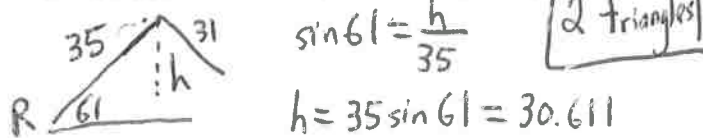


3.06 Law of Sines and Cosines Review

Date: _____

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

1. In ΔRST , $m\angle R = 61^\circ$, $t = 35$, $r = 31$

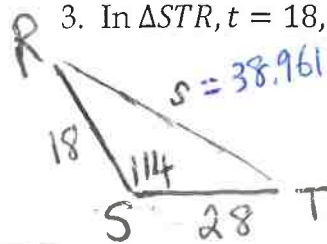


$$\sin 61 = \frac{h}{35}$$

$$h = 35 \sin 61 = 30.611$$

Solve each triangle. $30.611 < 31 < 35$

2. In ΔCAB , $m\angle A = 95^\circ$, $c = 9$, $a = 19$



$$s^2 = r^2 + t^2 - 2rt \cos(S)$$

$$s^2 = 28^2 + 18^2 - (2 \cdot 28 \cdot 18 \cdot \cos 114)$$

$$s^2 = 1517.991$$

$$s = 38.961$$

$$\frac{\sin R}{28} = \frac{\sin 114}{38.961} \rightarrow \sin R = \frac{28 \sin 114}{38.961}$$

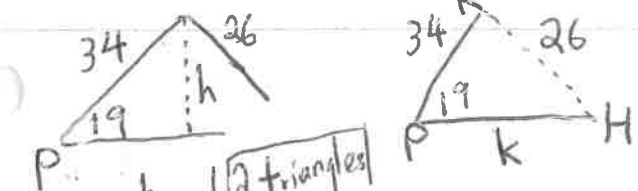
$$R = \sin^{-1}(0.65653)$$

$$R = 41.036^\circ$$

$$\angle T = 180 - 41.036 - 114 = 24.964^\circ$$

| | |
|----------------------|---------|
| $R_1 = 41.036^\circ$ | $R_2 =$ |
| $T_1 = 24.964^\circ$ | $T_2 =$ |
| $s_1 = 38.961$ | $s_2 =$ |

4. In ΔPKH , $m\angle P = 19^\circ$, $h = 34$, $p = 26$



$$\sin 19 = \frac{h}{k}$$

$$h = 34 \sin 19$$

$$h = 11.069$$

$$\frac{k}{\sin 135.802} = \frac{26}{\sin 19}$$

$$k = \frac{26 \sin 135.802}{\sin 19}$$

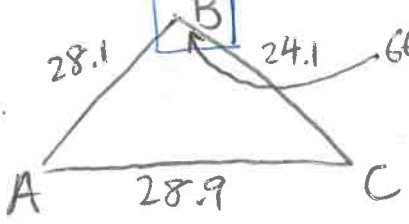
$$\frac{\sin H}{34} = \frac{\sin 19}{26}$$

$$\sin H = \frac{34 \sin 19}{26}$$

$$H = 25.197^\circ$$

| | |
|-----------------------|-----------------------|
| $H_1 = 25.197^\circ$ | $H_2 = 154.803^\circ$ |
| $K_1 = 135.802^\circ$ | $K_2 = 6.198^\circ$ |
| $k_1 = 55.673$ | $k_2 = 8.622$ |

5. In ΔCAB , $a = 24.1$, $b = 28.9$, $c = 28.1$



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

$$28.9^2 = 24.1^2 + 28.1^2 - (2 \cdot 24.1 \cdot 28.1 \cos B)$$

$$-535.21 = -1354.42 \cos B$$

$$0.39515 = \cos B$$

$$\cos B = 0.39515$$

$$B = \cos^{-1}(0.39515)$$

$$B = 66.724^\circ$$

$$\frac{k}{\sin 6.198} = \frac{26}{\sin 19}$$

$$k = \frac{26 \sin 6.198}{\sin 19}$$

$$k_2 = 8.622$$

| | |
|----------------------|---------|
| $A_1 = 50^\circ$ | $A_2 =$ |
| $B_1 = 66.724^\circ$ | $B_2 =$ |
| $C_1 = 63.276^\circ$ | $C_2 =$ |

