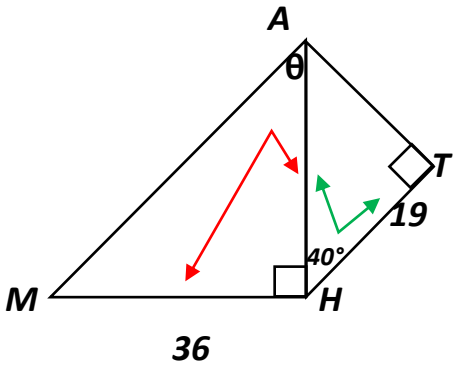
2 triangle Problems

For our final trig lesson we will look at problems involving more than 1 triangle

- ***We will always try to find a shared side or shared angle so that info in one triangle can be used in the other***

1) ***Find angle MAH***



We need AH $cos\ 40° = \frac{19}{AH}$ ***AH = 24.8***

Now to find MAH we have 2 sides in the left triangle: $tan\ \theta = \frac{36}{24.8}$ **θ = 55.4°**

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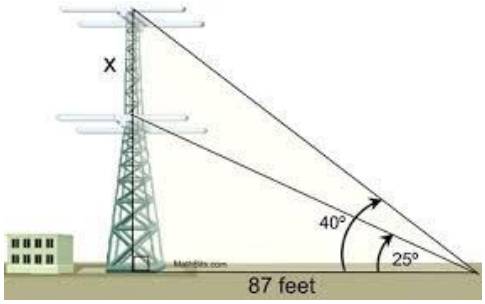
2) ***Find the distance between the contact points of the wires***

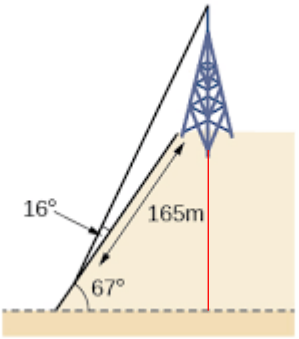


Using 40° $tan\ 40° = \frac{tower}{87}$ ***tower = 73.0 ft***

Using 25° $tan\ 25° = \frac{base}{87}$ ***base = 40.57 ft***

X = 32.43 ft

3a) ***How tall is the tower?***



Add red line to create right triangle

Using 67° $cos\ 67° = \frac{base}{165}$ ***base = 64.47***

Using 67° $sin\ 67° = \frac{hill}{165}$ ***hill = 151.88***

Using 67+16° $tan\ 83° = \frac{total}{64.47}$ ***total= 525.06***

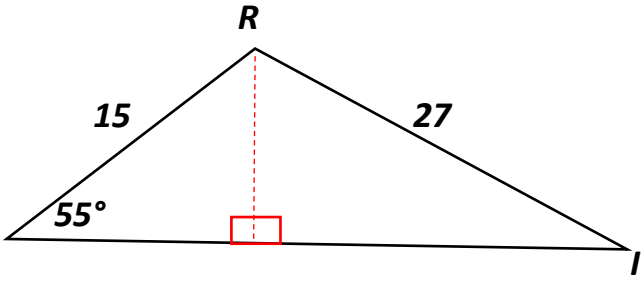
Tower = 373.2 m

b) ***How long is the wire?***

Since we have total h $sin\ 83° = \frac{525.06}{wire}$

Wire = 529 m

4)



Find angle TRI

This is not a right-angle triangle
So, we will create one

To find TRI we can add up the 2 angles
At the top, or find I and then add up Δ

Start by finding the new dotted line (opp)

$sin\ 55° = \frac{opp}{15}$ *opp = 12.287*

Now: $sin\ I° = \frac{12{,}87}{27}$ *I = 28.46°* *TRI =180° -55°-28.46°* *TRI = 96.5°*

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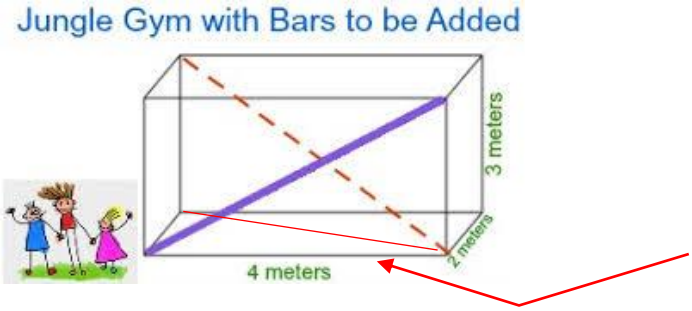
5)



Find the length of the diagonal dashed bar

<u>This is 2 right triangles</u>
A triangle on the ground (using 2 and 4)
A triangle standing up (using 3 and hypotenuse of the above Δ)

$4^2 + 2^2 = h^2$ $h = \sqrt{20}$ → $\sqrt{20}^2 + 3^2 = bar^2$ *bar =* $\sqrt{29}$ *or* $5.39\ m$

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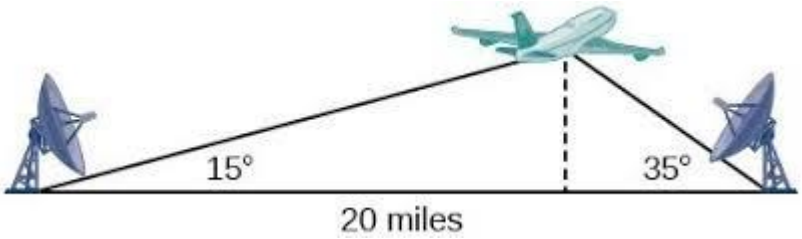
6) TRICKY Problem: *Find the height of the airplane*



X *20 – x*

Problem:
we don't know sides of the small Δ's

We will split 20 into x and 20- x

So: $sin\ 15° = \frac{h}{x}$ *and* $sin\ 35° = \frac{h}{20-x}$ *xsin15° = h and (20 - x)sin35° = h*

But h is the same for both: *x sin 15° = (20 – x)sin 35°*

x(0.2588) = 11.472 – x(0.5736) *x(0.8324) = 11.472*

x = 13.78

Which means: $sin\ 15° = \frac{h}{13.78}$ *h = 3.57 miles* *(5.75 km)*

Assignment = Page 118 # 3(a), 4(a), 5(a) , 8, 9, 11, 12, 13, 14