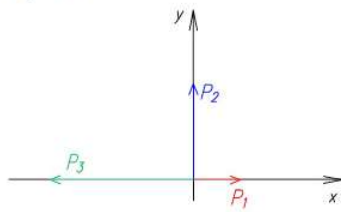


Statics: Force System: **Concurrent Force System Solved Problem using graphics method and analytical method**

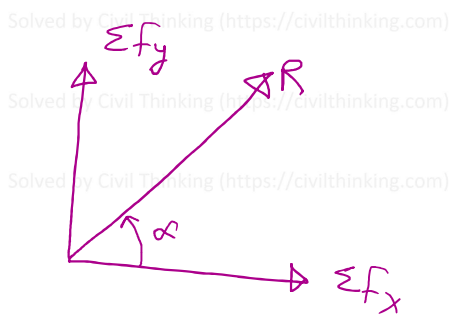
Please find the resultant of three forces passing through the origin of coordinates. Forces are perpendicular to one another.
 $P_1 = 12 \text{ kN}$, $P_2 = 24 \text{ kN}$, $P_3 = 36 \text{ kN}$.



Please use the ruler and set-square in the graphic method.

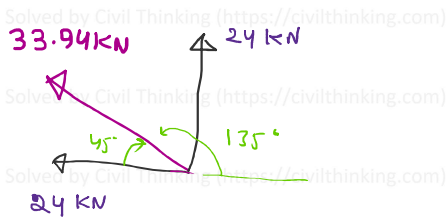
$$\begin{aligned} \sum F_x &= P_1 - P_3 \\ &= 12 - 36 = -24 \end{aligned}$$

$$\sum F_y = P_2 = 24$$



$$R = \sqrt{\sum F_y^2 + \sum F_x^2} = \sqrt{24^2 + 24^2}$$

$$= \text{sqrt}(24^2 + 24^2) = 33.94 \text{ kN}$$

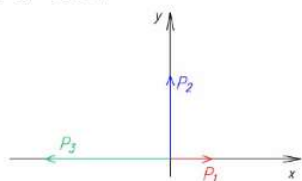


$$\alpha = \tan^{-1} \frac{\sum F_y}{\sum F_x} = \text{Atan}(24/-24) = -45^\circ$$

$$= 180 - 45 = 135^\circ$$

Graphics Method:

$P_1 = 12 \text{ kN}$, $P_2 = 24 \text{ kN}$, $P_3 = 36 \text{ kN}$.

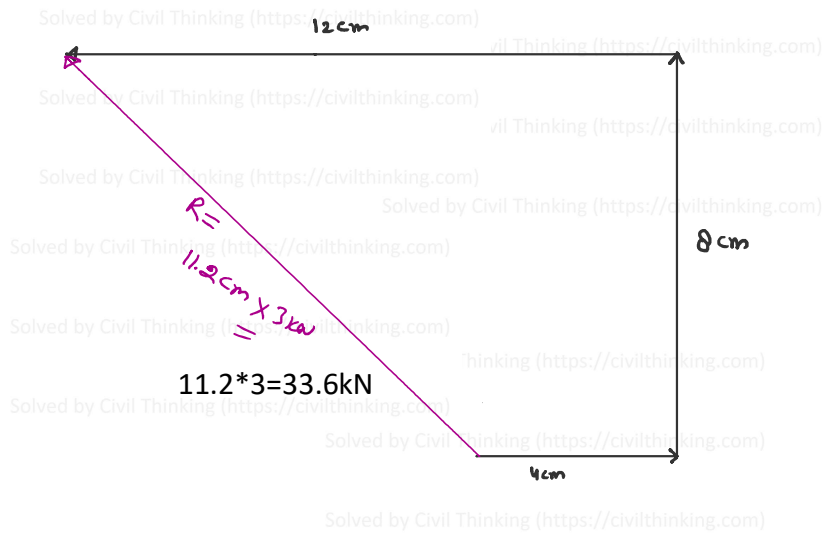


Scale: $1 \text{ cm} = 3 \text{ kN}$
 $1 \text{ kN} = \frac{1}{3} \text{ cm}$

$$P_1 = 12 \text{ kN} = \frac{12}{3} \text{ cm} = 4 \text{ cm}$$

$$P_2 = 24 \text{ kN} = \frac{24}{3} \text{ cm} = 8 \text{ cm}$$

$$P_3 = 36 \text{ kN} = \frac{36}{3} \text{ cm} = 12 \text{ cm}$$




This problem was solved by Civil Thinking (<https://civilthinking.com>)

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