☐ **DO NOW – Geometry Regents Lomac 2014-2015** **Date ____. due ____.**

Complex Congruence Proofs | **4.6**

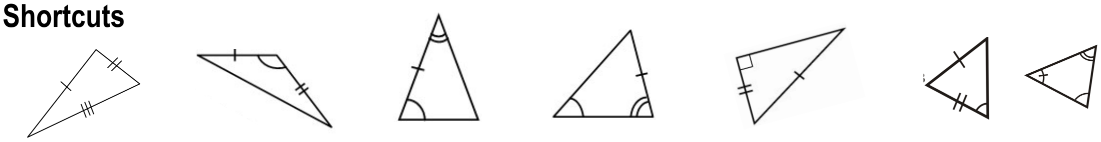
(DN) Write "did #1" on your do now sheet and complete problem number 1 below. (#1 includes the rest of this page.)

Name ________________________________**Per**______

LO: I know the basics for proof and can use congruent triangles to prove other relationships including relationships in quadrilaterals.

☐ (1) **Congruent Triangle Shortcuts**

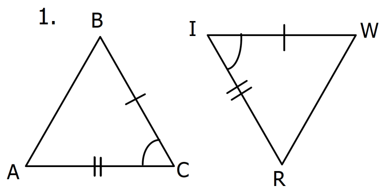
☐ If I see:



My reason will be: __________ __________ __________ __________ __________ _____ _____

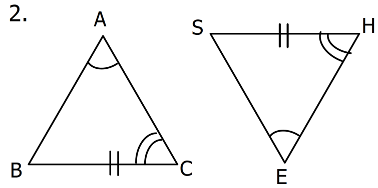
Complete each statement below:

1.



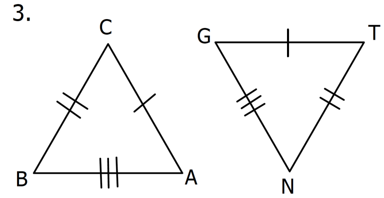
$\Delta ABC \cong \Delta$ ________ by __________

2.



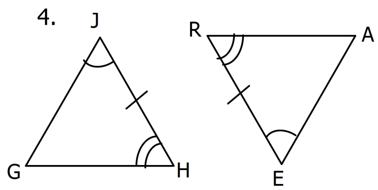
$\Delta ABC \cong \Delta$ ________ by __________

3.



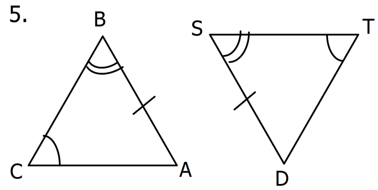
$\Delta ABC \cong \Delta$ ________ by __________

4.



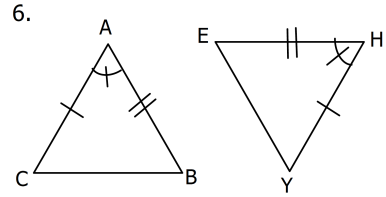
$\Delta GHJ \cong \Delta$ ________ by __________

5.



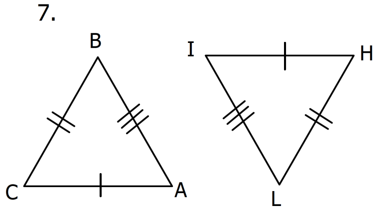
$\Delta ABC \cong \Delta$ ________ by __________

6.



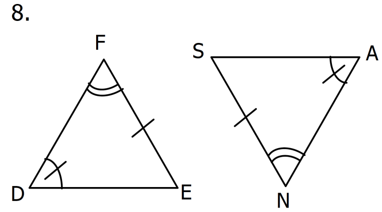
$\Delta ABC \cong \Delta$ ________ by __________

7.



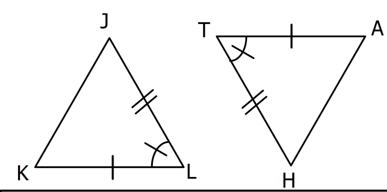
$\Delta ABC \cong \Delta$ ________ by __________

8.



