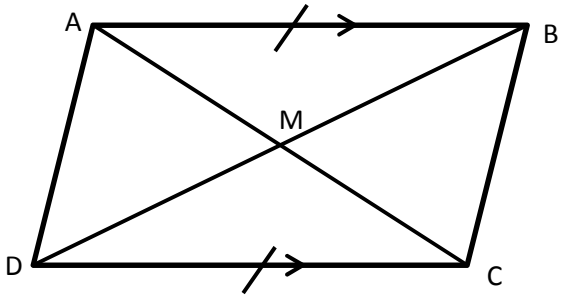
Math 213 Exam 2A Spring 2016 Name_____

1(16). Fill in the missing steps in the proof below.

Theorem: A quadrilateral with one pair of opposite sides both parallel and congruent must be a parallelogram.



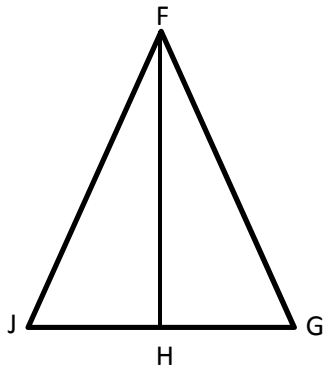
Given: $\overline{AB} \parallel \overline{CD}$
$\overline{AB} \cong \overline{CD}$

Prove: ABCD is a parallelogram

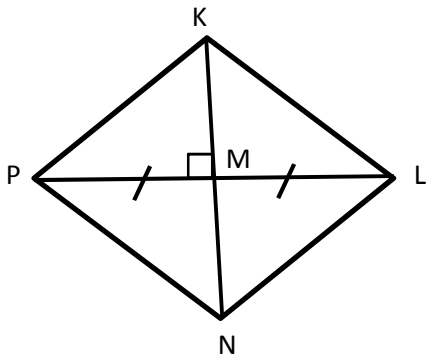
Statement	Reason
1. $\overline{AB} \parallel \overline{CD}$; $\overline{AB} \cong \overline{CD}$	1.
2. $< BAC \cong < DCA$; $< ABD \cong < CDB$	2.
3.	3. ASA
4. $\overline{AM} \cong \overline{CM}$; $\overline{BM} \cong \overline{DM}$	4.
5. $< AMD \cong < CMB$	5.
6.	6. SAS
7. $\overline{AD} \cong \overline{BC}$	7.
8. ABCD is a parallelogram	8.

2(5). Given: $< FJH \cong < FGH$

What additional information would allow you to conclude $\Delta FJH \cong \Delta FGH$ by ASA? Explain.



3(5). Critique the following proof.



Given: $\overline{KN} \perp \overline{PL}$
$\overline{PM} \cong \overline{LM}$

Prove: KLNP is a rhombus.

Statement	Reason
1. $\overline{KN} \perp \overline{PL}$; $\overline{PM} \cong \overline{LM}$	1. Given
2. $\overline{KM} \cong \overline{KM}$; $\overline{NM} \cong \overline{NM}$	2. Reflexive property
3. $< KMP, < KML, < PMN, < LMN$ are all right angles	3. Definition of perpendicular
4. $< KMP \cong < KML \cong < PMN \cong < LMN$	4. All right angles are congruent
5. $\Delta KMP \cong \Delta KML$; $\Delta PMN \cong \Delta LMN$	5. SAS
6. $\overline{KP} \cong \overline{KL} \cong \overline{PN} \cong \overline{LN}$	6. CPCTC
7. KLNP is a rhombus	7. Def'n of rhombus

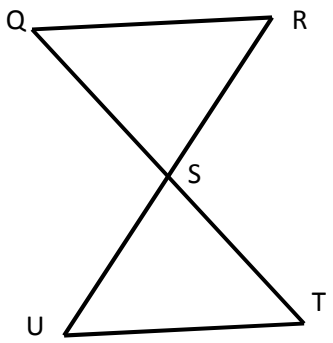
Identify which step contains an error and why.

4(30). Put a check in the box for each shape if it always has the property named.

