Name (print first and last) _____ **Per_____ Date:** 12/13 due 12/15
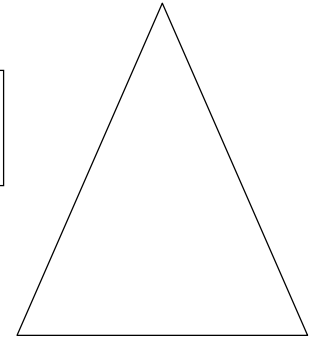**5.2 Congruence**   **Geometry Regents 2013-2014 Ms. Lomac**
SLO: I can use SAS≅ to prove the isosceles triangle theorem.

(1) ☐ Prove: If a triangle is isosceles then the base angles are congruent.

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① I am given _____ .
(Label the triangle with letters and mark congruent parts based on definitions.)

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② Side _____ ≅ _____ because △_____ is

_____ .
(What congruent parts did you mark?)

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③ I can construct auxiliary line segment _____ that bisects the vertex angle → ∠_____ .
(Where is the vertex angle? What does bisect mean? The segment needs a letter where it intersects the base of the triangle.)

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④ ∠ _____ ≅ ∠ _____ because segment _____ is the _____ of _____ .
(Should you have congruent angles from step 3? Where? Why? Do you have to name them with 3 letters? Mark this fact in the diagram.)
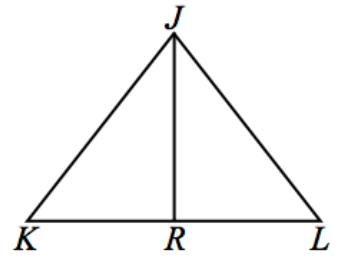
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⑤ _____ ≅ _____ because the segment is the same as itself (reflexive property)
(What segment is a side of both triangles? Mark this fact in the diagram.)

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⑥ △_____ ≅ △_____ because of _____ triangle congruence.
(Check your facts from steps 2, 4, and 5. Is that enough to prove the triangles are congruent? See lesson 5.1)

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⑦ _____ ≅ _____ because when triangles are congruent, all corresponding angle pairs and side pairs
are _____ . Since _____ and _____ are _____ and are
_____ _____ we can say that _____

_____
(What were we trying to prove? What are the base angles?)

5.2

(2) ☐ Given: $\overline{JK} \cong \overline{JL}$, $\overline{JR}$ bisects ∠KJL   Prove: $\overline{JR} \perp \overline{KL}$

① I am given _____ AND _____.

(Mark congruent parts.)

② ∠_____ ≅ ∠_____ because _____ bisects _____.

(What was bisected? What does bisect mean?What congruent parts did you mark?)

③ _____ ≅ _____ because the segment is the same as itself (reflexive property)

(What segment is a side of both triangles? Mark this fact in the diagram.)

④ _____ ≅ _____ because of _____ triangle congruence.

(Check your facts from steps 1,2, and 3. Is that enough to prove the triangles are congruent? See lesson 5.1)

⑤ _____ ≅ _____ because when triangles are congruent, all corresponding angle pairs and corresponding side pairs are _____.

(What were we trying to prove? What angles will help us do that?)

⑥ _____ + _____ = 180° because they are a linear pair.

(How can 180° help us get to 90°?)

⑦ _____ + _____ = 180° by substitution

(How can we put the information from steps 5 and 6 together?)

⑧ 2(_____) = 180° by combining like terms

(How can we use information from step 7 to help us get what we want for step 9?)

⑨ _____ = _____° by _____ _____

(What kind of angles will help us get what we want in step 10?)

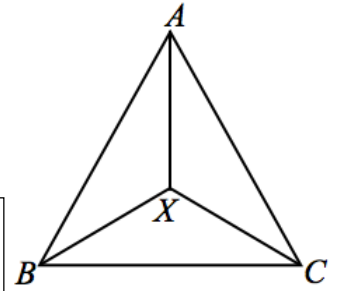⑩ _____ ⊥ _____ because lines are _____ when they intersect at _____° angles.

