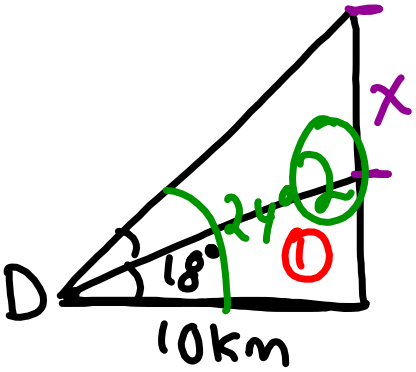
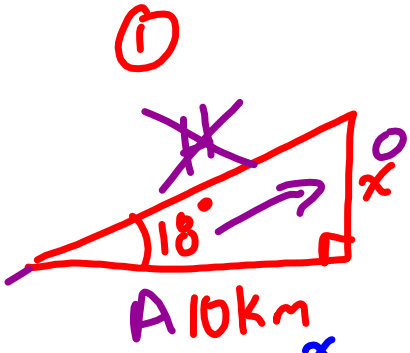
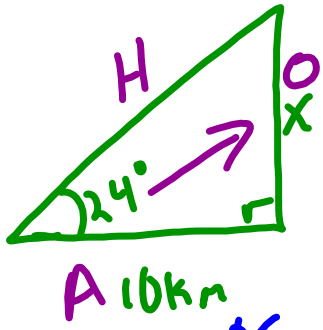
Trig Word Problems

Desi is 10 km from a rocket launch pad, watching a rocket lift away from Earth. At one point the rocket has an angle of inclination of 18°. Two minutes later, the angle of inclination has increased to 24°.

a) How far has the rocket traveled during this time?







$4.45 - 3.25$

$= 1.2\text{km}$

$\tan 18 = \frac{x}{10}$

$0.3249 = \frac{x}{10}$

$3.25 = x$

$\tan 24 = \frac{x}{10}$

$0.4452 = \frac{x}{10}$

$4.45 = x$

b) What is the average speed of the rocket in kilometres per hour?

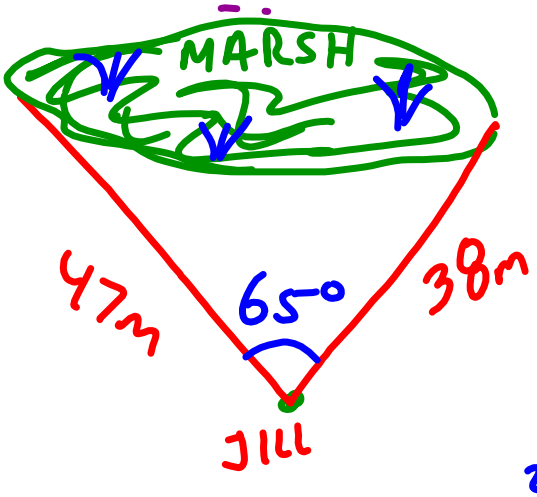
1.2km in 2 min

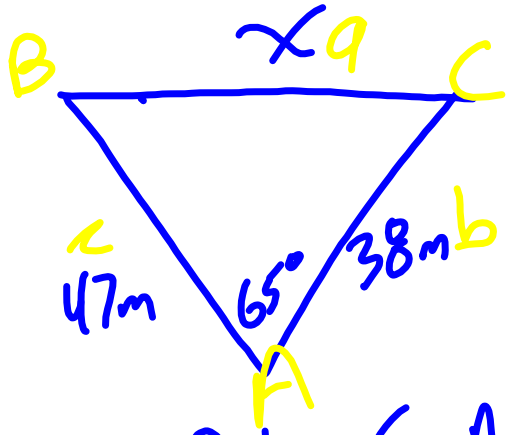
0.6km in 1 min

$0.6\text{km/min} \times 60$

$= 36\text{km/h}$

From Where Jill is standing, she is 38 m away from the Eastern side of a marsh and 47 m away from the Western side. The angle between the East and West sides from where she is standing is 65°. How far is it across the marsh?





