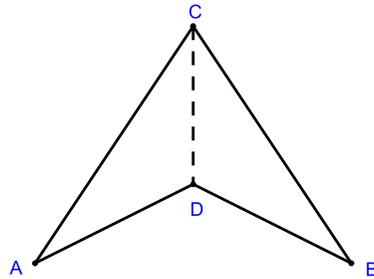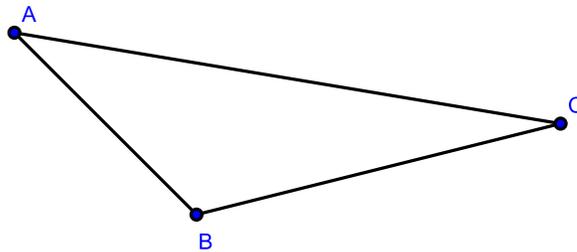# Math 206 - Test 3

April 21, 2010

Name _____

Score _____

Show all work. Supply explanations when necessary.

1. (3 points) The figure shown below is a kite. Carefully explain how we can be sure that $\triangle ACD \cong \triangle BCD$.

2. (4 points) With only your compass and straightedge, use the SSS property or the SAS property to construct a triangle congruent to the one shown below.

3. (4 points) What is the measure of each interior angle of a regular nonagon? What is the measure of each exterior angle?

4. (3 points) If the measure of an angle is $33° \, 25' \, 48''$, what is the measure of its complement? Write your answer in degrees in decimal form.

5. (3 points) Use a straightedge to sketch an obtuse angle. Then use your protractor to find the measure of the angle.

6. (6 points) Sketch each of the following or explain why it is not possible.

   (a) A concave pentagon

   (b) A kite that is not a rhombus

   (c) A polygonal curve that is neither simple nor closed

   (d) A scalene, isosceles triangle

   (e) A parallelogram with exactly one right angle

   (f) An equilateral triangle that is not acute

7. (3 points) Use a straightedge to roughly sketch (not construct) a parallelogram. Label the vertices, choose any two adjacent interior angles, and prove that your angles are supplementary.

8. (4 points) Given the figure shown below with $\overleftrightarrow{AX} \parallel \overleftrightarrow{DY}$, find each of the following:
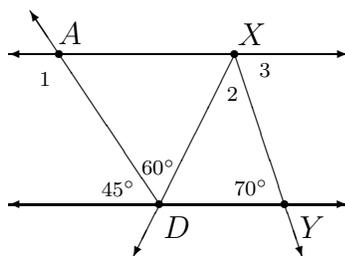
(a) $m(\angle 1)$

(b) $m(\angle 2)$

(c) $m(\angle 3)$

9. (3 points) Is the following information sufficient to justify $\triangle JKM \cong \triangle NPQ$? Justify your answer.
$$\overline{JK} \cong \overline{NP}, \qquad \angle J \cong \angle N, \qquad \angle K \cong \angle P$$

10. (3 points) You have two sticks that have lengths of $11\,\text{cm}$ and $18\,\text{cm}$. Describe the possible lengths of a third stick if you are going to make a triangle from the sticks.

11. (3 points) What are vertical angles? Give a convincing argument that vertical angles are congruent.

12. (5 points) Parallelogram $ABCD$ is shown here.
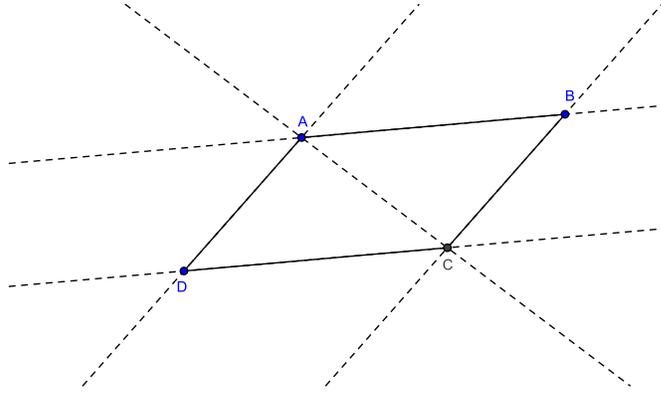
(a) According to the definition of parallelogram, what can be said about the $ABCD$?

(b) What can be said about $\angle ACD$ and $\angle CAB$? Explain your reasoning.

(c) What can be said about $\angle DAC$ and $\angle BCA$? Explain your reasoning.

(d) Using parts (b) and (c), what triangle congruence property allows us to conclude that $\triangle ADC \cong \triangle CBA$?

(e) Are opposite sides of a parallelogram congruent? Justify your answer.

13. (3 points) The triangles shown here are clearly not congruent. Why doesn't the AAS congruence property apply?
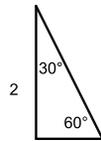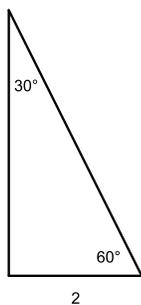
14. (3 points) Use your straightedge to sketch a line segment. Then use only your compass and straightedge to construct the segment's perpendicular bisector.