$$\frac{\sin A}{24.1} = \frac{\sin 66.724}{28.9}$$

$$\sin A = 0.76603$$

$$A = \sin^{-1}(0.76603)$$

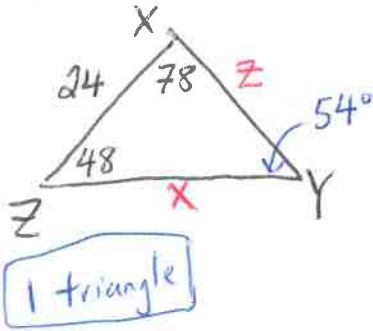
$$A = 49.999 \approx 50^\circ$$

$$\angle C = 180 - 50 - 66.724$$

$$\angle C = 63.276^\circ$$

*use Law of Sine

6. In ΔZXY , $m\angle Z = 48^\circ$, $m\angle X = 78^\circ$, $y = 24$



$$\frac{x}{\sin 78} = \frac{24}{\sin 54}$$

$$x = \frac{24 \sin 78}{\sin 54}$$

$$x = 29.017$$

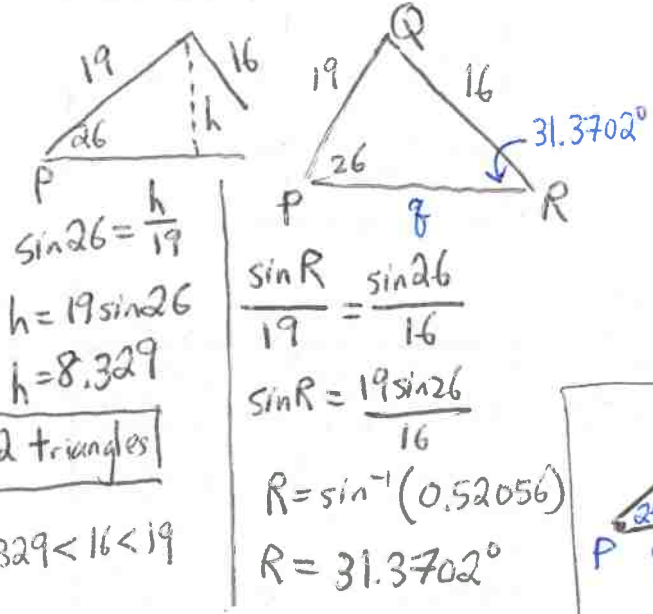
$$\frac{z}{\sin 48} = \frac{24}{\sin 54}$$

$$z = \frac{24 \sin 48}{\sin 54}$$

$$z = 22.046$$

| | |
|------------------|---------|
| $Y_1 = 54^\circ$ | $Y_2 =$ |
| $z_1 = 22.046$ | $z_2 =$ |
| $x_1 = 29.017$ | $x_2 =$ |

7. In ΔPQR , $m\angle P = 26^\circ$, $r = 19$, $p = 16$



$$Q_1 = 180 - 26 - 31.3702 = 122.630^\circ$$

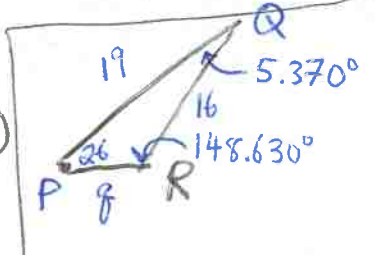
$$Q_2 = 180 - 31.3702 = 148.630^\circ$$

$$\frac{q}{\sin 122.63} = \frac{16}{\sin 26}$$

$$q = \frac{16 \sin 122.63}{\sin 26}$$

$$q = 30.738$$

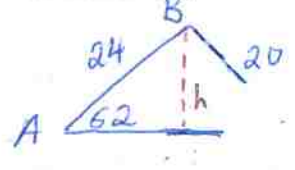
| | |
|-----------------------|-----------------------|
| $R_1 = 31.3702^\circ$ | $R_2 = 148.630^\circ$ |
| $Q_1 = 122.630^\circ$ | $Q_2 = 5.370^\circ$ |
| $q_1 = 30.738$ | $q_2 = 3.416$ |



$$\frac{q}{\sin 5.370} = \frac{16}{\sin 26}$$

$$q = \frac{16 \sin 5.370}{\sin 26} = 3.416$$

8. Determine which law you would use to solve and how many triangles there are given $A = 62^\circ$, $b = 24$, and $a = 20$



*SSA, test for ambiguous case

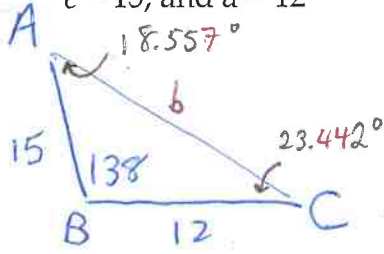
$$\sin 62 = \frac{h}{24}$$

$$h = 24 \sin 62$$

$$h = 21.191$$

No triangles since $a = 20$ is less than $h = 21.191$

9. Determine which law you would use to solve and how many triangles there are given $B = 138^\circ$, $c = 15$, and $a = 12$



SAS \rightarrow use Law of Cosines

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

$$b^2 = 12^2 + 15^2 - (2 \cdot 12 \cdot 15 \cos 138)$$

$$b^2 = 636.532$$

$$b = 25.2295$$

$$\frac{\sin A}{12} = \frac{\sin 138}{25.2295}$$

$$\sin A = \frac{12 \sin 138}{25.2295}$$

$$A = \sin^{-1}(0.31826)$$

$$A = 18.557^\circ$$

$$\angle C = 180 - 138 - 18.557^\circ$$

$$\angle C = 23.442^\circ$$