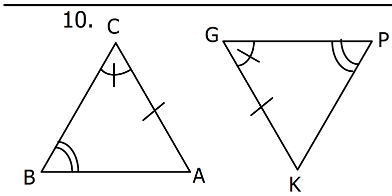
$\Delta DEF \cong \Delta$ ________ by __________

9.



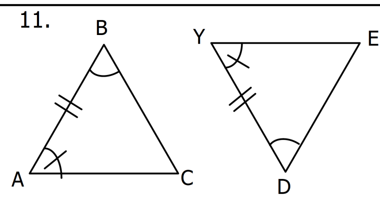
$\Delta JKL \cong \Delta$ ________ by __________

10.



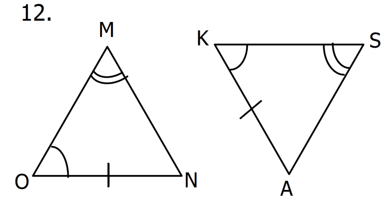
$\Delta ABC \cong \Delta$ ________ by __________

11.



$\Delta ABC \cong \Delta$ ________ by __________

12.



$\Delta MNO \cong \Delta$ ________ by __________

☐ (2) **First, draw it, then make a conclusion**

☐ (a)

I know that . . .	**because . . .**
$\overline{BL}$ bisects $\overline{AS}$ at point T	It is given

☐ (b)

I know that . . .	**because . . .**
$\overline{BL}$ bisects $\angle ABS$	It is given

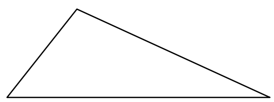
☐ (c)

I know that . . .	**because . . .**
Alternate interior angles ABC and BCD are congruent	It is given

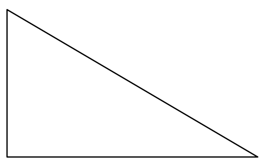
☐ (3) transparencies and dry erase markers

Triangles and Quadrilaterals

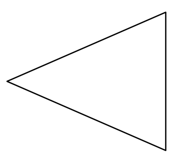
(1) ☐ Use a compass and straightedge OR tracing paper/plastic to make quadrilaterals



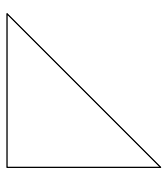
A **parallelogram** is a 4 sided shape with opposite sides parallel. Why do we get a **parallelogram** when we rotate any triangle around the midpoint of one of its sides?



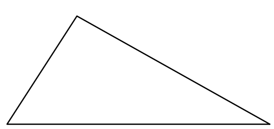
A **rectangle** is a 4 sided shape with 4 right angles. Why do we get a **rectangle** when we rotate a right triangle around the midpoint of its hypotenuse?



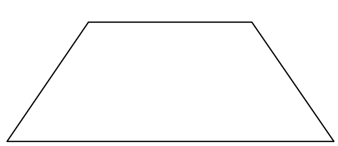
A **rhombus** is a 4 sided shape with 4 equal sides. Why do we get a **parallelogram** if we rotate an isosceles triangle around the midpoint of its base?



A **square** is a 4 sided shape with 4 equal sides and 4 right angles. Why do we get a **square** when we rotate an isosceles right triangle around the midpoint of its hypotenuse?



A **kite** is a 4 sided shape with 2 pairs of adjacent sides that are congruent. Why do we get a **kite** when we reflect any triangle across its longest side?



A **trapezoid** is a 4 sided shape with at least one pair of parallel opposite sides. Why can't the **trapezoid** at left be made by rotating or reflecting a triangle?

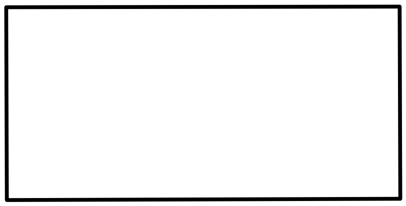
☐ (4) **Quadrilateral Proofs**

☐ (a) Use the definition of a parallelogram to prove that opposite sides are congruent. (Use one or more of the following: add one diagonal to the diagram, congruent alt. int. angles, congruent triangles, $\cong \triangle$'s have $\cong$ corresp. parts.)