	Parallelo-gram	Rhombus	Kite	Square	Trapezoid	Isosceles Trapezoid
Has 2 or more congruent sides						
Has at least one pair of parallel sides						
Has 2 or more congruent angles						
Has congruent diagonals						
Has perpendicular diagonals						

5(10). Given: $\overline{RU}$ *and* $\overline{QT}$ *bisect each other*.

Prove: $\overline{QR} \parallel \overline{UT}$



6. Consider the following conjecture:

In an isosceles triangle, the angle bisector of the non-base angle is perpendicular to the base.

a(4). Sketch an appropriate diagram, label its vertices, and mark the given information on the diagram. *Do **not** mark the conclusion (the claim that is to be proved).*

b(6). **Using your labeled diagram**, specify the "Given" and the "To Prove" for this conjecture:

Given:

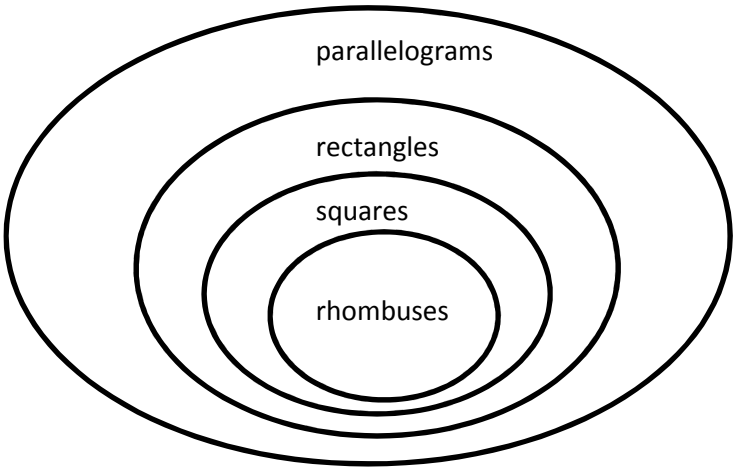
To Prove:

7(7). Use compass and straightedge to construct an isosceles right triangle that has the given segment $\overline{AB}$ as one of its legs.

Be sure to leave all of your compass marks visible so your procedure is clear.

A B

8(7). A student created this Venn diagram to show the relationships among parallelograms, rectangles, rhombuses, and squares. What portions of the diagram are correct? What are her misunderstandings? Explain and correct the diagram.



Extra Credit (up to +3):

Consider the construction shown below.

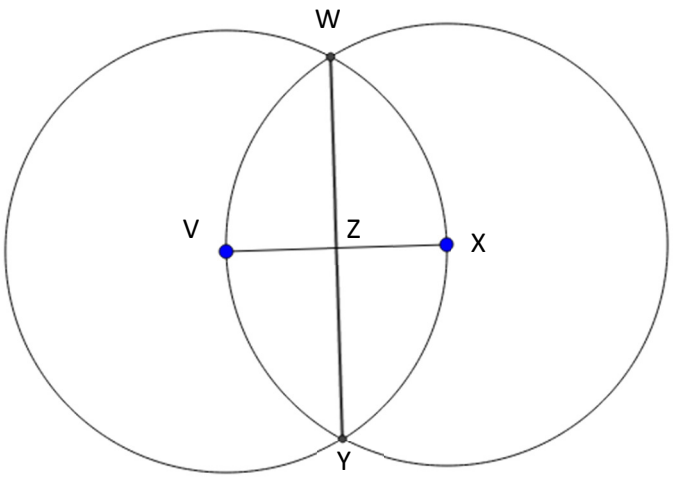
First a circle was constructed with center X passing through point V.

Then a circle was constructed with center V passing through point X.

The intersection points of the two circles were labeled W and Y, as shown.

Segments $\overline{VX}$ and $\overline{WY}$ were drawn.

What claim can be made about segments $\overline{VX}$ *and* $\overline{WY}$?



Justify your claim.

Please copy and sign: I pledge on my honor that I have not given or received any unauthorized assistance on this exam. [signed]