(What were we trying to prove? What type of angles will help us do that?)

5.2

(3) ☐ Given: $\overline{AB} \cong \overline{AC}$, $\overline{XB} \cong \overline{XC}$ Prove: $\overline{AX}$ bisects ∠BAC

① I am given _____ AND _____ .
(Mark congruent parts.)

② ∠ABC ≅ ∠ _____ and ∠XBC ≅ ∠ _____ because base angles of
_____ .
(Refer to notes from lesson 4.5.)

③ ∠ABX = ∠ABC − ∠_____   and   ∠ACX = ∠_____ − ∠_____
   because _____
(What equations can we write with the angles we know?)

④ ∠ABC − ∠_____ = ∠_____ − ∠_____
   because _____
Therefore ∠ABX = ∠ACX
   because _____
(What equations can we write with the angles we know?)

⑤ △_____ ≅ △_____ because _____ .
(Which angles must be congruent to prove that?)

⑥ ∠_____ ≅ ∠_____ because when triangles are congruent, all corresponding angle pairs and corresponding side pairs are _____ .
(What were we trying to prove? What angles will help us do that?)

⑦ $\overline{AX}$ bisects ∠_____ because when 2 adjacent angles are congruent, the larger angle formed by the two angles must have been cut in half (bisected).
(What does bisect mean? What evidence will show us that an angle is bisected?)

5.2

(4) ☐ Given: $\overline{JX} \cong \overline{JY}$, $\overline{KX} \cong \overline{LY}$ Prove: △JKL is isosceles
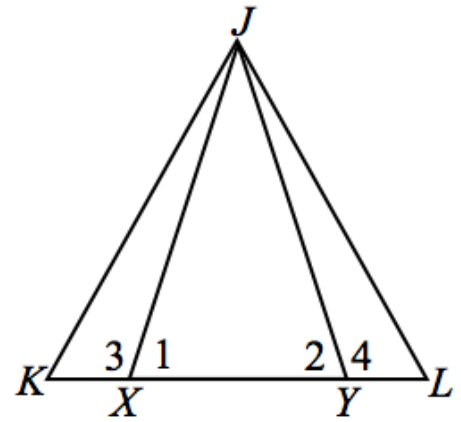
① I am given _____ AND _____ .
(Mark congruent parts.)

② ∠____ ≅ ∠ ____ because base angles of an _____

_____ are _____ .
(Refer to notes from lesson 4.5.)

③ ∠____ + ∠____ = _____   and   ∠____ + ∠____ = _____

because _____
(What angle relationships do you see with angles 1, 3, 2, and 4?)

④ ∠____ + ∠____ = ∠____ + ∠____ because _____

Therefore ∠____ = ∠____ because _____
(Since angles 1 and 2 are equal, what can we do to simplify the equation? Mark the diagram.)

⑤ △_____ ≅ △_____ because _____ .
(Which pair of triangles should we prove congruent to get the congruent segments we want?)

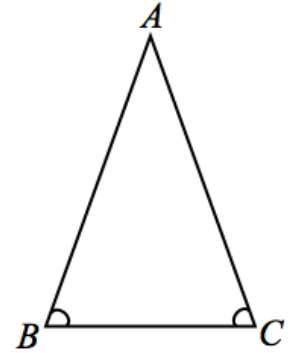⑥ _____ ≅ _____ because when triangles are congruent, all corresponding angle pairs and

corresponding side pairs are _____ .
(What were we trying to prove? What segments will help us do that?)

⑦ △JKL is isosceles because it has _____ congruent sides, side _____ and side _____ .
(What does isosceles mean? What evidence will show us that a triangle is isosceles?)

5.2

(5) ☐ Given: △ABC with ∠CBA ≅ ∠BCA   Prove: $\overline{BA} \cong \overline{CA}$

① I am given _____.
(Mark congruent parts.)

