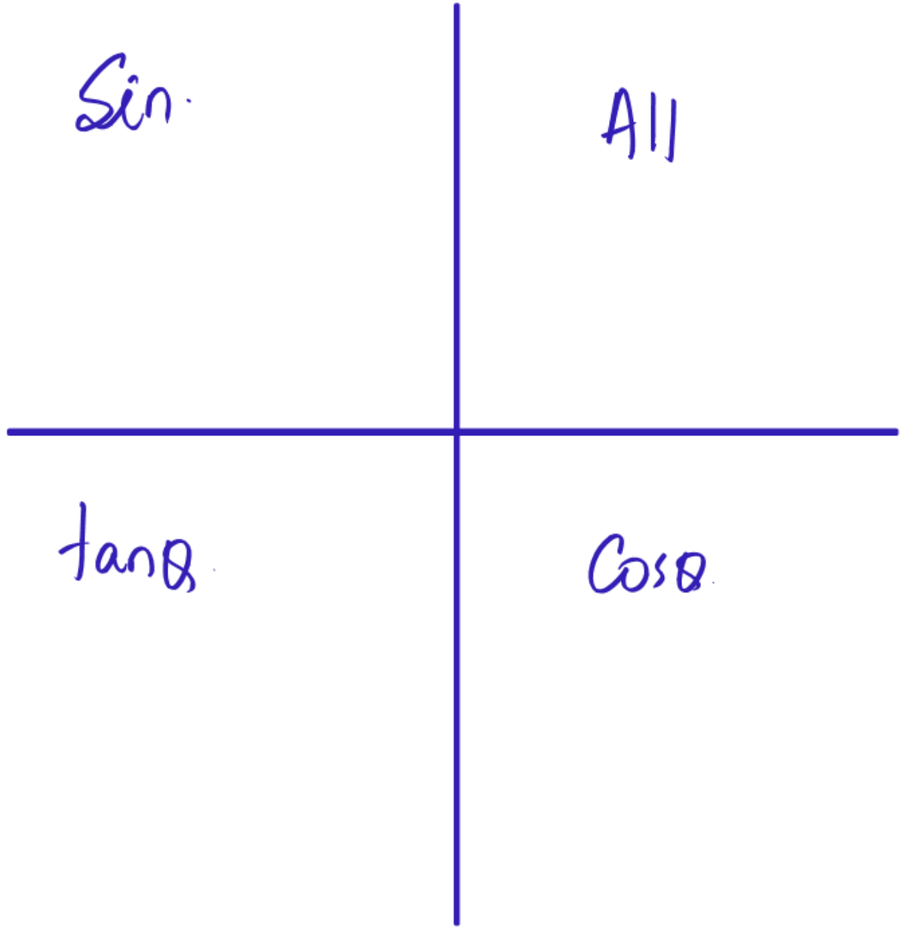
$$\frac{F_1}{\sin\beta} = \frac{F_2}{\sin\gamma} = \frac{F_3}{\sin\alpha}$$

- Concept

$\sin 120^\circ = \sin(90+30)$

$\sin(90+\theta) = \cos\theta$

$= \cos 30^\circ = \sqrt{3}/2$



Forces equal to **P, 2P, 3P and 4P** act along the sides AB, BC, CD and DA of a square ABCD. The magnitude of resultant and the angle which the resultant makes with the horizontal are respectively

P, 2P, 3P और 4P के बराबर बल एक वर्ग ABCD की भुजाओं AB, BC, CD और DA के अनुदिश कार्य करते हैं। परिणामी का परिमाण और परिणामी द्वारा क्षैतिज के साथ बनाया गया कोण क्रमशः हैं

