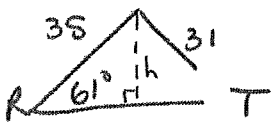
Accelerated Pre-Calculus Name Key 2017

3.06 Law of Sines and Cosines Review

0 Δs, 1 Δ, 2 Δs

State the number of possible triangles that can be formed using the given measurements.

1. In $\Delta RST, m\angle R = 61°, t = 35, r = 31$



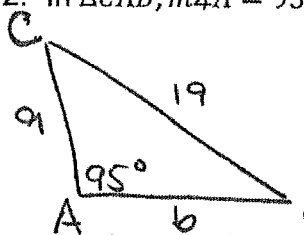
ASS w/ acute angle
adj > opp so check height

$h = 35 \sin 61° \approx 30.6$

adj > opp > height
35 > 31 > 30.6
2 Δs

Solve each triangle. Round your answers to the nearest tenth.

2. In $\Delta CAB, m\angle A = 95°, c = 9, a = 19$



obtuse ASS → 1 Δ
Law of Sines

$\frac{\sin C}{9} = \frac{\sin 95°}{19}$

$C = \sin^{-1}\left(\frac{9 \sin 95°}{19}\right)$

$C \approx 28.157°$

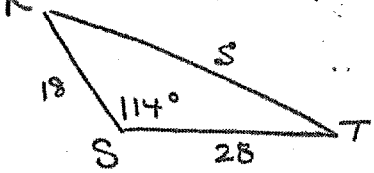
$B = 180 - 95 - C$

$\frac{b}{\sin B} = \frac{19}{\sin 95°}$

$b = \frac{19 \sin B}{\sin 95°}$

$B_1 = 56.843°$	$B_2 =$
$C_1 = 28.157°$	$C_2 =$
$b_1 = 15.967$	$b_2 =$

3. In $\Delta STR, t = 18, r = 28, m\angle S = 114°$



SAS → 1 Δ
Law of Cosines

$s = \sqrt{18^2 + 28^2 - 2(18)(28)\cos 114°}$

$s \approx 38.961$

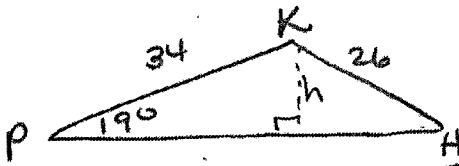
$\frac{\sin R}{28} = \frac{\sin 114°}{s}$

$R = \sin^{-1}\left(\frac{28 \sin 114°}{s}\right)$

$T = 180 - S - R$

$R_1 = 41.036°$	$R_2 =$
$T_1 = 24.964°$	$T_2 =$
$s_1 = 38.961$	$s_2 =$

4. In $\Delta PKH, m\angle P = 19°, h = 34, p = 26$



ASS w/ acute angle, opp < adj
check the height

$h = 34 \sin 19° = 11.1$ 2 Δs

$H_1 = \sin^{-1}\left(\frac{34 \sin 19°}{26}\right)$

$K_1 = 180 - 19° - H_1$

$\frac{k_1}{\sin K_1} = \frac{26}{\sin 19°}$

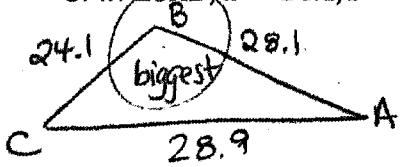
$H_2 = 180 - H_1$

$K_2 = 180 - 19° - H_2$

$k_2 = \frac{26 \sin K_2}{\sin 19°}$

$H_1 = 25.198°$	$H_2 = 154.802°$
$K_1 = 135.802°$	$K_2 = 6.198°$
$k_1 = 55.634°$	$k_2 = 8.622$

5. In $\Delta CAB, a = 24.1, b = 28.9, c = 28.1$



SSS → 1 Δ
Law of Cosines

$b^2 = a^2 + c^2 - 2ac\cos B$

$\frac{b^2 - a^2 - c^2}{-2ac} = \cos B$

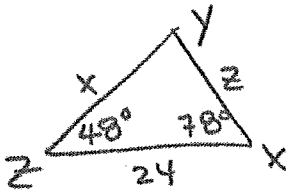
$B = \cos^{-1}\left(\frac{28.9^2 - 24.1^2 - 28.1^2}{-2(24.1)(28.1)}\right)$

$C = \sin^{-1}\left(\frac{28.1 \sin B}{28.9}\right)$

$A = 180° - B - C$

$A_1 = 50°$	$A_2 =$
$B_1 = 66.724°$	$B_2 =$
$C_1 = 63.276°$	$C_2 =$

6. In $\Delta ZXY, m\angle Z = 48°, m\angle X = 78°, y = 24$



ASA → 1 Δ
Law of Sines

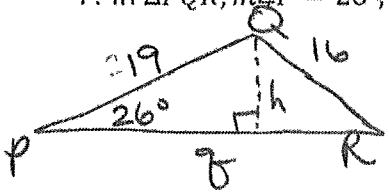
$Y = 180° - Z - X$

$x = \frac{24 \sin 78°}{\sin 54°}$

$z = \frac{24 \sin 48°}{\sin 54°}$

$Y_1 =$ 54°	$Y_2 =$
$z_1 =$ 22.046	$z_2 =$
$x_1 =$ 29.017	$x_2 =$

7. In $\Delta PQR, m\angle P = 26°, r = 19, p = 16$



ASS w/ acute angle opp < adj : must check height!
$h = 19 \sin 26° \approx 8.3$ height < opp < adj ⇒ 2 Δs

$R_1 = \sin^{-1}\left(\frac{19 \sin 26°}{16}\right)$

$Q_1 = 180 - 26° - R_1$

$q_1 = \frac{16 \sin Q_1}{\sin 26°}$

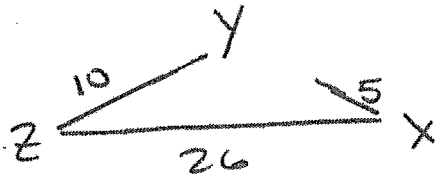
$R_2 = 180° - R_1$

$Q_2 = 180° - 26° - R_2$

$q_2 = \frac{16 \sin Q_2}{\sin 26°}$

$R_1 =$ 31.370°	$R_2 =$ 148.630°
$Q_1 =$ 122.630	$Q_2 =$ 5.370°
$q_1 =$ 30.738	$q_2 =$ 3.416

8. In ΔXYZ, $x = 10,\ y = 26,\ z = 5$

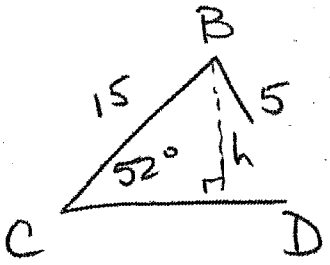


$10 + 5 \not> 26$

0 Δs

$Y_1 =$	$Y_2 =$
$Z_1 =$	$Z_2 =$
$X_1 =$	$X_2 =$

9. In ΔBCD, $m\angle C = 52°,\ c = 5,\ d = 15$



ASS, with a given acute angle and adj > opposite side
check the height

$h = 15 \sin 52°$

$h = 11.8$

opp < height
↑ too short to reach

$B_1 =$	$B_2 =$
$D_1 =$	$D_2 =$
$b_1 =$	$b_2 =$

0 Δs