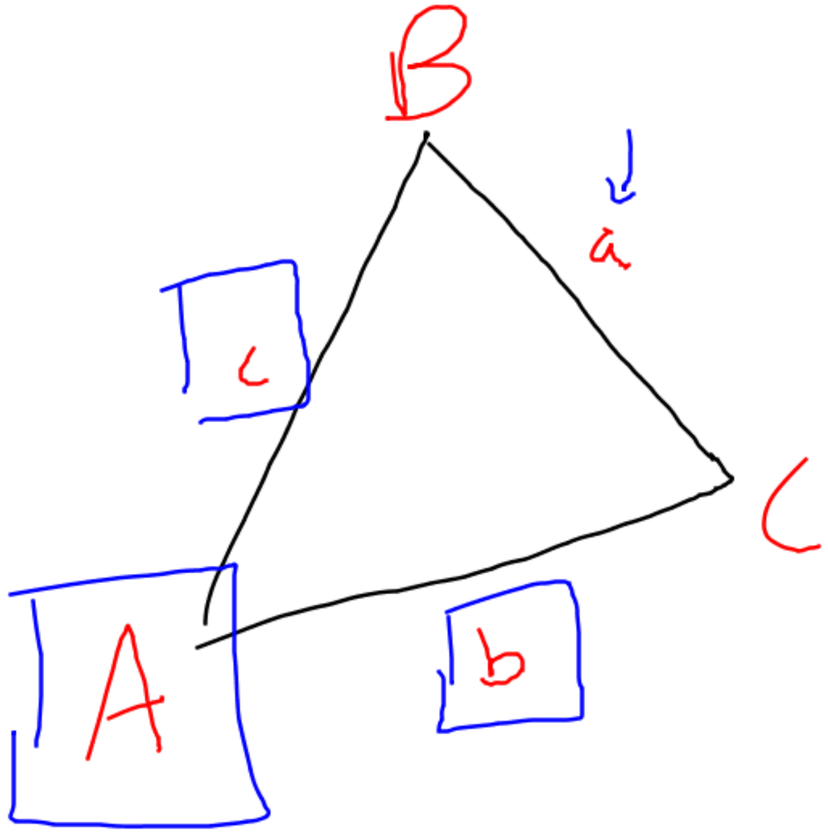
Mathematics 11C

1.4 – The Cosine Law

Mr. D. Hagen



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

$$b^2 = a^2 + c^2 - 2ac\cos B$$

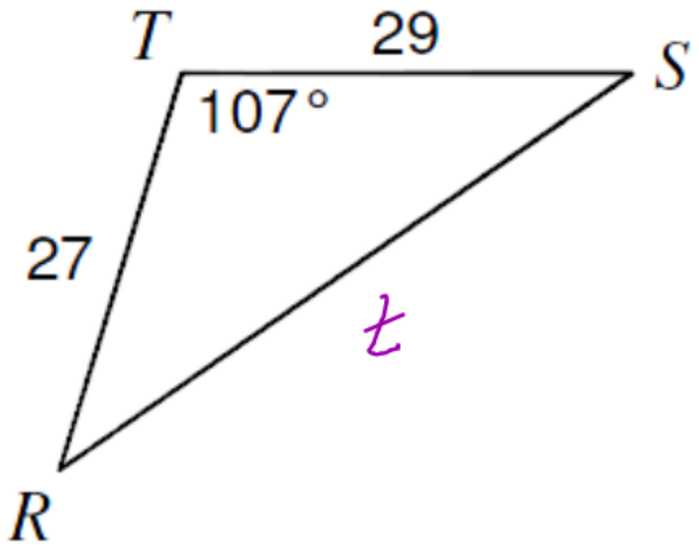
$$c^2 = a^2 + b^2 - 2ab\cos C$$

- 2 sides and the angle that joins them together

or

- all 3 sides

1) Find RS t



$t^2 = r^2 + s^2 - 2rs\cos T$

$t^2 = 29^2 + 27^2 - 2(29)(27)\cos 107$

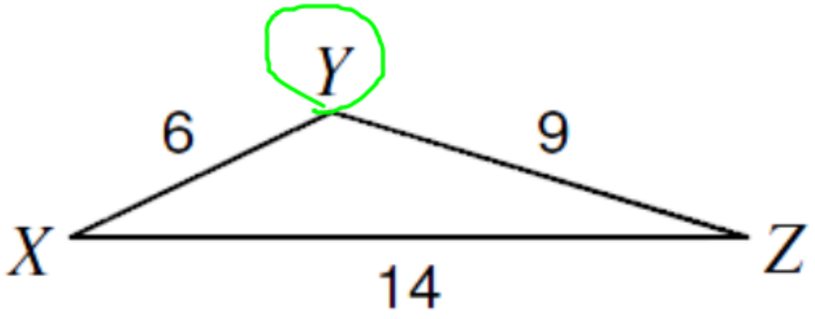
-457.85

$t^2 = 841 + 729 + 457.85$

$\sqrt{t^2} = \sqrt{2027.85}$

$t = 45$

2) Find $m\angle Y$



$$y^2 = x^2 + z^2 - 2xz\cos Y$$

$$14^2 = 9^2 + 6^2 - 2(9)(6)\cos Y$$

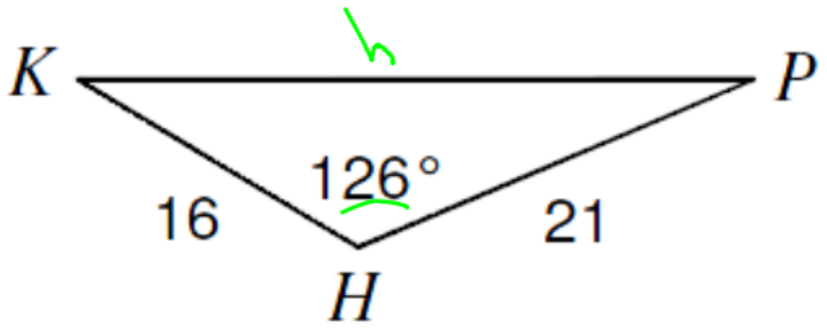
$$196 = 81 + 36 - 108\cos Y$$

$$79 = -108\cos Y$$

$$-0.7315 = \cos Y$$

$$\cos^{-1}(-0.7315) = Y = 137^\circ$$

3) Solve