$a^2 = b^2 + c^2 - 2bc\cos A$

$a^2 = 38^2 + 47^2 - 2(38)47\cos 65°$

$\cos 65° \approx 0.4226$

$a^2 = 1444 + 2209 - 1509.6$

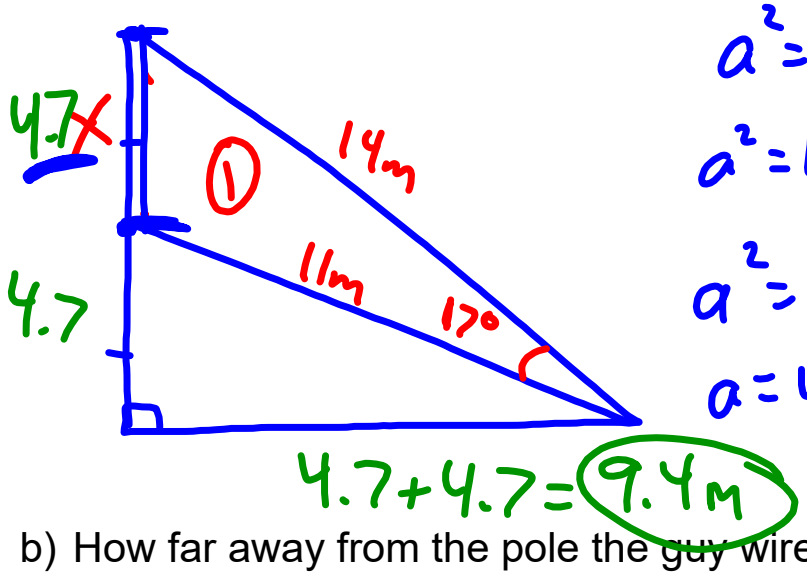
$\sqrt{a^2} = \sqrt{2143.4}$

$a = 46.3\text{ m}$

∴ the marsh is 46.3 m wide.

A pole is supported by two guy wires. One wire is attached to the top of the pole and the other to the midpoint. Both wires are staked into the ground at the same spot. If the longer wire is 14 m, the shorter is 11 m and the angle between them is 17° determine:

a) The height of the pole.



