Name: Key

Date: ____________

UNIT 5

LESSON 11

AIM: CORRESPONDING SIDES OF SIMILAR TRIANGLES ARE IN PROPORTION

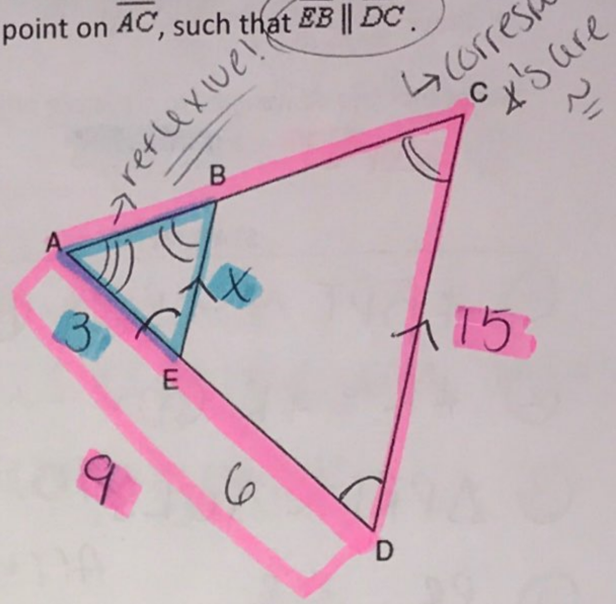
Do Now: In the diagram below of $\triangle ACD$, E is a point on $\overline{AD}$ and B is a point on $\overline{AC}$, such that $\overline{EB} \parallel \overline{DC}$.

If $AE = 3$, $ED = 6$, and $DC = 15$, find the length of $\overline{EB}$.

$$\frac{3}{x} = \frac{9}{15}$$

$$\frac{9x}{9} = \frac{45}{9}$$

$$\boxed{x = 5}$$

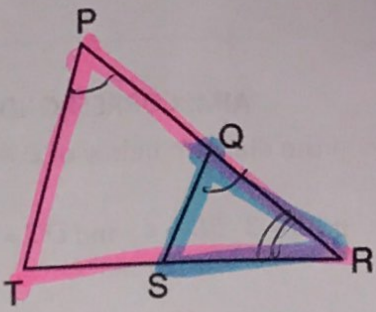


NOTES:

- **WHY** were you able to set up a proportion and solve for the missing side length in the do now?
  B/C the Δ's are similar
- **WHAT** made the triangles similar in the do now?
  The ∡'s are ≅!
- Therefore, after you prove triangles are similar using AA, it can be stated that corresponding sides of similar triangles are in proportion!
- How will you know if a proof requires you to state that corresponding sides of similar triangles are in proportion? The prove statement will be a proportion.
- Before you can state that corresponding sides of similar triangles are in proportion, you must always prove triangles are similar using AA first!

1. Given: Q is a point on $\overline{PR}$, S is a point on $\overline{TR}$, $\overline{QS}$ is drawn
$\angle RPT \cong \angle RQS$

(2) Prove: $\frac{PR}{RT} = \frac{QR}{RS}$ → PROPORTION



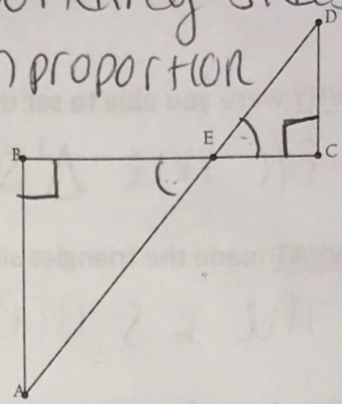
What triangles do we need to prove are similar first?

(1) $\triangle PRT \sim \triangle QRS$

STATEMENT	REASON
(1) $\angle RPT \cong \angle RQS$ (A) ✓	(1) Given
(2) $\angle R \cong \angle R$ (A) ✓	(2) Reflexive property
(3) $\triangle PRT \sim \triangle QRS$	(3) AA ≅ AA
(4) $\frac{PR}{RT} = \frac{QR}{RS}$	(4) corresponding sides of ~ Δ's are in proportion

2. Given: $\overline{DC} \perp \overline{BC}$, $\overline{AB} \perp \overline{BC}$

(2) Prove: $\frac{AB}{EB} = \frac{DC}{EC}$



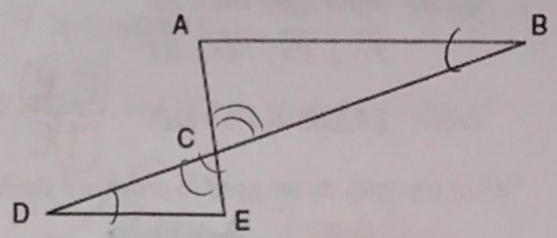
What triangles do we need to prove are similar first?