$\angle K = 31^\circ \quad k = 21$

$\angle P = 23^\circ \quad p = 16$

$\angle H = 126^\circ \leftrightarrow h = 33$

$h^2 = 16^2 + 21^2 - 2(16)(21)\cos 126$

$h^2 = 256 + 441 + 395$

$\sqrt{h^2} = \sqrt{1092}$

$h = 33$

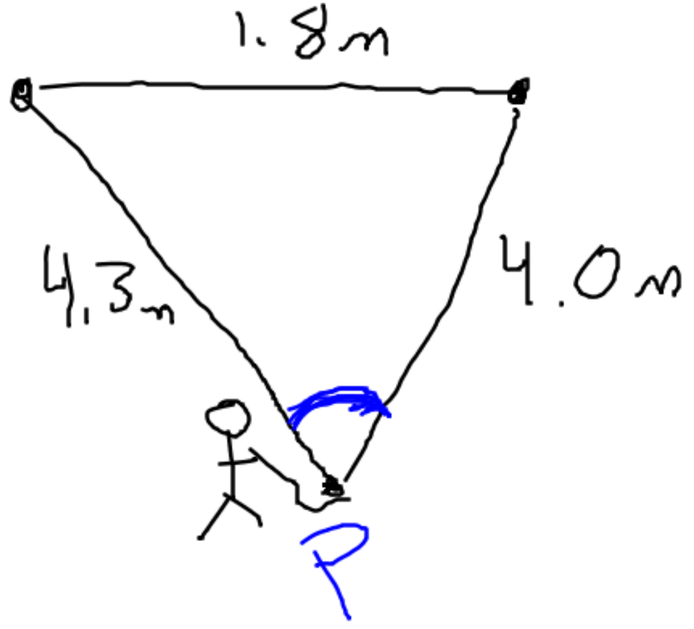
$\frac{\sin P}{16} = \frac{\sin 126}{33}$ (1)

$\sin P = 0.3923$

$P = \sin^{-1}(0.3923)$

$P = 23^\circ$

The posts of a hockey net are 1.8 m apart. A player tries to score a goal by shooting the puck along the ice from a point that is 4.3 m from one goalpost and 4.0 m from the other goalpost. Determine the measure of the angle that the puck makes with both goalposts.



$$1.8^2 = 4^2 + 4.3^2 - 2(4)(4.3)\cos P$$

$$3.24 = 16 + 18.49 - 34.4\cos P$$

$$-31.25 = -34.4\cos P$$

$$-34.4 \qquad -34.4$$

$$0.9084 = \cos P$$

$$\cos^{-1}(0.9084) = P = 25^\circ$$