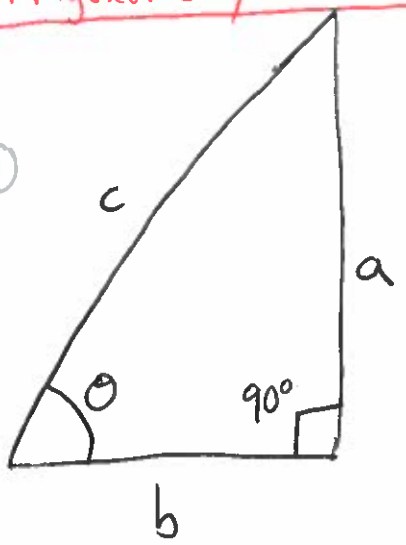
Trigonometry Review



$\sin\theta = \frac{a}{c}$

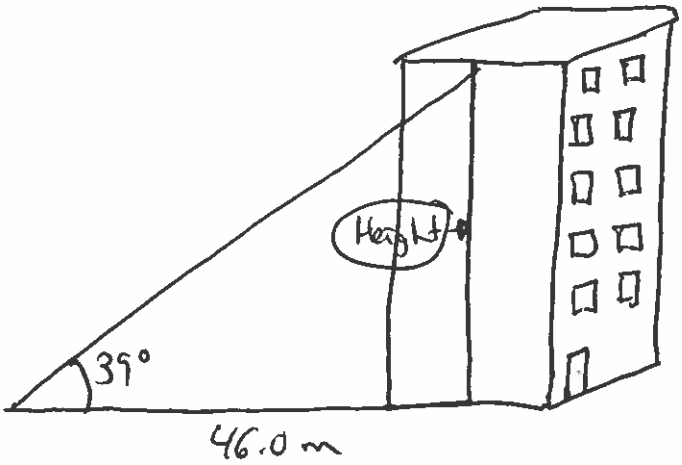
$\cos\theta = \frac{b}{c}$

$\tan\theta = \frac{a}{b}$

"CAH" = cos (adjacent/hypotenuse)

"SOH" = sin (opposite/hypotenuse)

"TOA" = tan (opposite/adjacent)



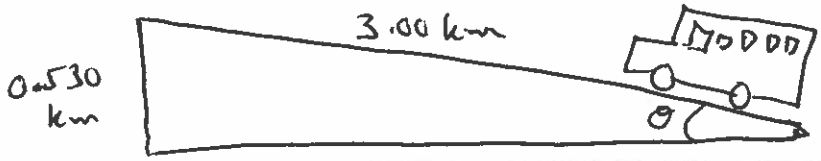
$\tan 39.0° = \frac{\text{Height}}{46.0\,m}$

$\text{Height} = (\tan 39°)(46.0\,m)$

$= (0.810)(46.0\,m) = \boxed{37.3\,m}$

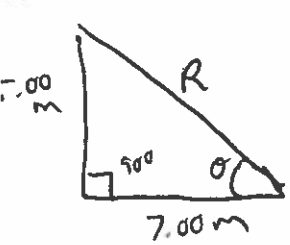
$R = \sqrt{A^2 + B^2}$

$= \sqrt{(37.3)^2 + (46.0)^2} = \boxed{59.2\,m}$



$\sin\theta = \frac{0.530}{3.00} = 0.177$

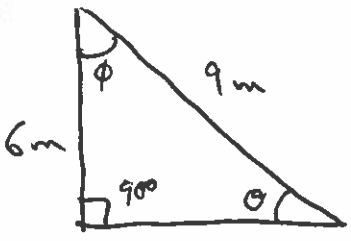
$\theta = \sin^{-1}(0.177) = \boxed{10.2°}$