(1) $\triangle ABE \sim \triangle DCE$

STATEMENT	REASON
(1) $\overline{DC} \perp \overline{BC}$, $\overline{AB} \perp \overline{BC}$	(1) Given
(2) $\angle B \cong \angle C$ (A) ✓	(2) ⊥ lines create ≅ right ∠'s
(3) $\angle DEC \cong \angle AEB$ (A) ✓	(3) vertical ∠'s are ≅
(4) $\triangle ABE \sim \triangle DCE$	(4) AA ≅ AA
(5) $\frac{AB}{EB} = \frac{DC}{EC}$	(5) corresponding sides of ~ Δ's are in proportion.

3. Given: $\overline{AE}$ and $\overline{BD}$ intersect at C, and $\overline{AB} // \overline{ED}$

Prove: $\frac{AB}{BC} = \frac{ED}{DC}$



What triangles do we need to prove are similar first?

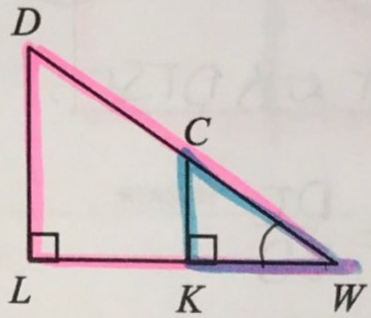
$\Delta ABC \sim \Delta EDC$

STATEMENT	REASON
① $\overline{AE}$ & $\overline{BD}$ intersect @ C $\overline{AB} \parallel \overline{ED}$	① Given
② ∡ B ≅ ∡ D	② ∥ lines create ≅ alt. int ∡'s
③ ∡ ACB ≅ ∡ ECD	③ vertical ∡'s are ≅
④ $\Delta ABC \sim \Delta EDC$	④ AA ≅ AA
⑤ $\frac{AB}{BC} = \frac{ED}{DC}$	⑤ corresponding sides of ~ Δ's are in proportion

4. **Given:** ΔDLW **is a right triangle**

$\overline{KC} \perp \overline{LW}$

Prove: $\frac{DW}{LW} = \frac{CW}{KW}$



What triangles do we need to prove are similar first?

$\Delta DWL \sim \Delta CWK$

STATEMENT	REASON
① ΔDLW is a right Δ $\overline{KC} \perp \overline{LW}$	① Given
② ∡ CKW is a right ∡	② ⊥ lines create right ∡'s
③ ∡DLW is a right ∡	③ Right Δ's have 1 right ∡
④ ∡ CKW ≅ ∡ DLW Ⓐ ✓	④ All right ∡'s are ≅
⑤ ∡ W ≅ ∡ W Ⓐ ✓	⑤ Refluxive property
⑥ $\Delta DWL \sim \Delta CWK$	⑥ AA ≅ AA
⑦ $\frac{DW}{LW} = \frac{CW}{KW}$	⑦ corresponding sides of ~ Δ's are in proportion

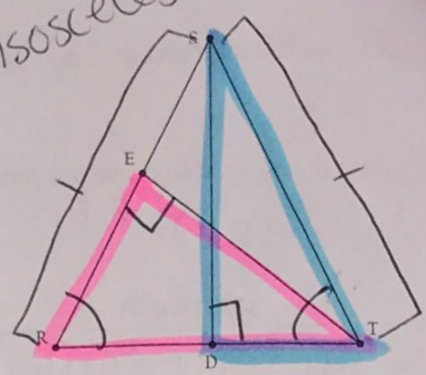
5. Given: ΔSRT with $\overline{SR} \cong \overline{ST}$

$\overline{TE} \perp \overline{RS}$, $\overline{SD} \perp \overline{RT}$

FIX!

Prove: ~~$ER \times SD = TE \times DT$~~ $\frac{ER}{TE} = \frac{DT}{SD}$

Isosceles Δ!



What triangles do we need to prove are similar first?

