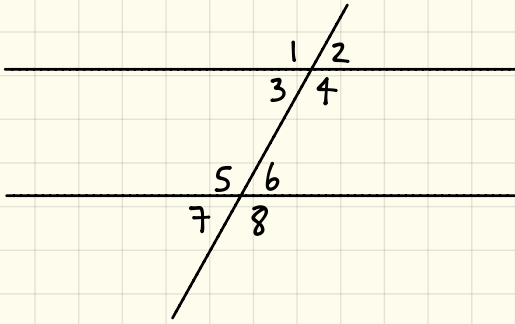Sample Free Response Questions (Solutions)

1. Use diagram 1 to answer the information.

1a. Suppose $\angle 3 = 7x+4$ and $\angle 5 = 15x$. Find the unknown variable.

$$\angle 3 + \angle 5 = 180°$$
$$7x+4 + 15x = 180$$
$$22x + 4 = 180$$
$$22x = 176$$
$$\boxed{x = 8}$$

1b. Explain in words your reasoning in determining 1a.

$\angle 3$ and $\angle 5$ are supplementary since the 2 angles are consecutive interior (or same side interior)
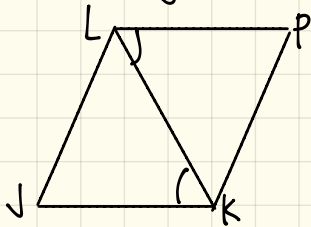
1c. Find $\angle 4$

$\angle 3 = 7x+4$
$\angle 3 = 7(8)+4$
$= 60°$

$\angle 4 = 180 - 60° = \boxed{120°}$

1d. Explain in words your reasoning in determining 1c.

$\angle 3$ and $\angle 4$ are supplementary since the 2 angles are a linear pair.

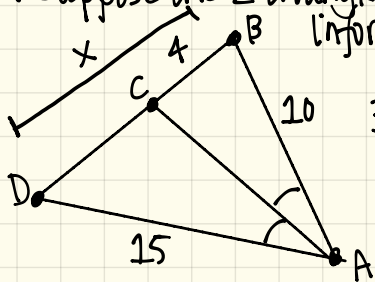# 2. Use diagram 2 to answer the information

2a. State what additional information is required to know that the triangles are congruent using ASA postulate.

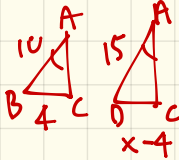$$\overline{LK} \cong \overline{LK}$$

2b. Explain your reasoning using a theorem property or postulate.

$\overline{LK} \cong \overline{LK}$ because of the reflexive property.

3. Suppose the 2 triangles are similar. Use diagram 3 to answer the information.

3a. Find $\overline{BD}$.

$$\frac{10}{15} = \frac{4}{x-4}$$

$$(4)(15) = (10)(x-4)$$

$$60 = 10x - 40$$

$$100 = 10x$$

$$10 = x$$

3b. Prove that the 2 triangles are similar.

$\triangle ABC \sim \triangle ADC$ because SAS since

$\angle BAC \cong \angle DAC$. and

$$\frac{AB}{AD} = \frac{BC}{DC} \text{ or } \frac{10}{15} = \frac{4}{6}$$

4. Consider $\triangle KXL$ where $KX=3$, $XL=4$, $KL=5$, $<KXL=90°$ and $<K=\theta$
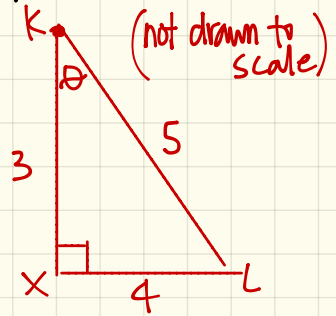
4a. Determine $\sin\theta$.

$$\sin\theta = \frac{4}{5}$$

4b. Determine $\cos\theta$.

$$\cos\theta = \frac{3}{5}$$

4c. Determine $\tan\theta$

$$\tan\theta = \frac{4}{3}$$

(not drawn to scale)

5. Consider $\triangle JWC$ where $JW=18$, $<W=90°$, $<J=66°$
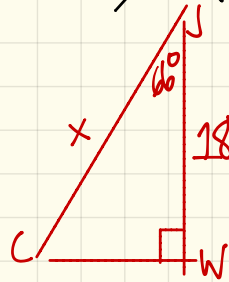
5a. Find the length of JC.

$$\cos 66° = \frac{18}{X}$$
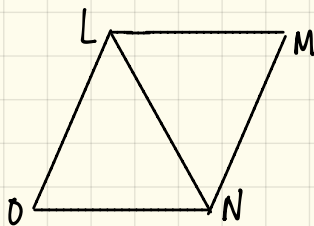
$$X\cos 66° = 18$$

$$X = \frac{18}{\cos 66°}$$

$$X \approx 44.25$$

5b. Find the measure of $<C$.

$$180 - 66 = 144°$$

6. Given: $\angle NLM \cong \angle LNO$
   $\angle OLN \cong \angle MNL$
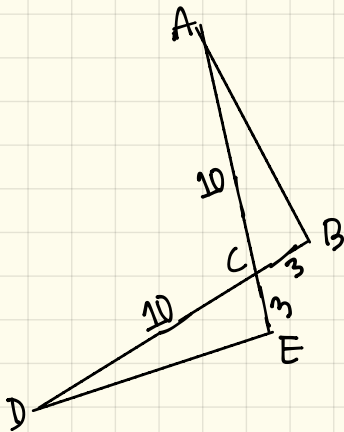
   Prove: $\angle M \cong \angle O$

Also study #1 and #3 on 2.4 Classwork Assignment and also #'s 1-7 2.4 Homework Assignment.

Statements	Reasons
1. $\angle NLM \cong \angle LNO$	1. Given
2. $\angle OLN \cong \angle MNL$	2. Given
3. $LN \cong NL$	3. Reflexive Property
4. $\triangle LNO \cong \triangle NLM$	4. ASA
5. $\angle M \cong \angle O$	5. CPCTC

7. Use diagram 4 to answer the information.

7a. Are these 2 triangles congruent? Explain your reasoning.

Yes $\triangle ABC \cong \triangle DEC$ because of SAS since $\overline{AC} \cong \overline{DC}$ and $\overline{BC} \cong \overline{EC}$ with $\angle DCE \cong \angle ACB$.

7b. Are these 2 triangles similar? Explain your reasoning.

Yes $\triangle ABC \sim \triangle DEC$ because the 2 triangles are congruent.