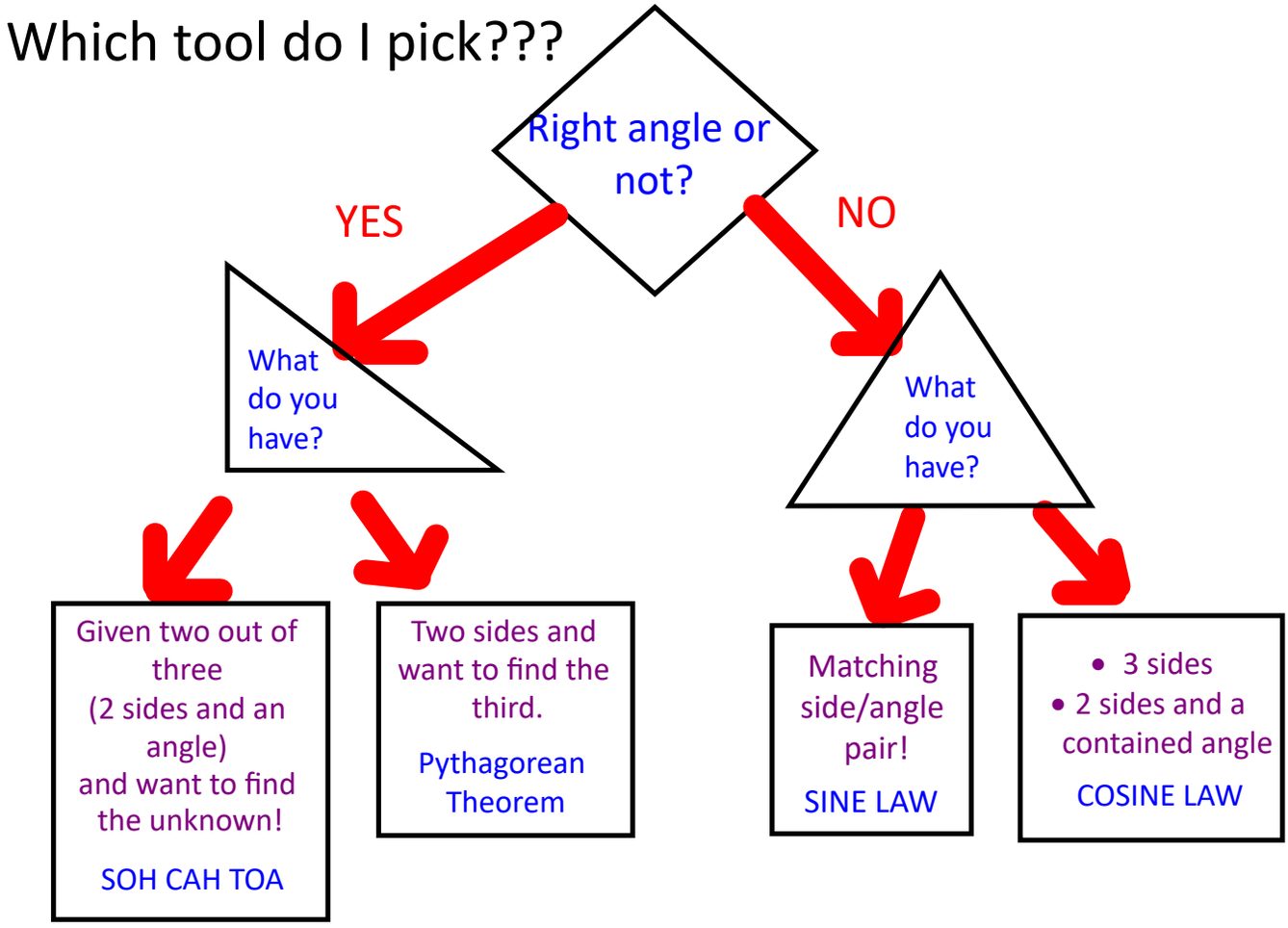
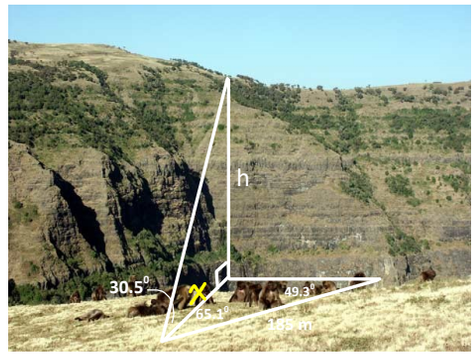
Which tool do I pick???