$\Delta ERT \sim \Delta DTS$

STATEMENT	REASON
① ΔSRT with $\overline{SR} \cong \overline{ST}$, $\overline{TE} \perp \overline{RS}$, $\overline{SD} \perp \overline{RT}$	① Given
② $\angle TER \cong \angle SDT$ (A) ✓	② ⊥ lines form ≅ right ∠'s
③ ΔRST is an isosceles Δ	③ isosceles Δ's have 2 ≅ sides
④ $\angle ERT \cong \angle DTS$ (A) ✓	④ Base ∠'s of isos. Δ's are ≅
⑤ $\Delta ERT \sim \Delta DTS$	⑤ AA ≅ AA
⑥ $\frac{ER}{TE} = \frac{DT}{SD}$	⑥ corresponding sides of ~ Δ's are in proportion

SUMAMRY- ORDER MATTERS!

	PROVE STATEMENT	REASON
1.	Similarity Statement $\Delta ABC \sim \Delta DEF$	$AA \cong AA$
2.	Proportion $\frac{AB}{BC} = \frac{DE}{EF}$	Corresponding sides of similar triangles are in proportion.

Name: Kelly

UNIT 5

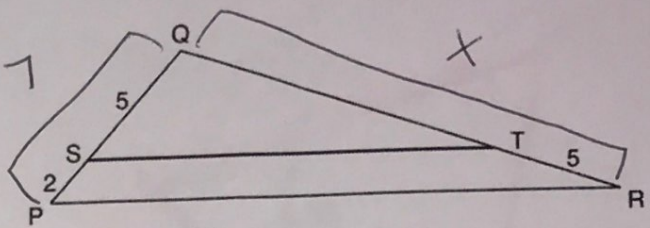
Date: ____

LESSON 11

HOMEWORK

1. In the diagram below of $\triangle PQR$, $\overline{ST}$ is drawn parallel to $\overline{PR}$, $PS = 2$, $SQ = 5$, and $TR = 5$. What is the length of $\overline{QR}$?

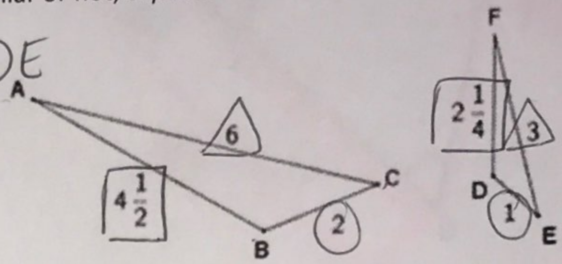
$$\frac{7}{2} = \frac{x}{5}$$
$$35 = 2x$$
$$\boxed{x = 17.5}$$



2. Given the pairs of triangles, determine if the triangles are similar or not, *explain*.

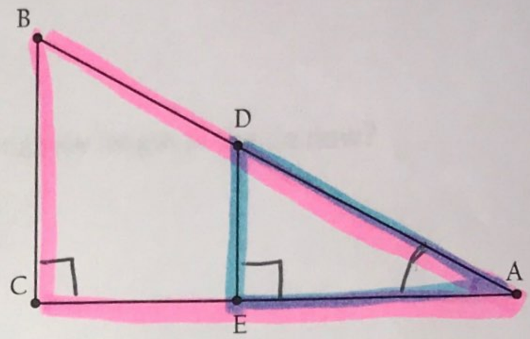
S | $2/1 = 2$
S | $4\frac{1}{2} / 2\frac{1}{4} = 2$
S | $6/3 = 2$

yes $\triangle ABC \sim \triangle FDE$ by SSS ~



3. Given: In right triangle ABC, $\angle C = 90°$, $\overline{DE} \perp \overline{AC}$

Prove: $\frac{AD}{ED} = \frac{AB}{CB}$



What triangles do we need to prove are similar first?

$\triangle ADE \sim \triangle ABC$

STATEMENT	REASON
① Right $\triangle ABC$, $\angle C = 90°$, $\overline{DE} \perp \overline{AC}$	① Given
② $\angle DEA$ is a right $\angle$	② $\perp$ lines form right $\angle$'s
③ $\angle C \cong \angle DEA$ Ⓐ ✓	③ Right $\angle$'s are $\cong$
④ $\angle A \cong \angle A$ Ⓐ ✓	④ Reflexive Property
⑤ $\triangle ADE \sim \triangle ABC$	⑤ AA $\cong$ AA
⑥ $\frac{AD}{ED} = \frac{AB}{CB}$	⑥ corresp. sides of $\sim \triangle$'s are in proportion