Grade 10 Academic Math   Lesson: __7 - 6__

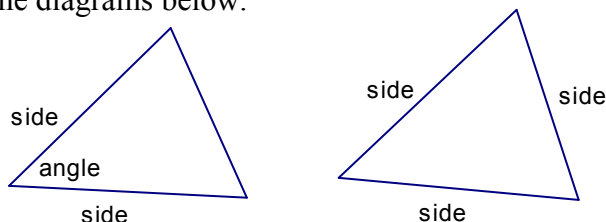Unit: __Trigonometry__   Topic: __Cosine Law__

■ *homework check:* **Principles of Mathematics 10 p. 433 #1, 5, 8, 9, 11**

■ *note:* **Cosine Law**

The cosine law is used on triangles when a complete pair is not given. Most cosine law applications rely on either a triangle that supplies a side angle side (SAS) or side side side (SSS) situation as in the diagrams below.


The cosine law states that $c^2 = a^2 + b^2 - 2ab\cos C$. Notice that the only pair in the formula are angle C and side c, therefore, when you are given a SAS situation, you are finding the side that pairs with the angle given. When we rearrange the formula to solve for an angle, we find the angle opposite whichever side is written first. Therefore, the cosine law for angles is written as

$C = \cos^{-1}\left[\dfrac{\left(c^2 - a^2 - b^2\right)}{\left(-2ab\right)}\right]$ and again the pair is angle C and side c. For example, find the
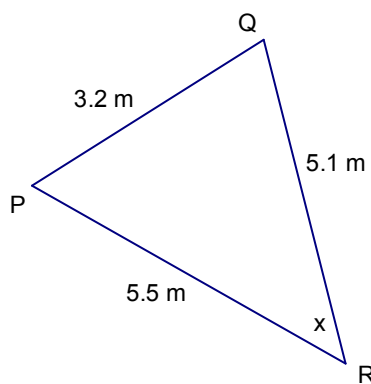
measure of the unknown angle or side.

a)
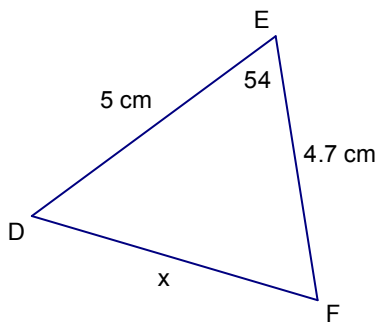
$c^2 = 5^2 + 4.7^2 - 2(5)(4.7)\cos 54$

$c = \sqrt{5^2 + 4.7^2 - 2(5)(4.7)\cos 54}$

$c = 4.4cm$

b)

Q

3.2 m

5.1 m

P

5.5 m

x

R

$$x = \cos^{-1}\left[\frac{\left(3.2 - 5.5^2 - 5.1^2\right)}{\left(-2 \times 5.5 \times 5.1\right)}\right]$$

$$x = 34.9°$$

🎞 *homework assignment:* **Principles of Mathematics 10** **p. 443 # 2 – 5, 11**