☐ (b) Use the definition of a parallelogram and the information you proved in #4a to prove that the diagonals bisect each other. (Use one or more of the following: congruent alt. int. angles, congruent opposite sides, vertical angles, congruent triangles, $\cong \triangle$'s have $\cong$ corresp. parts, the fact that having 2 equal pieces of a segment means that the segment was bisected.)

☐ (5) **Quadrilateral Proofs**

☐ (a) Use the definition of a rectangle to prove that it is a parallelogram. (Use one or more of the following: lines are parallel when the sum of the same side interior angles is 180°.

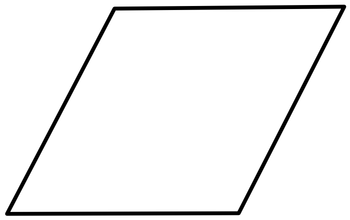


☐ (b) Use the definition of a rectangle and anything you have proven so far to prove that the diagonals are congruent.

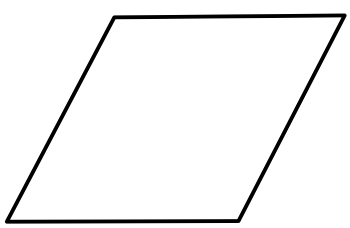
(Use one or more of the following: right angles, congruent opp. sides, reflexive prop, ≅ △'s have ≅ corresp. parts.)

☐ (6) **Quadrilateral Proofs**

☐ (a) Use the definition of a rhombus to prove that it is a parallelogram. (Use one or more of the following: congruent sides, add a diagonal, congruent triangles, $\cong$ $\triangle$'s have $\cong$ corresp. parts, congruent alt. int. angles with parallel lines.)

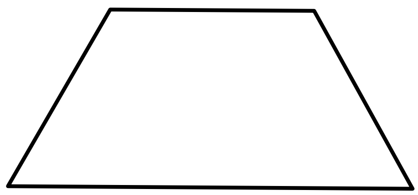


☐ (b) Use the definition of a rhombus to prove that the diagonals are perpendicular. (Use one or more of the following: add both diagonals, congruent sides, congruent triangles, $\cong$ $\triangle$'s have $\cong$ corresp. parts, sum of the angles around a point is 360°.)

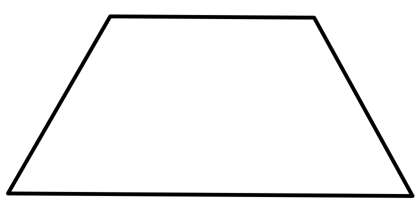


☐ (7) **Quadrilateral Proofs**

☐ (a) Use the definition of isosceles trapezoid to prove that its base angles are congruent. (Use 2 altitudes to make a rectangle and 2 right triangles, show the triangles are congruent, use congruent parts.)



☐ (b) Use the information from #7 to prove that the diagonals are congruent. (Use congruent parts and overlapping triangles.)

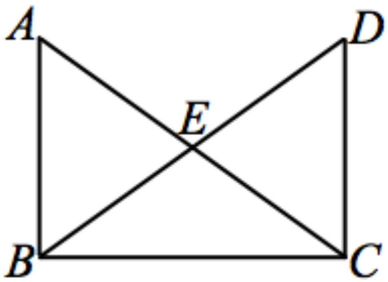


☐ (8) **Complex Proofs**

Choose which to use
SAS≅
ASA≅
SSS≅
AAS≅
HL≅

(1) ☐ Given $\overline{AB} \perp \overline{BC}$, $\overline{DC} \perp \overline{BC}$, $\overline{DB}$ bisects ∠ABC, $\overline{AC}$ bisects ∠DCB, $\overline{EB} \cong \overline{EC}$

