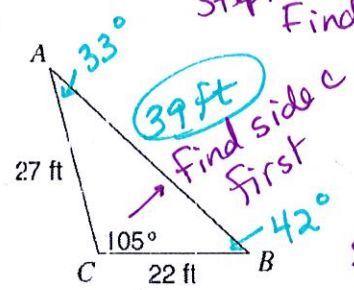
Solve each triangle. Round all measures to the nearest tenth (one decimal place).

1.



Step 1: Find side c

$c^2 = 27^2 + 22^2 - 2(27)(22)\cos 105°$

$c = \sqrt{27^2 + 22^2 - 2(27)(22)\cos 105°}$

$c \approx 39.0$

Step 2: Find m∠B

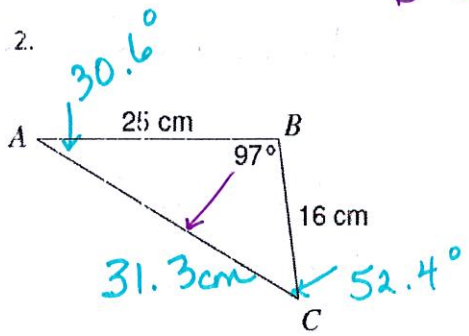
$\cos^{-1}\left(\frac{27^2 - 22^2 - 39^2}{-2(22)(39)}\right)$

$m\angle B \approx 42.0°$

Step 3: Find m∠A

$180° - 105° - 42.0° = 33°$

2.



$b^2 = 25^2 + 16^2 - 2(25)(16)\cos 97°$

$b \approx 31.3$

$m\angle C \rightarrow \cos^{-1}\left(\frac{25^2 - 16^2 - 31.3^2}{-2(16)(31.3)}\right)$

$m\angle C \approx 52.4°$

$m\angle A = 180° - 97° - 52.4° = 30.6°$

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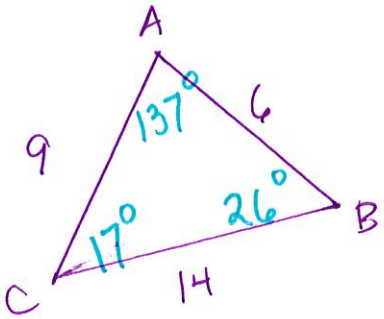
3. In △ABC, a = 14 cm, b = 9 cm, and c = 6 cm



Find m∠A first!

$\cos^{-1}\left(\frac{14^2 - 9^2 - 6^2}{-2(9)(6)}\right)$

$m\angle A \approx 137°$

Find m∠B

$\cos^{-1}\left(\frac{9^2 - 6^2 - 14^2}{-2(6)(14)}\right)$

$m\angle B \approx 26.0°$

$m\angle C = 180° - 137° - 26.0° \approx 17°$

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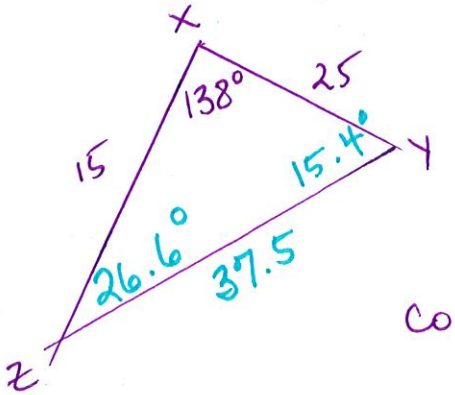
4. In △XYZ, m∠X = 138°, y = 15 in., and z = 25 in.



Find side x first

$x = \sqrt{15^2 + 25^2 - 2(15)(25)\cos 138°}$

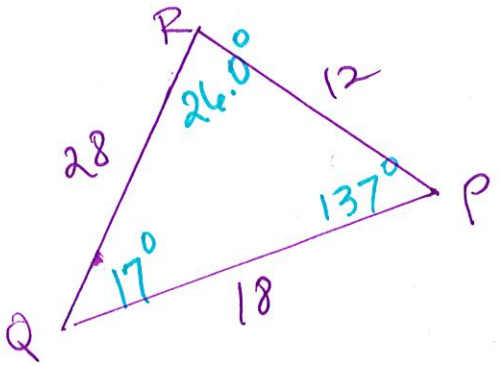
$x \approx 37.5$ in.

Find m∠Z:

$\cos^{-1}\left(\frac{25^2 - 15^2 - 37.5^2}{-2(15)(37.5)}\right) \approx 26.6°$

$m\angle Y = 180° - 26.6° - 138° = 15.4°$

5. In △QRP, q = 12 ft, p = 28 ft, and r = 18 ft



Find m∠P first

$\cos^{-1}\left(\frac{28^2-12^2-18^2}{-2(12)(18)}\right)$

$m\angle P \approx 137.0°$

Find m∠R

$\cos^{-1}\left(\frac{18^2-28^2-12^2}{-2(28)(12)}\right)$

$m\angle R \approx 26.0°$

For #6 and #7, find the area of the triangle to the nearest tenth of a square unit using Heron's Formula.

6. In △TRS, s = 9 yd, r = 11 yd, and t = 4 yd

Step 1: Find the semi-perimeter, s

$s = \frac{1}{2}(9+11+4) = 12$

$A = \sqrt{12(12-9)(12-11)(12-4)}$

OR

$A = \sqrt{12(3)(1)(8)}$

$A = 12\sqrt{2}$ OR

$\approx 17.0 \text{ yds}^2$

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7. In △CAB, b = 14 km, c = 7 km, and a = 15 km

$s = \frac{1}{2}(14+7+15) = 18$

$A = \sqrt{18(4)(11)(3)}$

$A \approx 48.7 \text{ km}^2$

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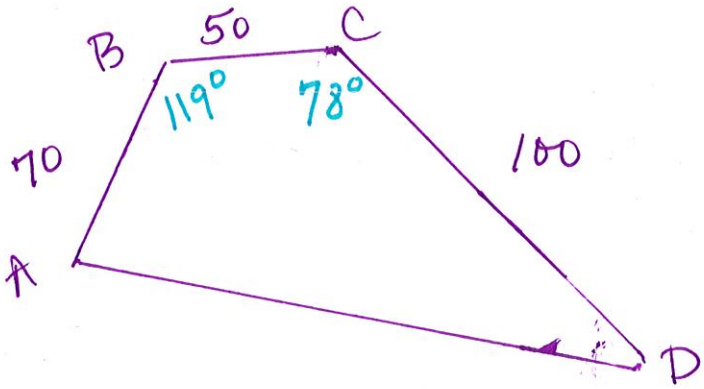
8. *Let's try it again. .*

A homeowner has a property in the shape of an irregular quadrilateral labeled ABCD. Side AB is 70 feet, side BC is 50 feet, and side CD is 100 feet. Angle B is 119° and angle C is 78°. Find the area of this property.



I know the answer.
Do you?