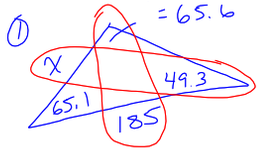


1.9 Solve Problems with Trigonometry

1. To measure the height, h, of an inaccessible cliff, a surveyor records the data shown. Find the height of the cliff, to the nearest metre.



① $180 - 65.1 - 49.3 = 65.6$



② $\frac{x}{\sin 49.3} = \frac{185}{\sin 65.6}$

$x = (\sin 49.3)\frac{185}{\sin 65.6}$

$\doteq 154$

③ $\tan\theta = \frac{O}{A}$

$\tan 30.5 = \frac{h}{154}$

$(154)\tan 30.5 = h$

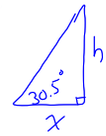
$h = 90.7$

∴ Height of the cliff is approx. 90.7m

Steps?

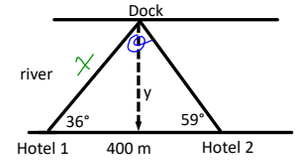
③ - Use SOCAHTOA to find h
- Need x

② - Use sine law to find x
- Need last angle

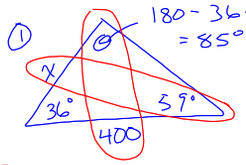


① - Find last angle using sum of angles

2. Two hotels are located on the same side of a river, 400 m apart. There is a ferry dock on the other side of the river, as shown. How wide is the river?



① $180 - 36 - 59 = 85°$



② $\frac{x}{\sin 59°} = \frac{400}{\sin 85}$

$x = (\sin 59)\left(\frac{400}{\sin 85}\right)$

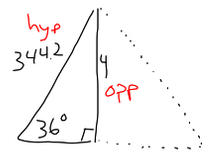
$= 344.2$

③ $\sin\theta = \frac{O}{H}$

$\sin 36° = \frac{y}{344.2}$

$y = 344.2 \cdot \sin 36°$

$\doteq 202.3$



∴ The width of the river is 202.3m

③ - Use $\sin\theta = \frac{O}{H}$ to find y
- Need x

② - Find x using sine law
- Need θ

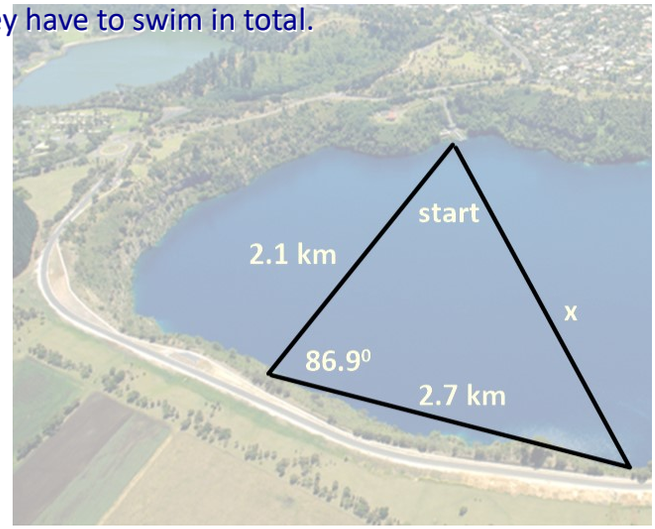
① - Find θ using sum of angles

3. The swimming portion of a triathlon course is shown below.
Find the distance they have to swim in total.

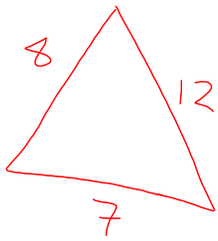
Steps?

② - Add all 3 sides
- Need x

① - Use cosine law to find x



4. Alex is making a triangular garden with side lengths 12 m, 7 m and 8 m. Find the measure of the largest angle between the sides.



Steps?

- Find first angle using cosine law
- Use that angle and sine law for 2nd angle
- Sum of angles to find last angle

- Not needed
- largest side will be opp. largest angle

Practice!

Set 1: p. 427#1,2,3a,4,7

Set 2: p. 427#1,3a,6,7,10,13