Prove: △BEA ≅ △CED

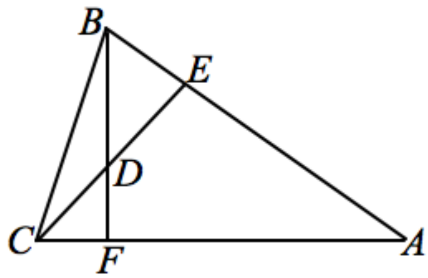


☐ (9) **Complex Proofs**

☐ Given $\overline{BF} \perp \overline{AC}$, $\overline{CE} \perp \overline{AB}$, $\overline{AE} \cong \overline{AF}$

Prove: $\triangle ACE \cong \triangle ABF$

Ideas
Reflexive
⊥ gives me ___



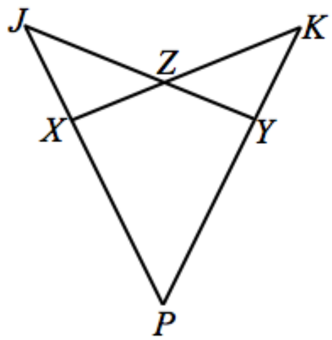
☐ (10) HW

Complex Proofs

☐ Given $\overline{XJ} \cong \overline{YK}$, $\overline{PX} \cong \overline{PY}$, $\angle ZXJ \cong \angle ZYK$

Prove: $\overline{JY} \cong \overline{KX}$

Ideas
Reflexive
Segment addition
Linear pair
sub of = values
≅△ → ≅ parts
inverse opp.

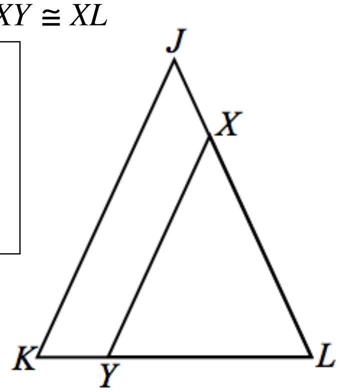


☐ (11) **Complex Proofs**

☐ Given $\overline{JK} \cong \overline{JL}$, $\overline{JK} \parallel \overline{XY}$

Prove: $\overline{XY} \cong \overline{XL}$

Ideas
Sub of = values
Isos. △ thrm
Alt int, corresp, alt ext, etc. . .

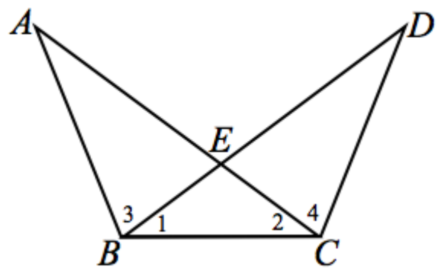


☐ (12) **Complex Proofs**

☐ Given: $\angle 1 \cong \angle 2$, $\angle 3 \cong \angle 4$

Prove: $\overline{AC} \cong \overline{BD}$

Ideas
Reflexive
angle addition
Linear pair
sums of =∠s are=
≅△→≅ parts
inverse opp.
Sub of = values



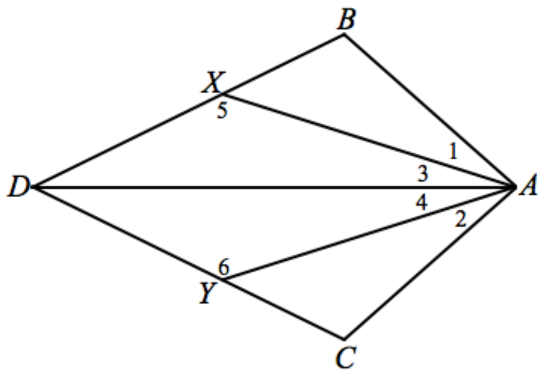
☐ (13) HW

Complex Proofs

☐ Given: $\angle 1 \cong \angle 2$, $\angle 3 \cong \angle 4$, $\overline{AB} \cong \overline{AC}$

Prove: $\angle 5 \cong \angle 6$ by first proving $\triangle ABD \cong \triangle ACD$ and then $\triangle AXD \cong \triangle AYD$

