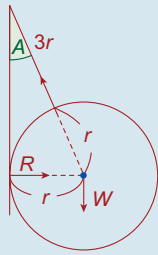


Exercise 8J

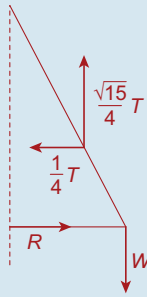
Q. 1. Forces:



$$\sin A = \frac{r}{3r + r} = \frac{1}{4}$$

$$\therefore \cos A = \frac{\sqrt{15}}{4}$$

Resolved Forces:



$$(1) \frac{\sqrt{15}}{4} T = W$$

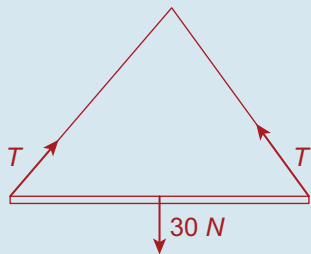
$$\Rightarrow T = \frac{4W}{\sqrt{15}}$$

$$(2) R = \frac{1}{4} T$$

$$= \frac{1}{4} \left(\frac{4W}{\sqrt{15}} \right)$$

$$= \frac{W}{\sqrt{15}}$$

Q. 2. Forces:



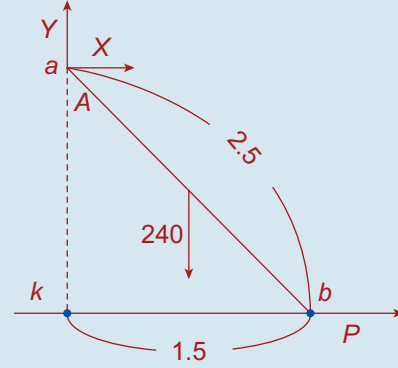
Resolved Forces:

$$(1) \frac{\sqrt{3}}{2} T + \frac{\sqrt{3}}{2} T = 30$$

$$\Rightarrow T = \frac{30}{\sqrt{3}}$$

$$= 10\sqrt{3} \text{ N}$$

Q. 3. (i) "..... are concurrent"
(ii)



$$|ak|^2 + |kb|^2 = |ab|^2$$

$$\Rightarrow |ak|^2 + 2.25 = 6.25$$

$$\Rightarrow |ak| = 2$$

$$(1) Y = 240$$

$$(2) P + X = 0 \Rightarrow X = -P$$

(3) Taking moments about a:

$$240(0.75) = P(2)$$

$$\Rightarrow P = 90 \text{ N}$$

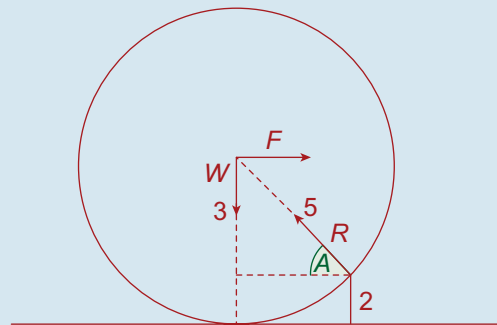
$$\vec{X} = -90\vec{i}, \vec{Y} = 240\vec{j}$$

$$\text{Resultant} = -90\vec{i} + 240\vec{j} = |\vec{R}|$$

$$= \sqrt{(-90)^2 + (240)^2}$$

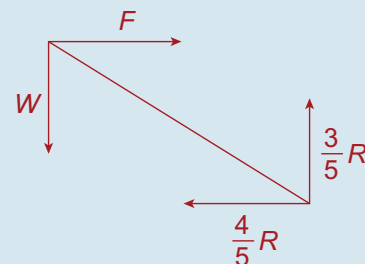
$$= 256 \text{ N}$$

Q. 4. (i) Forces:



$$\text{Since } \sin A = \frac{3}{5}, \cos A = \frac{4}{5}$$

Resolved Forces:



(ii) In accordance with Theorem 8.7