Section 7.2

The Cosine Law

Lesson 5:

Using the Cosine Law to find an Angle Measure in an Oblique Triangle

When given SSS information, we can rearrange the formulas to get this version:

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

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

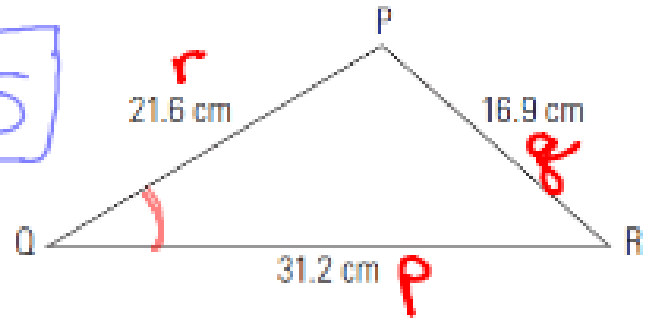
$$\cos C = \frac{a^2 + b^2 - c^2}{2ab}$$

Whichever variable is on the left side of the equation is the unknown angle we will be finding.

Example 2

Calculate the size of $\angle Q$.

SSS



$$\cos Q = \frac{p^2 + r^2 - q^2}{2pr}$$

$$\cos Q = \frac{31.2^2 + 21.6^2 - 16.9^2}{2(31.2)(21.6)} = \frac{1154.39}{1347.84}$$

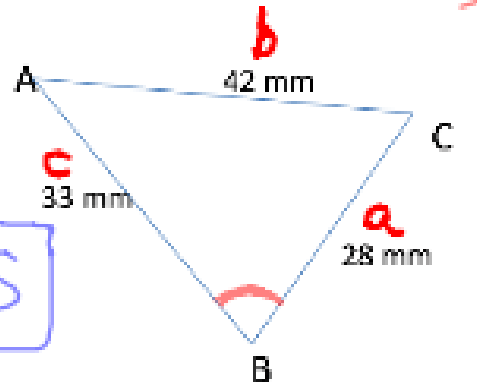
$\cos^{-1}\cos Q = \cos^{-1}\dfrac{1154.39}{1347.84}$ } 2nd cos (1154.39 ÷ 1347.84) =

$\angle Q = 31.077\ldots$

$\boxed{\angle Q = 31^\circ}$

Example

Determine the measure of $\angle B$ to the nearest degree.



SSS

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

$$\cos B = \frac{28^2 + 33^2 - 42^2}{2(28)(33)}$$

$$\cos^{-1} \cos B = \cos^{-1} \frac{109}{1848}$$

$$\angle B = 86.618\ldots$$

$\angle B = 87^\circ$

Homework:

Build Your Skills
pg. 279
#4(a)(b)

Practise Your New Skills
pg. 284
#1

Cosine Law Worksheet
#1, 2, 3, 4