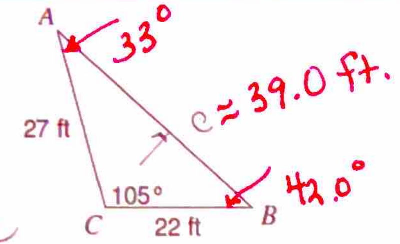
Shortcut formulas: to find a side: $a = \sqrt{b^2+c^2-2bc\cos A}$ to find an angle $m\angle A = \cos^{-1}\left(\frac{a^2-b^2-c^2}{-2bc}\right)$

Law of Cosines Practice:

Solve each triangle. Round sides to nearest tenth and angles to nearest degree:

1.



Find side c

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

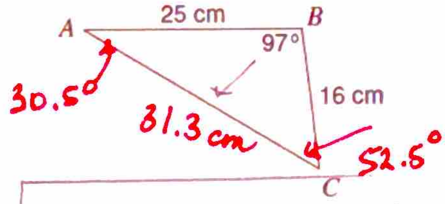
$c = \sqrt{27^2+22^2-2(27)(22)\cos 105^\circ}$

$\boxed{c \approx 39.0 \text{ ft}}$

Find $m\angle B$: $\cos^{-1}\left(\frac{27^2-39.0^2-22^2}{-2(39.0)(22)}\right)$

$\boxed{m\angle B \approx 42.0^\circ}$

2.



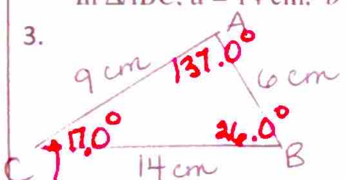
$b = \sqrt{25^2+16^2-2(25)(16)\cos 97^\circ}$

$\boxed{b \approx 31.3 \text{ cm}}$

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

$\boxed{m\angle A \approx 30.5^\circ}$

3. In ΔABC, $a = 14$ cm, $b = 9$ cm, $c = 6$ cm



$m\angle C \approx 17.0^\circ$

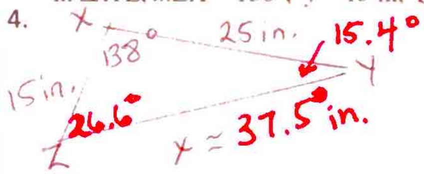
$m\angle A = \cos^{-1}\left(\frac{14^2-9^2-6^2}{-2(9)(6)}\right)$

$\boxed{m\angle A \approx 137.0^\circ}$

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

$\boxed{m\angle B \approx 26.0^\circ}$

4. In ΔXYZ, $m\angle X = 138^\circ$, $y = 15$ in, $z = 25$ in



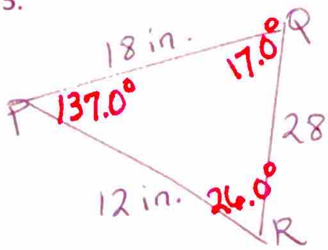
$x = \sqrt{15^2+25^2-2(15)(25)\cos 138^\circ}$

$\boxed{x \approx 37.5 \text{ in.}}$

$m\angle Z = \cos^{-1}\left(\frac{25^2-15^2-37.5^2}{-2(15)(37.5)}\right)$

$\boxed{m\angle Z \approx 26.6^\circ}$

5. In ΔQRP, $q = 12$ in, $p = 28$ in, $r = 18$ in



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

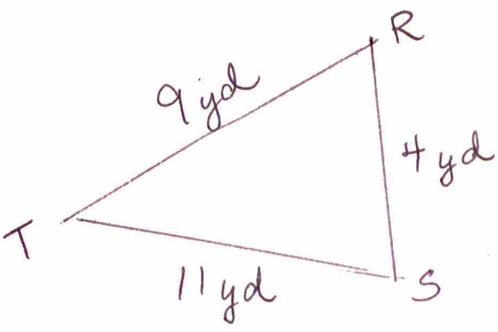
$\boxed{m\angle P \approx 137.0^\circ}$

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

$\boxed{m\angle Q \approx 17.0^\circ}$

Find the area to the nearest tenth using Heron's Formula:

6. In $\triangle TRS$, $s = 9$ yd, $r = 11$ yd, $t = 4$ yd



$$S = \frac{9+4+11}{2}$$

$$S = 12$$

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

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

7. In $\triangle CAB$, $b = 14$ km, $c = 7$ km, $a = 15$ km

$$S = \frac{14+7+15}{2}$$

$$S = 18$$

$$A = \sqrt{18(18-14)(18-7)(18-15)}$$

$$\boxed{A \approx 48.7 \text{ Km}^2}$$