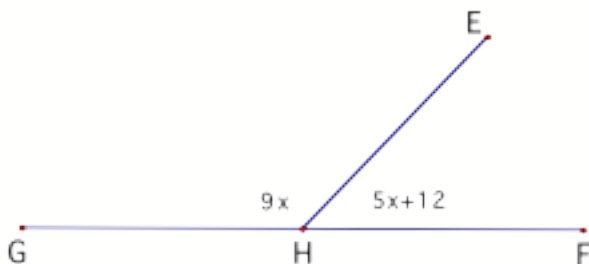


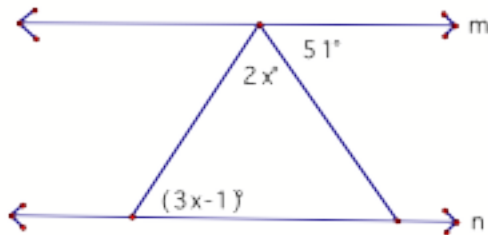
Math 310 Test #2 Solutions Fall 2007 Brittany Noble
No work, no credit.

- (1 pt each) **Matching** 1. *Collinear points*; 2. *Concurrent lines*; 3. *Non-coplanar points*; 4. *Skew lines*; 5. *Coplanar*
 - Lines in the same plane are: 5
 - Lines that do not intersect, and there is no plane that contains them are: 4
 - Lines that contain the same point are: 2
 - Points on the same line are: 1
 - These cannot be placed in a single plane: 3
- (8 pts) Points G, H and F are collinear. If $m(\angle FHE)$ is $(5x + 12)^\circ$, and $m(\angle EHG)$ is $9x^\circ$, find the measure in degrees of each of the angles FHE and EHG.



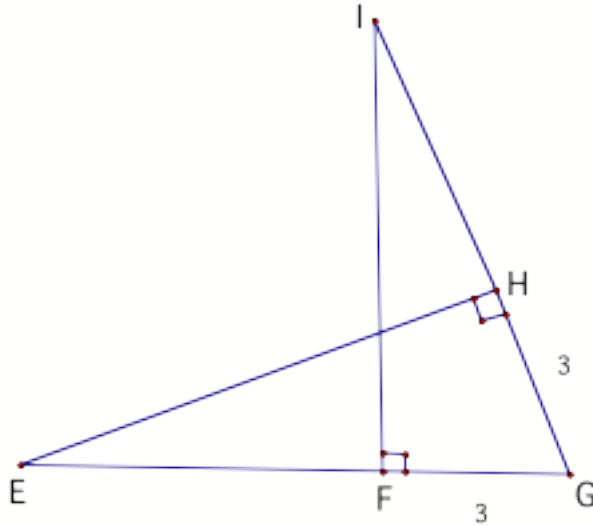
$9x + 5x + 12 = 180$, since they are supplementary. Solving for x , we get $x = 12$. To find the angle measures, we substitute $x = 12$ back:
 $m(\angle FHE)$ is $5(12) + 12 = 72^\circ$
 $m(\angle EHG)$ is $9(12) = 108^\circ$

- (5 pts) In the diagram below, lines m and n are parallel. Find x .



Using alternate interior angles, we have that $3x - 1 + 2x + 51 = 180$. Solving for x , we get $x = 26$.

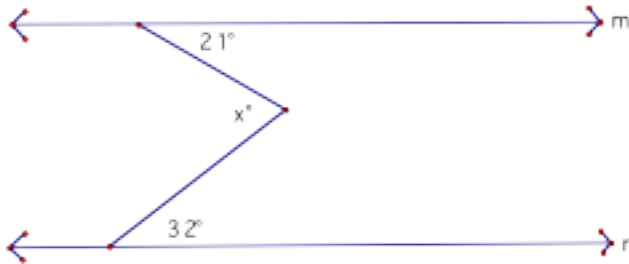
3. (3 pts) Use your protractor to draw an angle that measures 130° , accurate to within 1° .
5. a. (4 pts) In the figure below, explain why $\triangle EGH \cong \triangle IGF$. Be specific.



