Engineering Calculation Report: Three Force Equilibrium

October 13, 2025

Description

Find the resultant of three forces acting at a point

1 Known Variables

Symbol	Name	Value	Unit
$F_{1_{mag}}$	F_1$Magnitude$	250	lbf
$F_{1_{angle}}$	F_1$Direction$	90	°
$F_{2_{mag}}$	F_2$Magnitude$	375	lbf
$F_{2_{angle}}$	F_2$Direction$	30	°
$F_{3_{mag}}$	F_3$Magnitude$	375	lbf
$F_{3_{angle}}$	F_3$Direction$	−135	°

2 Unknown Variables (To Calculate)

Symbol	Name	Unit
F_{1_x}	F_1$X - Component$	lbf
F_{1_y}	F_1$Y - Component$	lbf
F_{2_x}	F_2$X - Component$	lbf
F_{2_y}	F_2$Y - Component$	lbf
F_{3_x}	F_3$X - Component$	lbf
F_{3_y}	F_3$Y - Component$	lbf
$F_{R_{mag}}$	F_R$Magnitude$	lbf
$F_{R_{angle}}$	F_R$Direction$	°
F_{R_x}	F_R$X - Component$	lbf
F_{R_y}	F_R$Y - Component$	lbf

3 Equations Used

4 Step-by-Step Solution

Step 1: Solve for $Unknown$

Equation:

Result:

$$Unknown =$$

Step 2: Solve for $Unknown$

Equation:

Result:

$$Unknown =$$

5 Summary of Results

Variable	Name	Final Value	Unit
F_{1_x}	$\mathrm{F}\backslash_1 X - Component$	$6.809\,38 \times 10^{-14}$	lbf
F_{1_y}	$\mathrm{F}\backslash_1 Y - Component$	1112.06	lbf
F_{2_x}	$\mathrm{F}\backslash_2 X - Component$	1444.6	lbf
F_{2_y}	$\mathrm{F}\backslash_2 Y - Component$	834.042	lbf
F_{3_x}	$\mathrm{F}\backslash_3 X - Component$	−1179.51	lbf
F_{3_y}	$\mathrm{F}\backslash_3 Y - Component$	−1179.51	lbf
F_{R_mag}	$\mathrm{F}\backslash_R Magnitude$	811.125	lbf
F_{R_angle}	$\mathrm{F}\backslash_R Direction$	−1.903 73	°
F_{R_x}	$\mathrm{F}\backslash_R X - Component$	−265.089	lbf
F_{R_y}	$\mathrm{F}\backslash_R Y - Component$	−766.584	lbf

6 Vector Diagram

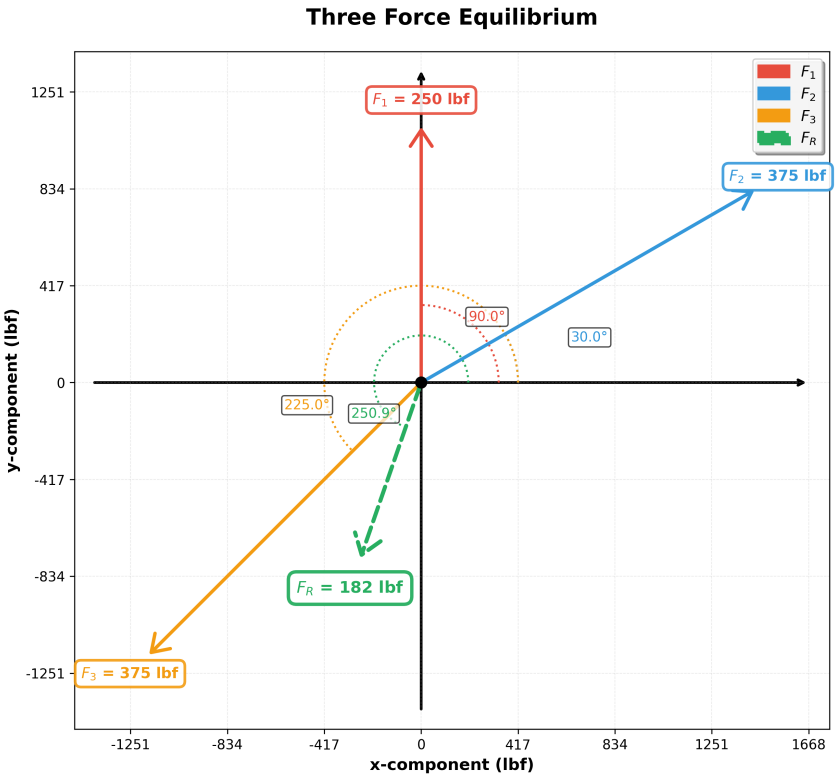

Figure: Vector diagram showing all forces and their orientations

Disclaimer

IMPORTANT NOTICE:
While every effort has been made to ensure the accuracy and reliability of the calculations provided, we do not guarantee that the information is complete, up-to-date, or suitable for any specific purpose. Users must independently verify the results and assume full responsibility for any decisions or actions taken based on its output. Use of this calculator is entirely at your own risk, and we expressly disclaim any liability for errors or omissions in the information provided.

Report Details:

- **Generated Date:** October 13, 2025
- **Generated Using:** Qnty Library
- **Version:** Beta (Independent verification required for production use)

Professional Review and Approval:

Role	Name	Signature	Date
Calculated By			
Reviewed By			
Approved By			