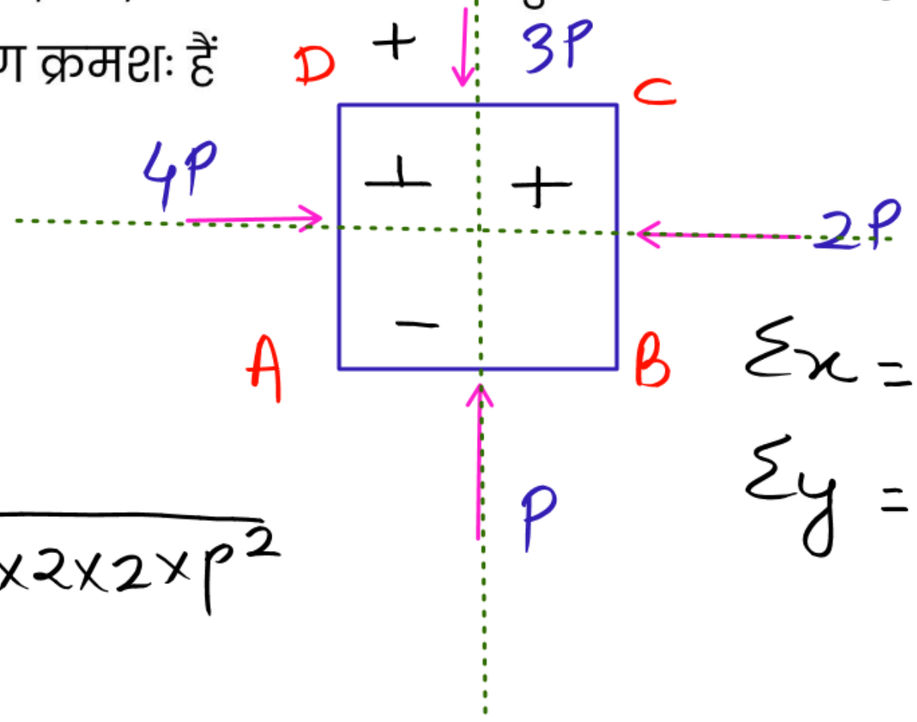
1. $\frac{\sqrt{3}}{2}$P and 60°
2. $\frac{\sqrt{3}}{4}$P and 60°
3. $2\sqrt{3}$P and 30°
4. $2\sqrt{2}$P and 45°

$R = \sqrt{(\varepsilon_x)^2 + (\varepsilon_y)^2}$

$R = \sqrt{4p^2 + 4p^2}$

$R = \sqrt{8p^2} = \sqrt{2 \times 2 \times 2 \times p^2}$

$R = 2\sqrt{2}p$



$\varepsilon_x = -2P$

$\varepsilon_y = 2p$

If three coplanar concurrent forces acting at a point 'O' are in equilibrium then the ratio of T_1/T_2 और T_1/T_3 respectively will be?

चमक्

$\sin(90+\theta) = \cos\theta$

1. $\sqrt{3}$ and $\frac{\sqrt{3}}{2}$
2. $\sqrt{\frac{3}{2}}$ and $\sqrt{3}$
3. 1 and $\frac{1}{2}$
4. $\frac{1}{2}$ and 1

$$\frac{T_1}{\sin 120} = \frac{T_2}{\sin 150} = \frac{T_3}{\sin 90}$$

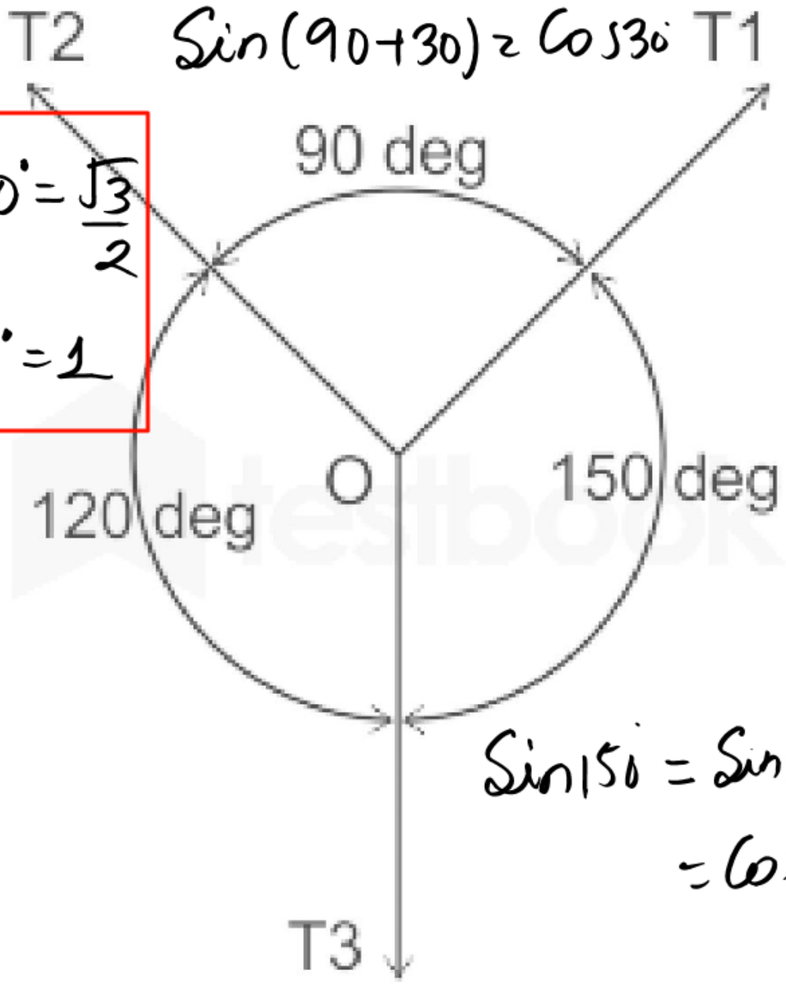
$\sin 120 \rightarrow \cos 30$ ↓ $\sin 150 \rightarrow \cos 60$ ↓ $\sin 90 = 1$

