Flash Cards: Law of Cosines

Directions: Answer the following.

1. Using the Law of Cosines, find the length of side x if y equals 8, z equals 12 and the measure of angle X equals 82 degrees.

2. Using the Law of Cosines, find the measure of angle P given side lengths p equals 15, q equals 14 and r equals 18.

3. Using the Law of Cosines, find the length of b if a equals 20, c equals 25 and the measure of angle A equals 44 degrees..

4. Find the missing parts of the triangle below. Triangle LMN has side LM with length 5, side MN with length 6 and side LN with length 7.

Answers:

1.
$x^2 = y^2 + z^2 - 2yz \cos X$
$x^2 = 8^2 + 12^2 - 2(8)(12)\cos 82$
$x^2 \approx 181.2788$
$x \approx$ the square root of 181.2788
$x \approx 13.46$

2. $p^2 = q^2 + r^2 - 2qr \cos P$
$15^2 = 14^2 + 18^2 - 2(14)(18) \cos P$
$225 = 196 + 324 - 504 \cos P$
$-295 = -504 \cos P$
$0.5853 \approx \cos P$
$\cos^{-1}(0.5853) \approx \cos^{-1}(\cos P)$
$54.18 \approx P$
The measure of angle P is approximately equals to 54.18 degrees.

3. The information given is two sides and the non-included angle. This is not a situation that would use the Law of Cosines. Instead, use the Law of Sines.

4.
Find any one of the angles using the Law of Cosines.
$6^2 = 7^2 + 5^2 - 2(7)(5) \cos L$
$36 = 49 + 25 - 70 \cos L$
$-38 = -70 \cos L$
$0.5429 \approx \cos L$
$\cos^{-1}(0.5429) \approx \cos^{-1}(\cos L)$
$57.12° \approx L$

The sine of M over 7 equals the sine of 57.12 over 6. Cross multiply to get 6 times the sine of M equals 7 times the sine of 57.12. The sine of M equals 7 times the sine of 57.12 divided by 6. The sine of M is approximately equal to 0.9798. Take the inverse sine of both sides. The measure of angle M is approximately equal to 78.46 degrees.

N = 180 – 57.12 – 78.46 = 44.42

The measure of angle L is approximately equal to 57.12 degrees. The measure of angle M is approximately equal to 78.46 degrees. The measure of angle N is approximately equal to 44.42 degrees.