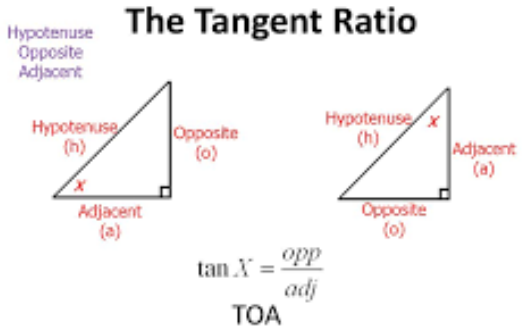
The Tangent Ratio



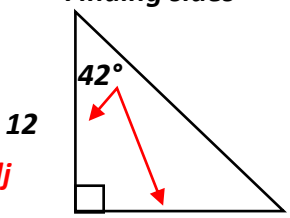
The tangent ratio works with the legs of a right triangle

The angle that you start at dictates the opposite and adjacent

Another relationship that exists: **tan θ = m**

1) Finding sides

a)



12

adj

t ***opp***

$\tan 42° = \frac{t}{12}$ ***12 tan 42°= t*** ***t = 10.8***

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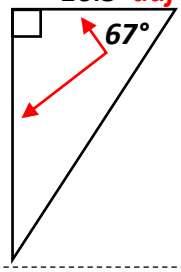
b) ***16.5 adj***



a

opp

$\tan 67° = \frac{a}{16.5}$ ***16.5 tan 67°= a*** ***a = 38.9***

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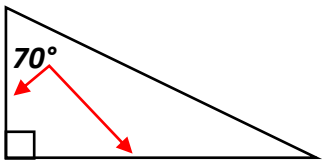
c)



n

adj

55.6 ***opp***

$\tan 70° = \frac{55.6}{n}$ $n = \frac{55.6}{\tan 70°}$ ***n = 20.2***

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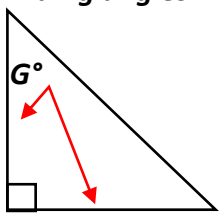
2) Finding angles

a)



77

adj

91 ***opp***

$\tan G° = \frac{91}{77}$ ***G = 2nd tan*** $(\frac{91}{77})$ ***G= 49.8°***

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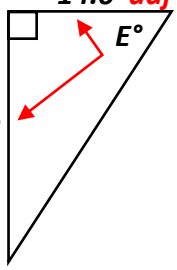
b) ***14.6 adj***

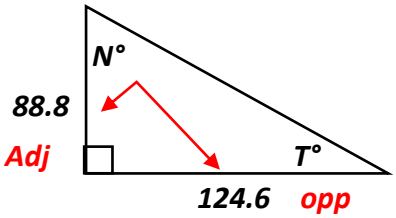


22

opp

$\tan E° = \frac{22}{14.6}$ ***E = 2nd tan*** $(\frac{22}{14.6})$ ***E= 56.4°***

3) Find the missing angles in the triangle



I decided to solve for N first … so that forces 124.6 = opposite

$\tan N^\circ = \frac{124.6}{88.8}$ N = 2nd tan $(\frac{124.6}{88.8})$ N= 54.5°

Now I could say: $\tan T^\circ = \frac{88.8}{124.6}$ and solve

But Δ = 180° T = 180° – 90° -54.5° T = 35.5°

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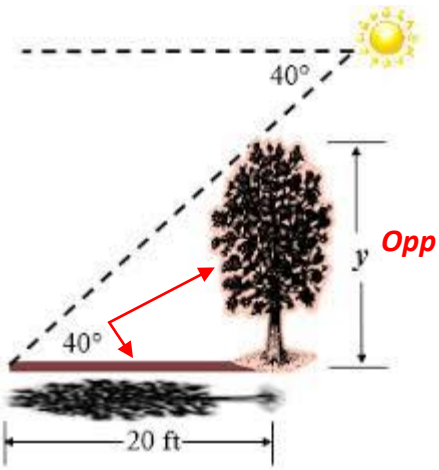
4) How tall is the tree if it casts a 20 ft long shadow as shown?



Opp

Adj

$\tan 40^\circ = \frac{y}{20}$ 20 tan 40°= y y = 16.78 ft

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5) Why would the tan 0° = 0 but the tan 90° = error?