$\angle G \cong \angle G$, $FG = GH$, $\angle IFG \cong \angle EHG$. So by ASA, $\triangle EGH \cong \triangle IGF$.

b. (1 pt) Explain why $IF = EH$: CPCTC

6. (5 pts) Determine x assuming m and n are parallel.



Extend one of the line segments to use as a transversal for the parallel lines. Then use properties of alternate interior angles and supplementary angles to find x . $x = 53^\circ$.

7. (5 pts) What is the measure of each interior angle of a regular hexagon?
 one interior angle is $\frac{(6-2)180}{6} = 120^\circ$.

8. Find each of the following:

a. (3 pts) $113^{\circ}57' + 18^{\circ}14'$
 $132^{\circ}11'$

b. (4 pts) The measure of an angle is $13^{\circ}49'27''$. Find the measure of its complement.

$$90^{\circ} - 13^{\circ}49'27'' = 76^{\circ}10'33''$$

9. (2 pts each) Find the number of vertices, edges and faces for the figures named. *Hint: you may find it helpful to draw the figure first.*

a. Rectangular prism:

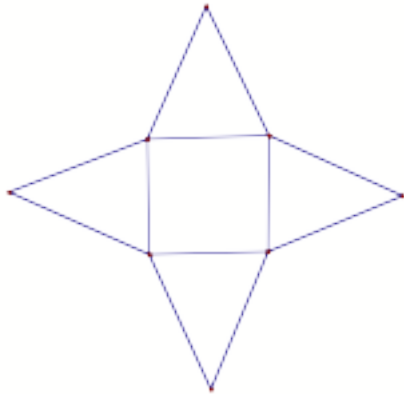
$$V = 8, E = 12, F = 6$$

b. Octagonal pyramid:

$$V = 9, E = 16, F = 9$$

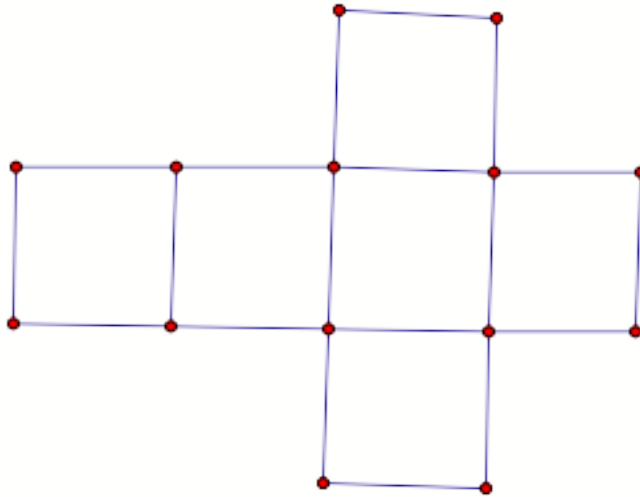
Note: both of these satisfy Euler's Formula: $V + F - E = 2$.

10. a. (3 pts) Name the figure which has the net shown below. Be as specific as possible.



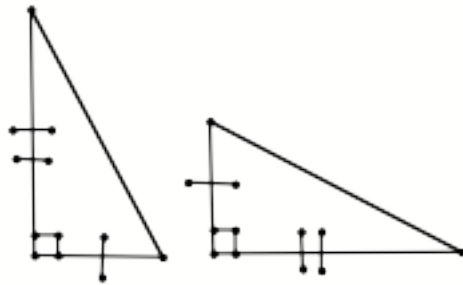
Right square pyramid.

b. (3 pts) Draw a net for a cube.



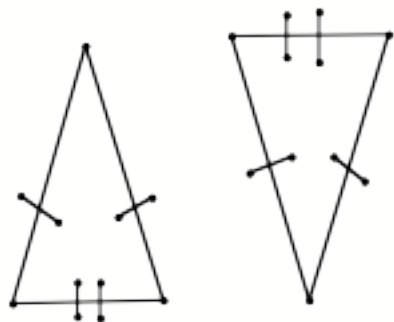
There are many possible nets, so this is not the only correct solution.

