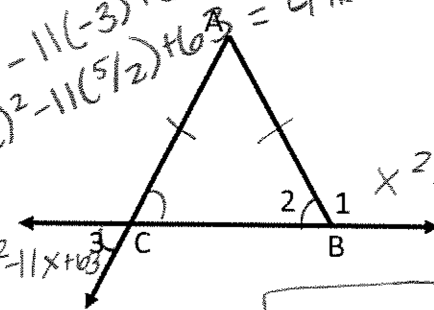
**Name:** Answer Key

**Honors Geometry**

**1.** $\triangle ABC$ is isosceles with base $\overline{BC}$. If $m\angle 1 = (x^2 + 12x + 102)^\circ$ and $m\angle 3 = (x^2 - 11x + 63)^\circ$, find the two possible values of $m\angle 2$.

$(-3)^2 - 11(-3) + 63 = 105^\circ$

$(5/2)^2 - 11(5/2) + 63 = 41.75^\circ$




$m\angle 3 = m\angle 2$

$m\angle 2 + m\angle 1 = 180$

$x^2 - 11x + 63 + x^2 + 12x + 102 = 180$

$2x^2 + 1x + 165 = 180$

$2x^2 + 1x - 15 = 0$

$6 \quad -30 \quad -5 \quad 1$

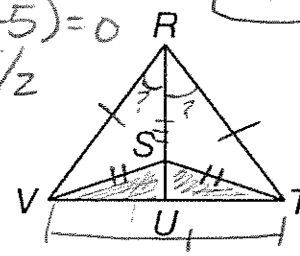
$(x + \frac{6}{2})(x - \frac{5}{2})$

$(x+3)(2x-5) = 0$

$x = -3 \quad x = 5/2$

$\boxed{m\angle 2 = 105^\circ \text{ or } 41.75^\circ}$

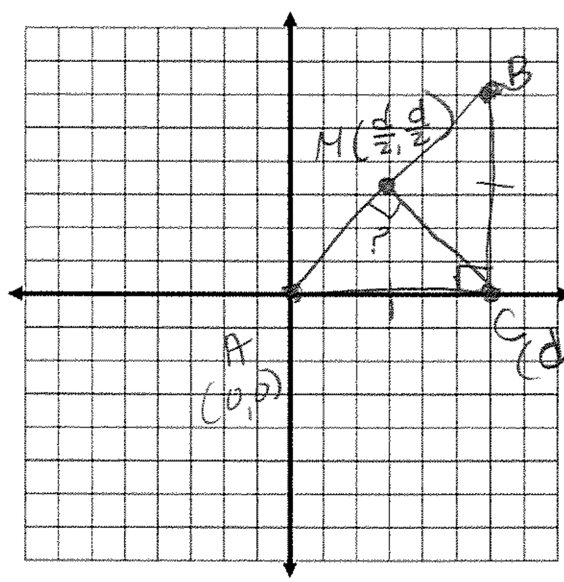
**2.** **<u>Given:</u>** $\triangle RVT$ is equilateral ; $\triangle SUV \cong \triangle SUT$
**<u>Prove:</u>** $\angle VRS \cong \angle TRS$




| Statements | Reasons |
| --- | --- |
| ① $\triangle RVT$ is equilateral, $\triangle SUV \cong \triangle SUT$ | ① Given |
| ② $\overline{VR} \cong \overline{RT} \cong \overline{VT}$ | ② If a $\triangle$ is an equilateral $\triangle$, then all sides are $\cong$. |
| ③ $\angle RVU \cong \angle VRT \cong \angle RTV$ | ③ If a $\triangle$ is an equilateral $\triangle$, then all $\angle$'s are $\cong$ |
| ④ $\overline{VS} \cong \overline{TS}$ | ④ CPCTC |
| ⑤ $\overline{RS} \cong \overline{RS}$ | ⑤ Reflexive POC |
| ⑥ $\triangle VRS \cong \triangle TRS$ | ⑥ SSS (2,4,5) |
| ⑦ $\angle VRS \cong \angle TRS$ | ⑦ CPCTC |

Not needed

**3.** $\triangle ABC$ is a right isosceles triangle with hypotenuse $\overline{AB}$. $M$ is the midpoint of $\overline{AB}$. Write a coordinate proof to show that $\overline{CM}$ is perpendicular to $\overline{AB}$.




Prove: $\overline{CM} \perp \overline{AB}$

Slope $\overline{CM} = \dfrac{\frac{d}{2} - 0}{\frac{d}{2} - d} = \dfrac{\frac{d}{2}}{-\frac{d}{2}} = -1$

C(d,0)

$M(\frac{d}{2}, \frac{d}{2})$

$\boxed{\text{slope } \overline{CM} = -1}$

Slope $\overline{AB} = \dfrac{d-0}{d-0} = \dfrac{d}{d} = 1$

A (0,0)

B (d,d)

$\boxed{\text{Slope } \overline{AB} = 1}$

* If 2 seg's slopes are opp. recipricals, then the segs are $\perp$.