The only way to get zero is a fraction is if you use 0…

So, for 0° the triangle would have NO opposite: $\tan 0^\circ = \frac{0}{adj}$

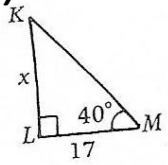
But for 90° the triangle would have NO adjacent: $\tan 90^\circ = \frac{opp}{0}$

Assignment = worksheet

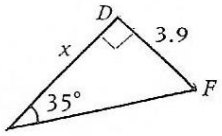
The Tangent Ratio

1) Set up your formulas and find side x to the nearest tenth

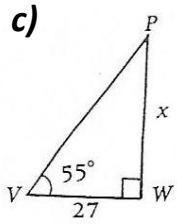
a)



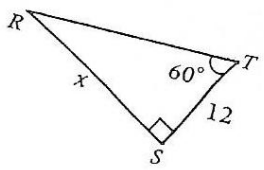
b)



c)

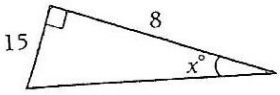


d)

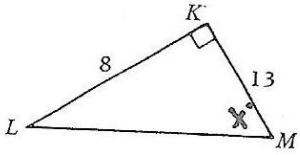


2) Find angle X accurate to 1 decimal place

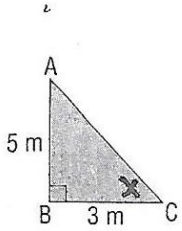
a)



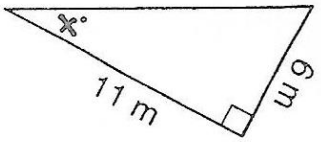
b)



c)

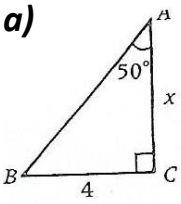


d)

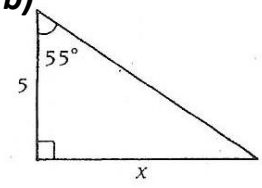


3) Find x accurate to at least 1 decimal place

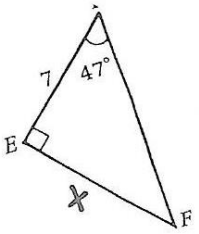
a)



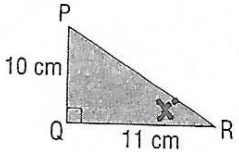
b)



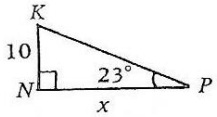
c)



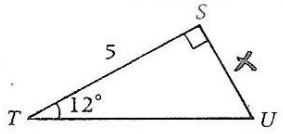
d)



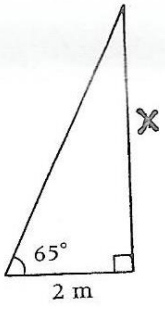
e)



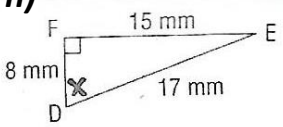
f)



g)

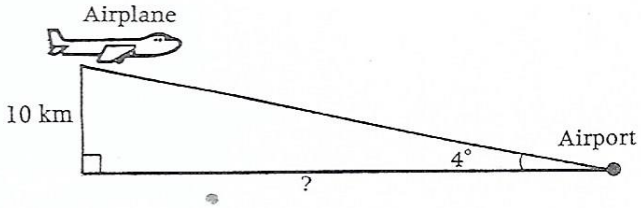


h)



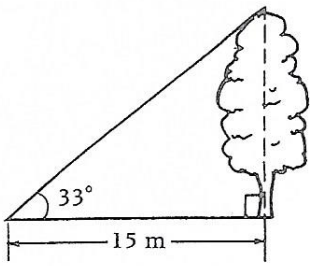
4)

. Commercial airplanes fly at an altitude of about 10 km. During a landing approach, a pilot wants the plane's path to make an angle of 4° with the ground. How far from the airport must the pilot begin the descent?



5)

. Determine the height of a tree casting a 15 m shadow at the same time as the sun's rays make a 33° angle with the ground.



Now try text

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5a) ***b)*** ***c)*** ***d)***

14) ***19)***

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5a) ***b)*** ***c)***

7) ***8)*** ***10)***