$a^2 = b^2 + c^2 - 2bc\cos A$

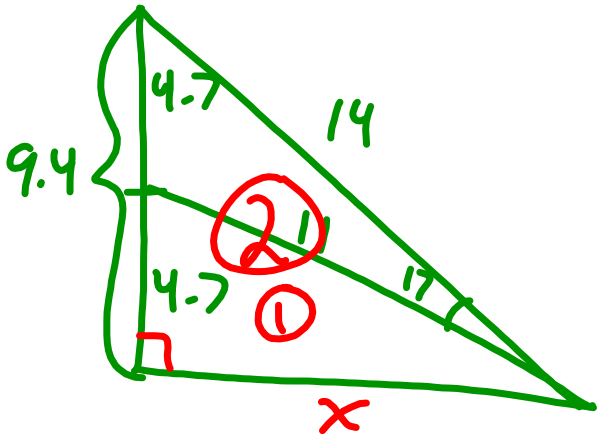
$a^2 = 11^2 + 14^2 - 2(11)(14)\cos 17°$

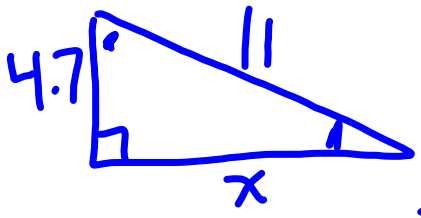
$a^2 = 22.46$

$a = 4.7$

$4.7 + 4.7 = 9.4\text{m}$

b) How far away from the pole the guy wires are attached to the ground





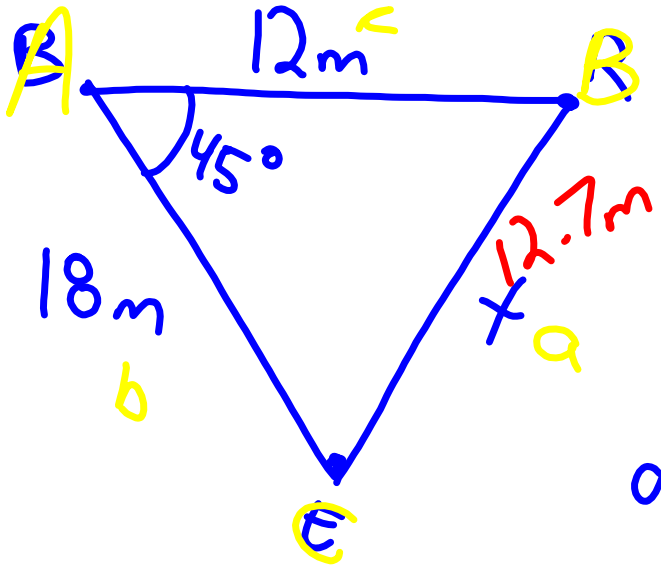
$11^2 - 4.7^2 = x^2$

$98.91 = x^2$

$9.94 = x$

Homework pg. 450 # 4 - 15

Rocco and Biff are two Koala[illegible] frolicking in a meadow. Suddenly, a tasty clump of eucalyptus falls to the ground, catching their attention. Biff glances at Rocco, who appears to be 12 m away, then over to the eucalyptus, which appears to be 18 m away. From Biffs view point, Rocco and the eucalyptus are separated by an angle of 45°. Rocco's top running speed is 1.0 m/s but Biff can run one and a half times as fast. Can Biff beat Rocco to the eucalyptus? State any assumptions you may have made.



$a^2 = b^2 + c^2 - 2bc\cos A$

$a^2 = 18^2 + 12^2 - 2(18)(12)\cos 45$

$a^2 = 162.5$

$a = 12.7\text{m}$

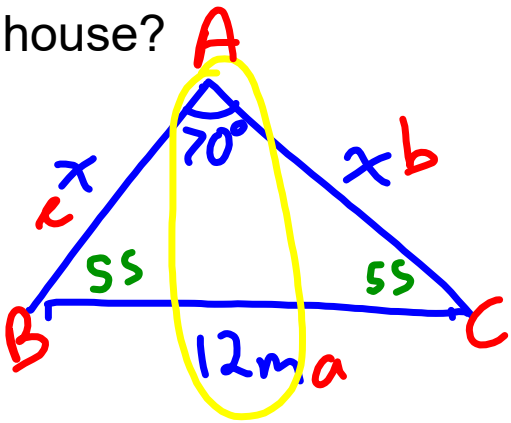
Biff → 18m (Runs 1.5m/s)

∴ 12 sec

Rocco → 12.7m (Runs 1.0m/s)

∴ 12.7 sec

A house is 12 m wide. If the angle at the top of the roof is 70°, and the house is symmetrical, how long is the roof of the house?



$180-70=110$

$\frac{110}{2}=55$

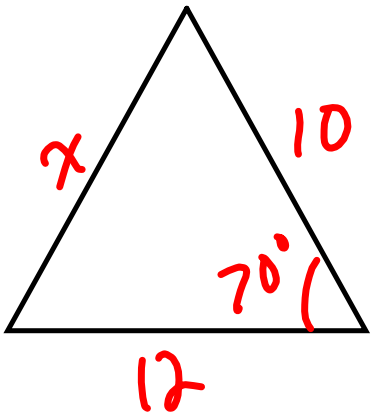
$\frac{a}{\sin A}=\frac{b}{\sin B}=\frac{c}{\sin C}$

$\frac{12}{\sin 70}=\frac{x}{\sin 55}$ ~~$=\frac{x}{\sin 55}$~~

$\frac{12}{0.9397}=\frac{x}{0.8192}$

$12.77=\frac{x}{0.8192}$

$10.5m=x$


x
10
70°
12