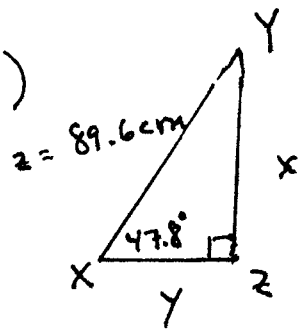
2.4 Solving right triangles

14)



Given:

$Z = 90^\circ$

$X = 47.8^\circ$

$z = 89.6$ cm

Find:

$Y = 90^\circ - 47.8^\circ = \boxed{42.2^\circ}$

$\sin 47.8^\circ = \frac{\text{opp}}{\text{hyp}} = \frac{x}{89.6\text{ cm}} \Rightarrow 89.6 \cdot \sin 47.8^\circ = \frac{89.6 \cdot x}{89.6}$

$\Rightarrow x = 89.6(\sin 47.8^\circ)$

$= 89.6\ (.7408046)$

$= 66.37609183$ cm

$\approx \boxed{66.4 \text{ cm}}$

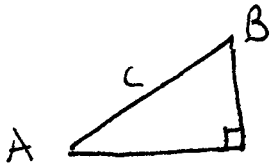
$\cos 47.8^\circ = \frac{\text{adj}}{\text{hyp}} = \frac{y}{89.6\text{cm}}$

$\Rightarrow y = (89.6\text{cm})(\cos 47.8^\circ)$

$= 89.6\ (.6717)$

$= \boxed{60.2 \text{ cm}}$

ex: Given $a = 44.25$ cm and $b = 55.87$ cm and $C = 90^\circ$, solve the triangle ABC.



$a = 44.25$ cm

$b = 55.87$ cm

$c^2 = a^2 + b^2$

$= 44.25^2 + 55.87^2$

$= 5079.5194$

$c = \sqrt{5079.5194}$

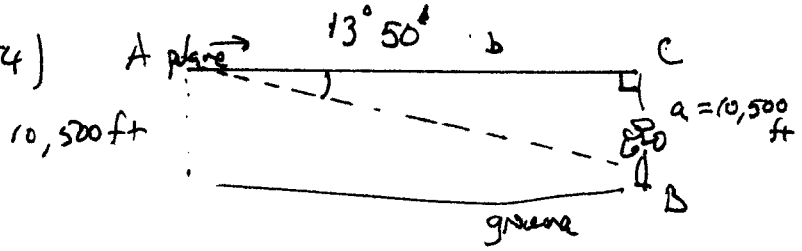
$= \boxed{71.27 \text{ cm}}$

$\tan A = \frac{\text{opp}}{\text{adj}} = \frac{44.25}{55.87} = 0.7920$

$A = \tan^{-1}(0.7920) = \boxed{38.38^\circ}$

$B = 90^\circ - 38.38^\circ = \boxed{51.62^\circ}$

2.4 54)



How far must the plane fly until it is directly over the tree?

$a = 10,500$ ft

$C = 90°$

$A = 13° 50'$

$$\tan 13° 50' = \frac{10,500 \text{ ft}}{b} = \frac{\text{opp}}{\text{adj}}$$

$$b \cdot \tan 13° 50' = 10,500$$

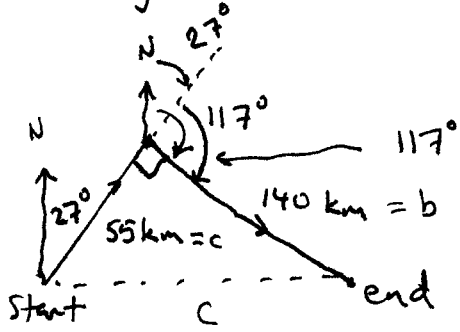
$$b = \frac{10,500 \text{ ft}}{\tan 13° 50'}$$

$$= \frac{10,500 \text{ ft}}{.24624}$$

$$= \boxed{42,600 \text{ ft}}$$

2.5 Bearing

20)



$117° - 27° = 90°$ Aha!

Problem: Find c.

$$c = \sqrt{a^2 + b^2} = \sqrt{55^2 + 140^2} = 150.416$$

$$\approx \boxed{150 \text{ km}}$$