Ideas
Reflexive
angle addition
≅△ → ≅ parts



Choose which to use
SAS≅
ASA≅
SSS≅
AAS≅
HL≅

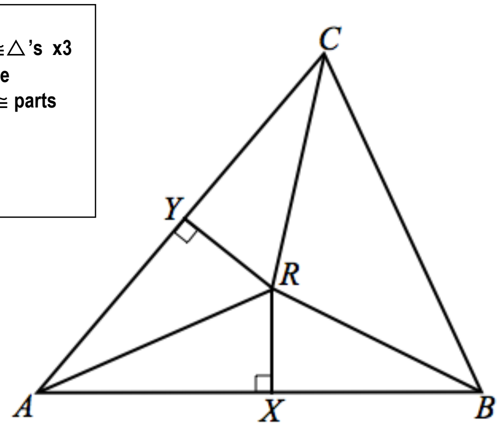
☐ (14) **Complex Proofs**

☐ CHALLENGE

Given: $\overline{RX}$ is the perpendicular bisector of $\overline{AB}$, $\overline{RY}$ is the perpendicular bisector of $\overline{AC}$, $\overline{YR} \cong \overline{XR}$.

Prove: $\overline{RA} \cong \overline{RB} \cong \overline{RC}$ by first proving that $\triangle RAX \cong \triangle RAY$

Ideas
Prove ≅△'s x3
reflexive
≅△ → ≅ parts

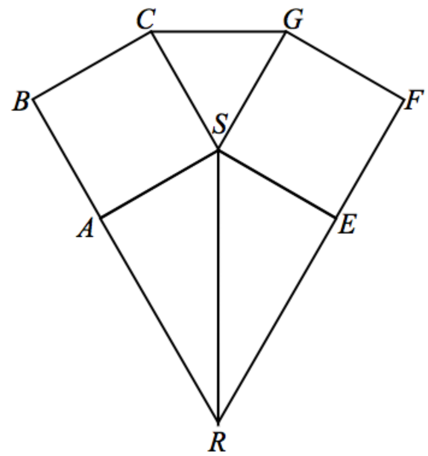


☐ (15) **Complex Proofs**

☐ Given: Square ABCS ≅ Square EFGS, RAB, REF

Prove: △ASR ≅ △ESR

<u>Ideas</u> **Square qualities** **reflexive** **Sub of = values**

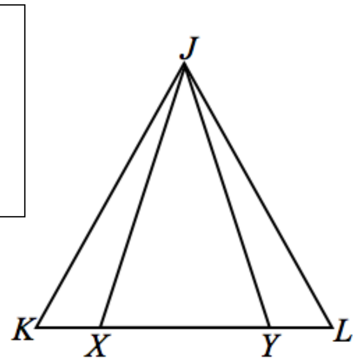


☐ (16) **Complex Proofs**

☐ Given: $\overline{JK} \cong \overline{JL}$, $\overline{JX} \cong \overline{JY}$

Prove: $\overline{KX} \cong \overline{LY}$

Ideas
Isos. △ thrm.
Reflexive
Linear pair
≅△ → ≅ parts

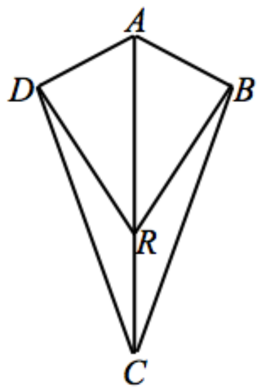


☐ (17) **Complex Proofs**

☐ Given: $\overline{AD} \perp \overline{DR}$, $\overline{AB} \perp \overline{BR}$, $\overline{AD} \cong \overline{AB}$

Prove: $\angle DCR \cong \angle BCR$

Ideas
Reflexive
$\cong\triangle \rightarrow \cong$ parts
$\perp$ gives me ___

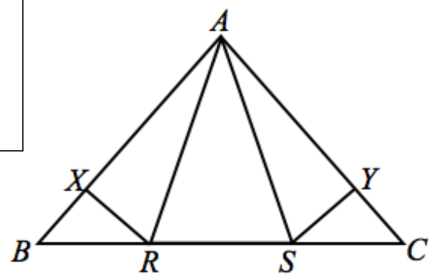


☐ (18) **Complex Proofs**

☐ CHALLENGE Given: $\overline{AR} \cong \overline{AS}$, $\overline{BR} \cong \overline{CS}$, $\overline{RX} \perp \overline{AB}$, $\overline{SY} \perp \overline{AC}$

Prove: $\overline{BX} \cong \overline{CY}$

Ideas
Isos. △ thrm.
Linear pair
≅△ → ≅ parts
⊥ gives me ___
Sub of = values
Inverse opp.

