Math 213 Exam 2A Spring 2017 Name_____

1(15). Consider the following statement: **The diagonals of a parallelogram bisect each other.**

a. Write the bold statement above as an equivalent "If—then—" statement.

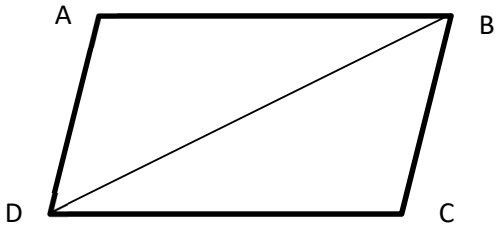
b. Write the converse of the statement you wrote in part a.

c. Write the contrapositive of the statement you wrote in part a.

d. Which of the statements you wrote in parts b and c is equivalent to your statement in part a?

e. Which of the statements you wrote in parts b and c is TRUE?

2(10). Consider the quadrilateral ABCD shown at right with diagonal $\overline{BD}$.



Which of the following given conditions would guarantee that ABCD is a parallelogram? Write "yes" if the conditions would be sufficient; write "no" if they are not sufficient.

_____ $\overline{AB} \cong \overline{CD}$; $\overline{AD} \cong \overline{BC}$

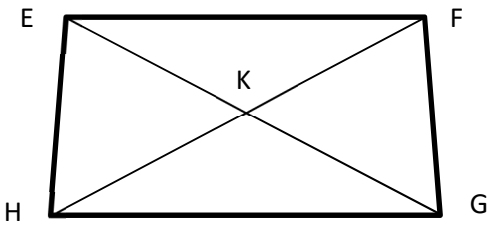
_____ $\overline{AB} \cong \overline{CD}$; $\overline{AB} \parallel \overline{CD}$

_____ $\overline{AB} \cong \overline{CD}$; $\overline{AD} \parallel \overline{BC}$

_____ $\Delta ABD \cong \Delta CDB$

_____ $\overline{BD}$ bisects $< ABC$

3(14). Given: EFGH is an isosceles trapezoid with $\overline{EF} \parallel \overline{GH}$,



Which of the following conclusions can be proved?

Write "yes" if the given statement can be proved; write "no" if it cannot be proved.

_____ $\overline{EF} \cong \overline{GH}$

_____ $\overline{EG} \cong \overline{FH}$

_____ $\overline{EH} \cong \overline{FG}$

_____ $\Delta EGH \cong \Delta FHG$

_____ $\Delta EKF \cong \Delta GKH$

_____ $\overline{EG}$ and $\overline{FH}$ bisect each other

_____ $\Delta EHG \cong \Delta HEF$

4(15). For each of the following sets of conditions, if possible sketch an example of a shape that fits the given criteria. Mark any congruent parts, perpendicular and parallel segments as relevant. If it is not possible, explain briefly. If the shape you draw has a more specific name, include it.

a. an obtuse isosceles triangle

b. a rectangle with perpendicular diagonals

c. a quadrilateral that is not convex

d. an equilateral right triangle

e. a kite that is also a parallelogram

4(10). Answer each of the following as Always true (A), Sometimes true (S), or Never true (N).

_____ a. A rhombus is a parallelogram.

_____ b. A triangle is convex.

_____ c. A parallelogram has congruent diagonals.

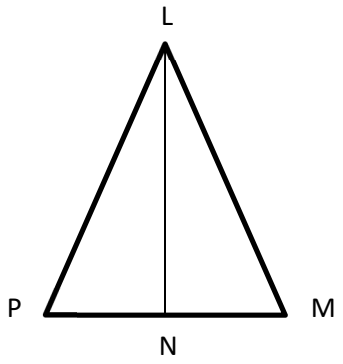
_____ d. A square has diagonals that bisect each other.

_____ e. A kite has four congruent sides.

5(6). Critique the following proof.

Given: $\overline{LN} \perp \overline{PM}$

Prove: ΔLMP is isosceles



Statement	Reason
1. $\overline{LN} \perp \overline{PM}$	1. Given
2. $< LNP = < LNM = 90°$	2. Definition of perpendicular
3. $\overline{LN} \cong \overline{LN}$	3. Reflexive property
4. $\overline{PN} \cong \overline{MN}$	4. Definition of midpoint
5. $\Delta LNP \cong \Delta LNM$	5. SAS
6. $\overline{LP} \cong \overline{LM}$	6. Definition of congruent triangles (CPCTC)
7. ΔLMP is isosceles	7. Definition of isosceles

Identify the step where an error occurs. What is wrong?

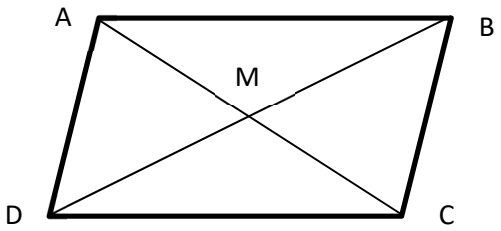
Is there an alternate correct way to complete this proof? Explain briefly.

6(20). Fill in the missing steps in the following proof.

Theorem: A quadrilateral with diagonals that bisect each other is a parallelogram.

Given: $\overline{AM} \cong \overline{MC}$; $\overline{BM} \cong \overline{MD}$

Prove: ABCD is a parallelogram



Statement	Reason
1. $\overline{AM} \cong \overline{MC}$; $\overline{BM} \cong \overline{MD}$	1.
2. $< DMC \cong < BMA$	2.
3.	3. SAS
4. $< ABM \cong < CDM$	4.
5. $\overline{AB} \,\|\|\, \overline{DC}$	5.
6. $< BMC \cong < DMA$	6.
7.	7. SAS
8. $< ADM \cong < CBM$	8.
9. $\overline{AD} \,\|\|\, \overline{BC}$	9.
10. ABCD is a parallelogram	10.

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