

Non 90 triangle Vector Addition (3 methods)

Construction line:
 A plane travelling North at 250 k/h has a crosswind of 40 k/h @ 195° bearing. Find \vec{V}_R (resultant velocity).

$V_p = 250 \text{ k/h} @ 0^\circ$
 $+ V_w = 40 \text{ k/h} @ 195^\circ$

$V_R = 211.7$
 $\theta = 2.8^\circ$

$\Delta A-B-D$
 $40 = 40 \cos 15^\circ = 38.6$
 $40 \sin 15^\circ = 10.4$

$\Delta C-B-D$
 $\tan \theta = \frac{10.4}{211.4} = \frac{10.4}{211.4}$
 $\theta = 2.8^\circ$
 $V_R^2 = 10.4^2 + 211.4^2$
 $V_R = 211.7$

Components

Plane	Wind
$V_{px} = 0$	$V_{wx} = 40 \cos 15^\circ = 38.6$
$V_{py} = +250$	$V_{wy} = 40 \sin 15^\circ = 10.4$

$\vec{V}_x = (0) + (-38.6) = -38.6$
 $\vec{V}_y = (+250) + (+10.4) = 260.4$

$270 + 87.2 = 357.2^\circ$
 $V_R = 211.7$

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