② Construct the perpendicular bisector of $\overline{BC}$ and label the point of intersection D. Now, ∠_____ = ∠_____ = _____° and _____ ≅ _____ because _____
_____
_____

(Refer to unit 2. What do we know when we have a perpendicular bisector? Mark this in your diagram)

③ When reflected across the perpendicular bisector, ray BA and ray _____ coincide because points B and _____ coincide and ∠B and ∠C are _____. Point A must be on the perpendicular bisector because the rays intersect at point ____ which means _____ must coincide with itself when the rays coincide. The only way for this to occur is if point A is on the _____ _____

(Does A have to be on the perpendicular bisector?)

④ _____ ≅ _____ because the segment is the same as itself (reflexive property)
*(What segment is a side of both triangles? Mark this fact in the diagram.)*

⑤ △_____ ≅ △_____ because _____.
(Which pair of triangles should we prove congruent to get the congruent segments we want?)

⑥ _____ ≅ _____ because when triangles are congruent, all corresponding angle pairs and corresponding side pairs are _____.
(What were we trying to prove? Could we prove it if we had congruent triangles?)

5.2

(6) ☐ Given: △ABC, $\overline{XY}$ bisects ∠BYA and $\overline{BC} \parallel \overline{XY}$, Prove: $\overline{YB} \cong \overline{YC}$
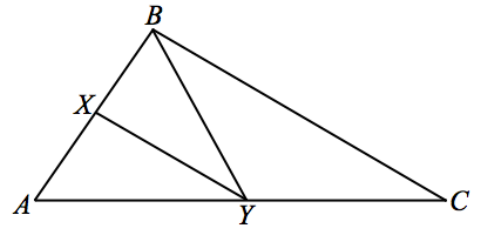
① I am given _____

_____ .

② ∠____ ≅ ∠ ____ because _____

_____

(What does bisect mean? Mark the diagram.)

③ ∠____ ≅ ∠ ____ because _____

_____

(What do we get out of parallel lines? Refer to notes from lesson 4.5. Mark the diagram.)

④ ∠____ ≅ ∠ ____ because _____

_____

(What do we get out of parallel lines? Refer to notes from lesson 4.5. Mark the diagram.)

⑤ _____ ≅ _____ because _____ .
(What congruent angles will help us prove that the segments are congruent?)

⑥ _____ ≅ _____ because _____ .
(Can we prove that segmentss are congruent? Can we show that base angles of a triangle are congruent so we can get congruent sides?)
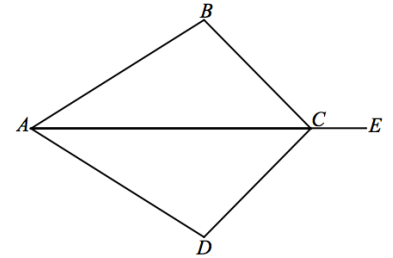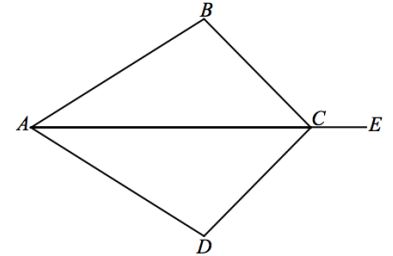
5.1 Exit Ticket   Name_____Per_____

Complete the statement. You may use diagrams to support your statement.

☐ Given: $\overline{AE}$ bisects ∠BCD, $\overline{BC} \cong \overline{DC}$.

Do △CAB and △CAD meet the SAS≅ criteria? _____ Provide evidence.

_____

_____

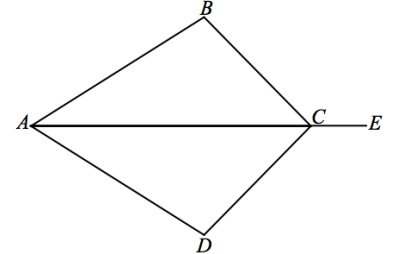_____

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_____

_____

_____

_____

5.1 Exit Ticket   Name_____Per_____

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_____

_____

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5.1 Exit Ticket   Name_____Per_____

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_____

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