11. (2 pts each) For each of the following pairs of triangles, determine whether the given conditions are sufficient to show that the triangles are congruent. If the triangles are congruent, tell which property can be used to verify this fact.



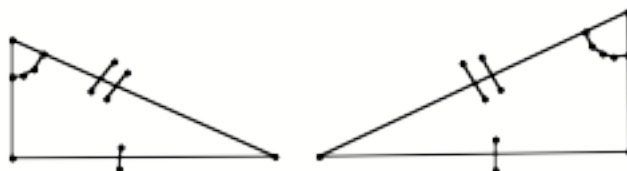
a.

SAS



b.

SSS

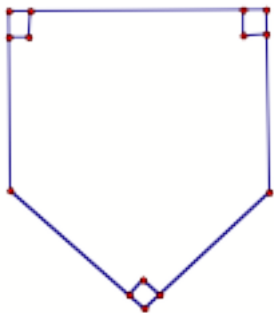


c.

insufficient information (no property for SSA!)

insufficient information

12. (6 pts) Home plate on a baseball field has three right angles and two other congruent angles. Find the measure of each of these two other congruent angles.



The sum of the angle measures is: $(5 - 2)180 = 540^\circ$. If we subtract the measure of the 3 90° angles, then we know that the remaining two angles sum $540^\circ - 270^\circ = 270^\circ$. Since the remaining two angles are congruent, we know that their measures are the same, thus, they are each $\frac{270^\circ}{2} = 135^\circ$.

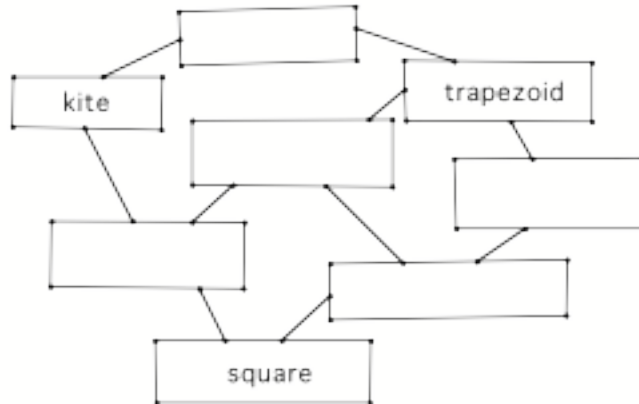
13. (4 pts) If the exterior angles of a regular polygon are 24° each, how many sides does the polygon have?

$$\frac{360^\circ}{n} = 24^\circ$$

$$360 = 24n$$

$$n = \frac{360}{24} = \frac{30}{2} = 15 \text{ sides.}$$

14. (1 pt each) Put the following in the empty boxes to show the relationship among the terms: *parallelogram*, *quadrilateral*, *isosceles trapezoid*, *rectangle*, *rhombus*.



This diagram is taken from the sample final, and is also in the textbook.

15. (4 pts) Describe two (2) *properties* of a rhombus, describing its sides, angles or diagonals.

There are many. Two possible properties are:

1. A rhombus is a quadrilateral with all sides congruent.
2. Diagonals of a rhombus are perpendicular bisectors.

16. (6 pts) Draw an angle, and construct the angle bisector using your compass and straightedge *only*. Leave all relevant pencil marks for the construction and no others. Accuracy and neatness count.

17. (8 pts) Draw a line l , and let P be a point on l . Using your compass and straightedge *only*, construct a perpendicular line to l through point P . Leave all relevant pencil marks for the construction and no others. Accuracy and neatness count.

BONUS QUESTION (8 pts)

On the back of this page, inscribe a circle in a triangle *OR* circumscribe a circle about a triangle using your compass and straightedge *only*. Leave all relevant pencil marks for the construction and no others. Accuracy and neatness count.