Law of Cosines

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

p. 298 # 27-33 odd, 35, 36

27) $A = 42°$ $a = 12.9$
$B = 29°$ $b = 12$
$C = 100°$ $c = 19$

$a^2 = 12^2 + 19^2 - 2(12)(19)\cos 42°$
$a^2 = 505 - 456\cos 42°$
$a = 12.9$

$12^2 = 12.9^2 + 19^2 - 2(12.9)(19)\cos B$
$-383.41 = -490.2\cos B$
$\cos^{-1}\left(\frac{383.41}{490.2}\right) = B$

29) $P = 73°$ $p = 14.6$
$Q = 27°$ $q = 7$
$R = 80°$ $r = 15$

$p^2 = 7^2 + 15^2 - 2(7)(15)\cos 73°$
$p = 14.6$

$7^2 = 14.6^2 + 15^2 - 2(14.6)(15)\cos Q$
$-389.16 = -438\cos B$
$Q = \cos^{-1}\left(\frac{-389.16}{-438}\right)$

31) $R = 96°$ $r = 35$
$S = 39°$ $s = 22$
$T = 45°$ $t = 25$

$35^2 = 22^2 + 25^2 - 2(22)(25)\cos R$
$\cos^{-1}\left(\frac{116}{-1100}\right) = R$

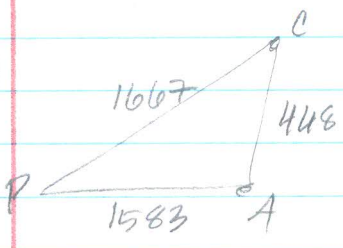
$22^2 = 35^2 + 25^2 - 2(35)(25)\cos S$
$\cos^{-1}\left(\frac{-1366}{-1750}\right) = S$

33) $B = 16°$ $b = 24.1$
$C = 162°$ $c = 27$
$D = 2°$ $d = 3$

$b^2 = 27^2 + 3^2 - 2(27)(3)\cos 16°$

$24.1^2 = 24.1^2 + 27^2 - 2(24.1)(27)\cos D$
$\cos^{-1}\left(\frac{-1300.81}{-1301.4}\right) = D$

35)



$P = 15.6°$

$C = 71.5°$

$A = 92.9°$

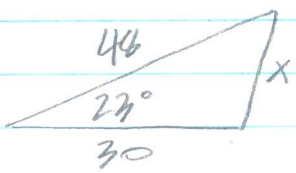
$448^2 = 1667^2 + 1583^2 - 2(1667)(1583)\cos P$

$\cos^{-1}\left(\frac{-5084074}{-5277722}\right) = P$

$1583^2 = 1667^2 + 448^2 - 2(1667)(448)\cos C$

$\cos^{-1}\left(\frac{-473704}{-1493632}\right) = C$

36)



$x^2 = 48^2 + 30^2 - 2(48)(30)\cos 23$

$x = \underline{23.5 \text{ ft}}$