$R = \sqrt{(5.00)^2 + (7.00)^2}$

$= 8.6\,m$

$\tan^{-1}\left(\frac{5.00}{7.00}\right) = \boxed{35.5°}$



$9^2 = (6)^2 + B^2$

$B^2 = 9^2 - 6^2$

$B^2 = 45$

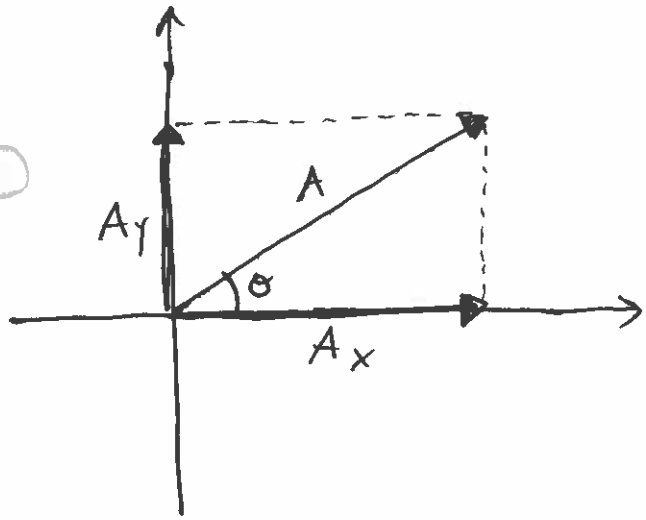
$B = \boxed{6.7\,m}$

$\tan\theta = \frac{6\,m}{6.7\,m}$

$\theta = \tan^{-1}\left(\frac{6}{6.7}\right) = \boxed{41.8°}$

$\sin\phi = \frac{6.7}{9}$

$\phi = \sin^{-1}\left(\frac{6.7}{9}\right) = \boxed{48.1°}$



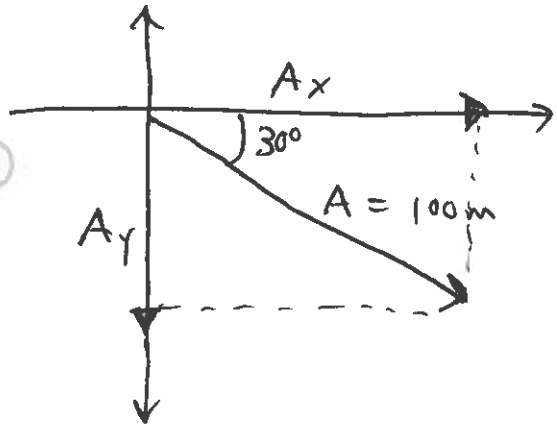
$$A_x = A\cos\theta$$

$$A_y = A\sin\theta$$

$$A = \sqrt{A_x^2 + A_y^2}$$

$$\tan\theta = \frac{A_y}{A_x}$$

$$\theta = \tan^{-1}\left(\frac{A_y}{A_x}\right)$$



$$A_x = A\cos\theta$$

$$= (100\text{ m})(\cos -30°)$$

$$= 86.6\text{ m}$$

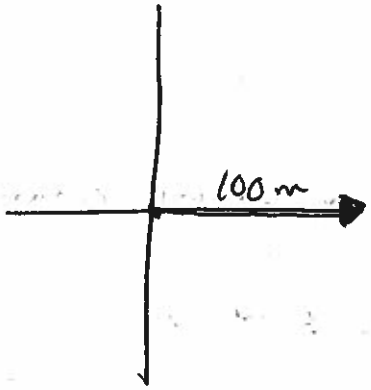
(or 330°)

$$A_y = A\sin\theta$$

$$= (100\text{ m})(\sin -30°)$$

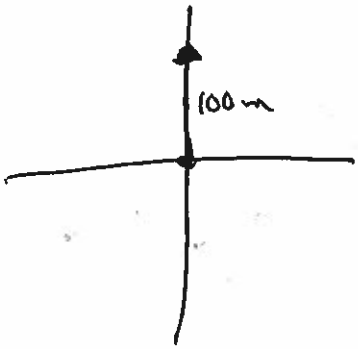
$$= -50.0\text{ m}$$

Direction Is Important!



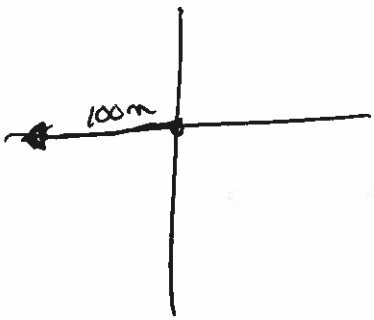
$A_x = 100\,m$

$A_y = 0\,m$



$A_x = 0\,m$

$A_y = 100\,m$



$A_x = -100\,m$

$A_y = 0\,m$

$A_x = 0\,m$

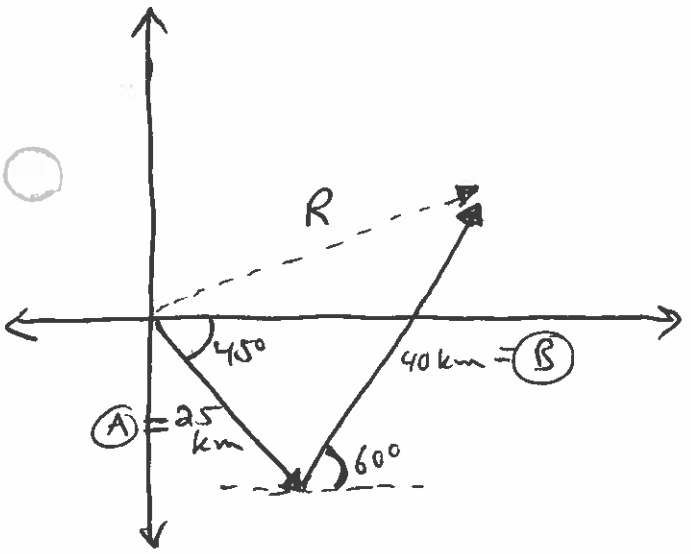
$A_y = -100\,m$

From Horizontal (x-Axis)

$$\theta = \tan^{-1}\left(\frac{R_y}{R_x}\right)$$

From Vertical (y-Axis)

$$\theta = \tan^{-1}\left(\frac{R_x}{R_y}\right)$$



$A_x = A\cos\theta$ (or 315°)

$= A\cos(-45°)$

$= (25.0\text{ km})(0.707) = 17.7\text{ km}$

$A_y = A\sin\theta$

$= A\sin(-45°)$

$= (25.0\text{ km})(0.707) = -17.7\text{ km}$

$B_x = B\cos\theta$

$= B\cos(60°)$

$= (40.0\text{ km})(0.500) = 20.0\text{ km}$

$B_y = B\sin\theta$

$= B\sin(60°)$

$= (40.0\text{ km})(0.866) = 34.6\text{ km}$

Total Displacement = ?

$R_x = A_x + B_x$

$= 17.7\text{ km} + 20.0\text{ km} = 37.7\text{ km}$

$R_y = A_y + B_y$

$= -17.7\text{ km} + 34.6\text{ km} = 16.9\text{ km}$

$R^2 = R_x^2 + R_y^2$

$R = \sqrt{R_x^2 + R_y^2}$

$= \sqrt{(37.7)^2 + (16.9)^2}$

$= 41.3\text{ km}$

$\theta = \tan^{-1}\left(\frac{R_y}{R_x}\right)$

$= \tan^{-1}(.448)$

$= 24.1°$