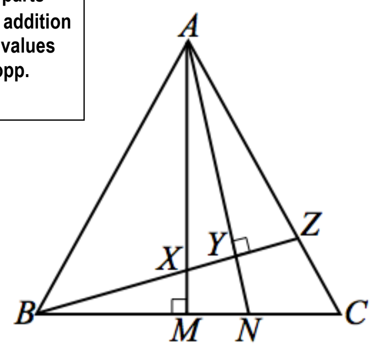


☐ (19) **Complex Proofs**

☐ CHALLENGE Given: $\overline{AX} \cong \overline{BX}$, $\angle AMB = \angle AYZ = 90°$

Prove: $\overline{NY} \cong \overline{NM}$

Ideas
Isos. △ thrm.
Linear pair
≅△ → ≅ parts
segment addition
Sub of = values
Inverse opp.
vertical

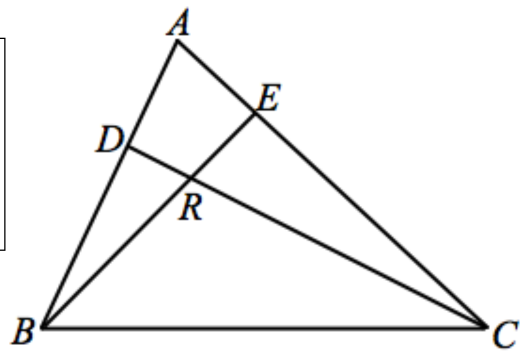


Choose which to use
SAS≅
ASA≅
SSS≅
AAS≅
HL≅

☐ (20) **Complex Proofs**

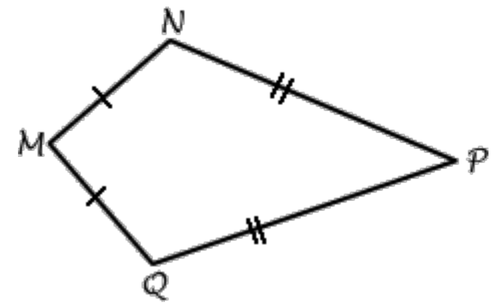
☐ CHALLENGE If $\overline{BE} \cong \overline{CE}$, $\overline{DC} \perp \overline{AB}$, $\overline{BE} \perp \overline{AC}$, then $\overline{AE} \cong \overline{RE}$.

<u>Ideas</u>
Isos. △ thrm.
Linear pair
≅△ → ≅ parts
⊥ gives me ___
Sub of = values
Inverse opp.
Triangle sum



☐ (21) **Exit Ticket**

☐ Use the definition of a kite (a quadrilateral with 2 pairs of consecutive = sides) to prove that diagonal $\overline{MP}$ bisects $\angle NPQ$.



☐ (22) **Homework**

First, draw it, then make a conclusion

☐ (a)

I know that . . .	**because . . .**
$\overline{AD} \perp \overline{ER}$ at point D	It is given

☐ (b)

I know that . . .	**because . . .**
$\overline{MN}$ bisects $\angle AND$	It is given

☐ (23) **Homework**

First, draw it, then make a conclusion

☐ (c)

I know that . . .	**because . . .**
T is the midpoint of $\overline{QY}$	It is given

☐ (d)

I know that . . .	**because . . .**
$\overline{OR}$ and $\overline{WA}$ intersect at P	It is given

☐ (e)

I know that . . .	**because . . .**
$\angle BOY$ and $\angle TOY$ are both 90°	It is given