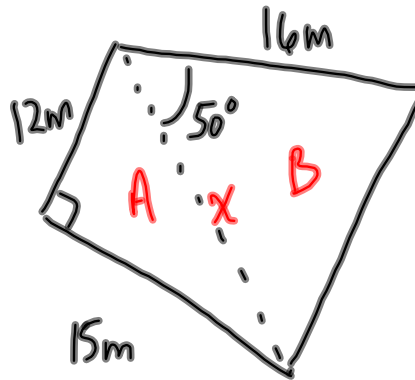


Concept Check:Triangle A:

$$\text{Area} = \frac{1}{2}bh$$

$$\text{Area} = \frac{1}{2}(12\text{m})(15\text{m})$$

$$\text{Area} = 90\text{m}^2$$

Triangle B

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

$$x^2 = (12\text{m})^2 + (15\text{m})^2$$

$$x = 19.2\text{m}$$

$$\text{Area} = \frac{1}{2}ab\sin C$$

$$\text{Area} = \frac{1}{2}(19.2\text{m})(16\text{m})\sin 50^\circ$$

$$\text{Area} = 117.7\text{m}^2$$

$$\begin{aligned} \text{Total Area} &= 90\text{m}^2 + 117.7\text{m}^2 \\ &= 207.7\text{m}^2 \end{aligned}$$

HW Answers (Sharpe 232(30-33))

30. a)  $\theta = 61^\circ$  or  $119^\circ$

b)  $\theta = 73^\circ$  or  $107^\circ$

c)  $\theta = 35^\circ$

31. a)  $\angle A = 55^\circ$  or  $125^\circ$

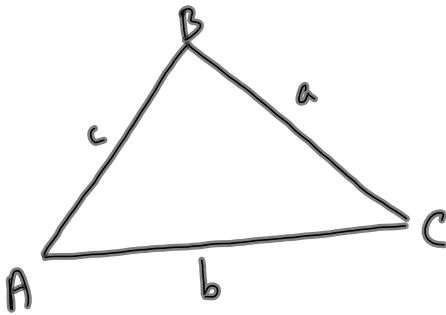
b)  $\angle B = 76^\circ$  or  $104^\circ$

c)  $\angle C = 47^\circ$

32.  $\angle F = 38^\circ$ ,  $EF = 36.6$ ,  $DF = 20.7$

33.  $x = 21.6$ ,  $y = 35.4$

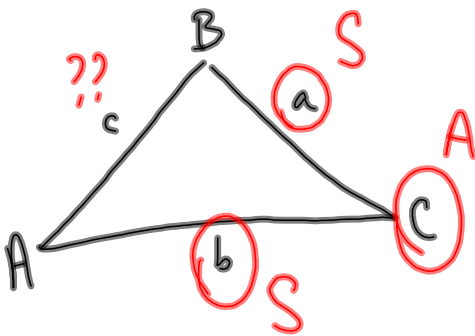
Law of Sines



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

\* Watch out for SSA if you are trying to find an angle  $\Rightarrow$  2 solutions (could be)

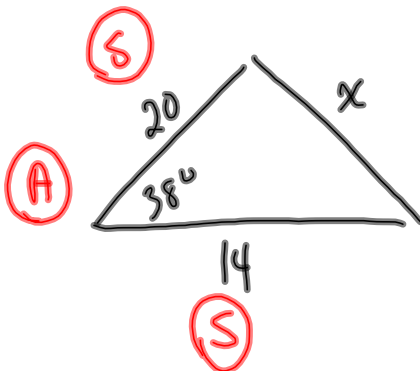
Law of Cosines



$$c^2 = a^2 + b^2 - 2ab \cos C$$

If you know two sides (a and b) and the angle (C) between, then you can find the missing side, c.

Example:



$$c^2 = a^2 + b^2 - 2ab \cos C$$

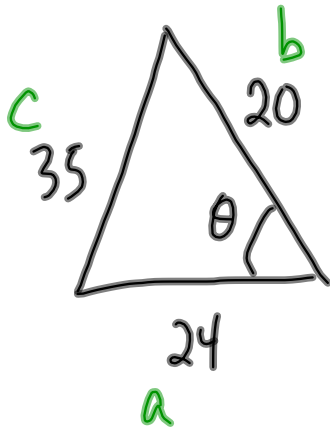
$$x^2 = 20^2 + 14^2 - 2(20)(14) \cos 38^\circ$$

$$x^2 = 400 + 196 - 441.3$$

$$x^2 = 154.7$$

$$x = 12.4$$

What if you know all the sides and want to find an angle?



$$c^2 = a^2 + b^2 - 2ab\cos C$$

$$\frac{c^2 - a^2 - b^2}{-2ab} = \frac{-2ab\cos C}{-2ab}$$

$$\cos C = \frac{c^2 - a^2 - b^2}{-2ab}$$

$$\cos C = \frac{(35^2 - 24^2 - 20^2)}{(-2(24)(20))}$$

$$\cos C = \frac{249}{-960}$$

$$\cos C = -0.259$$

$$C = \cos^{-1}(-0.259)$$

$$C \doteq 105^\circ$$

Use Law of Cosines:

- ① SAS, find the side opp the angle
- ② SSS, find an angle