

Engineering Calculation Report: Cardinal Direction Forces

October 13, 2025

Description

Forces aligned with coordinate axes (0° , 90° , 180° , 270°)

1 Known Variables

Symbol	Name	Value	Unit
$F_{East_{mag}}$	$F \backslash_{East} Magnitude$	500	N
$F_{East_{angle}}$	$F \backslash_{East} Direction$	0	$^\circ$
$F_{North_{mag}}$	$F \backslash_{North} Magnitude$	300	N
$F_{North_{angle}}$	$F \backslash_{North} Direction$	90	$^\circ$
$F_{West_{mag}}$	$F \backslash_{West} Magnitude$	200	N
$F_{West_{angle}}$	$F \backslash_{West} Direction$	180	$^\circ$

2 Unknown Variables (To Calculate)

Symbol	Name	Unit
F_{East_x}	$F \backslash_{East} X - Component$	N
F_{East_y}	$F \backslash_{East} Y - Component$	N
F_{North_x}	$F \backslash_{North} X - Component$	N
F_{North_y}	$F \backslash_{North} Y - Component$	N
$F_{R_{mag}}$	$F \backslash_{R} Magnitude$	N
$F_{R_{angle}}$	$F \backslash_{R} Direction$	$^\circ$
F_{R_x}	$F \backslash_{R} X - Component$	N
F_{R_y}	$F \backslash_{R} Y - Component$	N
F_{West_x}	$F \backslash_{West} X - Component$	N
F_{West_y}	$F \backslash_{West} Y - Component$	N

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_{East_x}	$F \backslash_{East} X - Component$	500	N
F_{East_y}	$F \backslash_{East} Y - Component$	0	N
F_{North_x}	$F \backslash_{North} X - Component$	$1.836\,97 \times 10^{-14}$	N
F_{North_y}	$F \backslash_{North} Y - Component$	300	N
$F_{R_{mag}}$	$F \backslash_R Magnitude$	424.264	N
$F_{R_{angle}}$	$F \backslash_R Direction$	-2.356 19	°
F_{R_x}	$F \backslash_R X - Component$	-300	N
F_{R_y}	$F \backslash_R Y - Component$	-300	N
F_{West_x}	$F \backslash_{West} X - Component$	-200	N
F_{West_y}	$F \backslash_{West} Y - Component$	$2.449\,29 \times 10^{-14}$	N

6 Vector Diagram

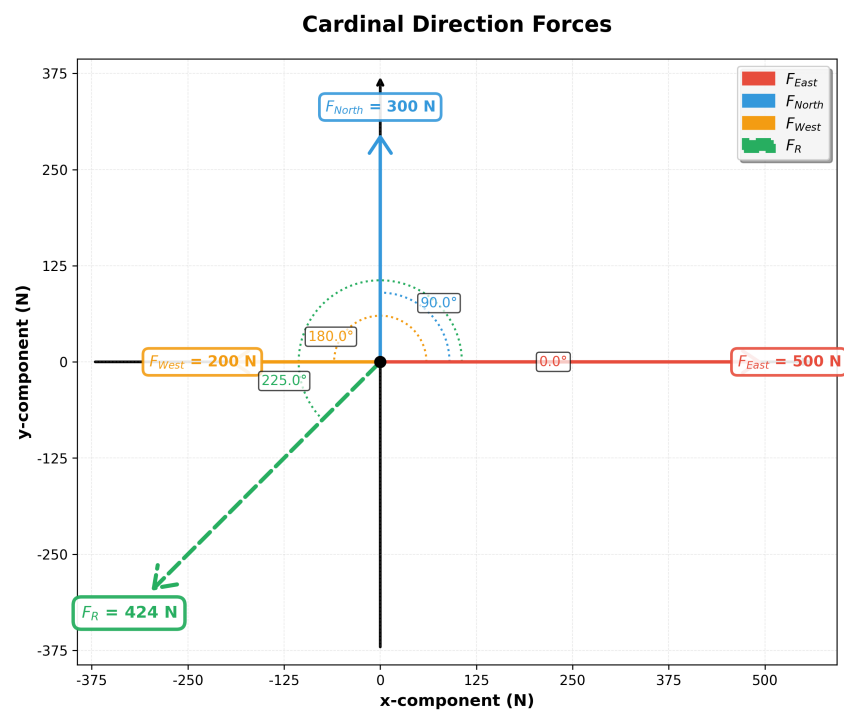


Figure: Vector diagram showing all forces and their orientations

Disclaimer

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