$$\frac{T_1}{\frac{\sqrt{3}}{2}} = \frac{T_2}{\frac{1}{2}} = \frac{T_3}{1}$$

$$\frac{T_1}{T_2} = \frac{\sqrt{3}}{1}$$

$\cos 30^\circ = \frac{\sqrt{3}}{2}$

$\cos 60^\circ = 1$



$\sin(90+30) = \cos 30$

$\sin 150 = \sin(90+60) = \cos 60$

If point A is in equilibrium under the action of the applied forces, the values of tension. T_{AC} = ?

यदि बिंदु A लागू बलों की कार्रवाई के तहत संतुलन में है, तो तनाव का मान। TAC =?

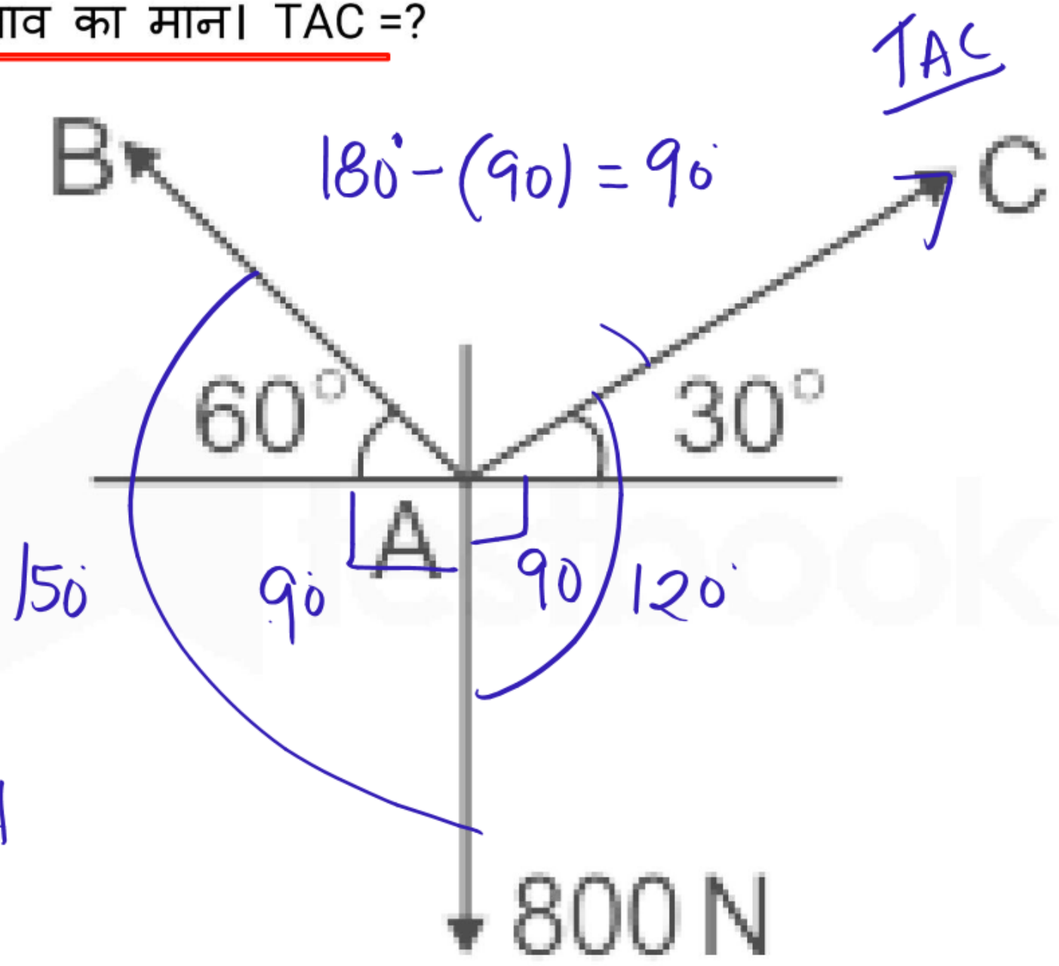
1. 520 N
2. 150 N
3. 400 N
4. 450 N

Concept

$$\frac{T_{AC}}{\sin 150^\circ} = \frac{800}{\sin 90^\circ}$$

$$\frac{T_{AC}}{\frac{1}{2}} = \frac{800}{1}$$

$$T_{AC} = \frac{800}{2} = 400\,N$$



Four forces having magnitudes of 200 N, 400 N, 600 N and 800 N respectively acting along four sides (1 m each) of a square ABCD as shown in Figure. Determine the magnitude and direction of the resultant **force from A along the line AB.**