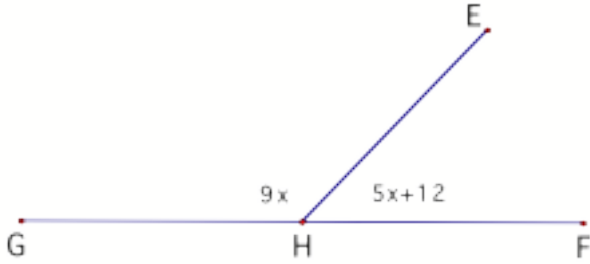


1. (1 pt each) **Matching** 1. Collinear points; 2. Concurrent lines; 3. Noncoplanar points; 4. Skew lines; 5. Coplanar
- A. Lines in the same plane are: 5
 B. Lines that do not intersect, and there is no plane that contains them are: 4
 C. Lines that contain the same point are: 2
 D. Points on the same line are: 1
 E. These cannot be placed in a single plane: 3

2. (5 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. Show all of your work.



First of all, note that both of the angles are SUPPLEMENTARY (i.e., they add up to 180°). So we have:

$$9x + 5x + 12 = 180$$

$14x = 168$ after combining like terms and subtracting 12 on both sides

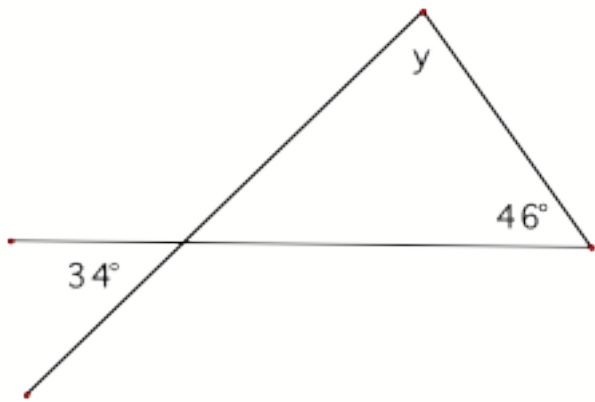
$x = 12$ after dividing both sides by 14

Then all we have to do is substitute in 14 for x (i.e., "plug in 14 for x"):

$$m(\angle EHG) = 108^\circ$$

$$m(\angle FHE) = 72^\circ$$

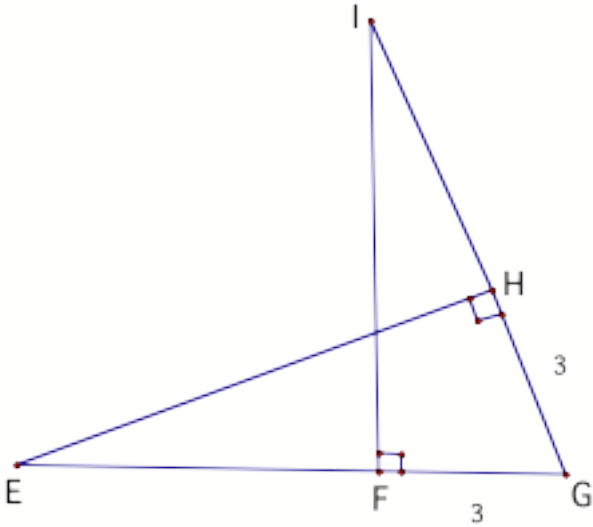
3. (5 pts) Find y . Show all of your work clearly.



By vertical angles, the blank interior angle of the triangle is 34° . We can then find y by using that all three interior angles must add up to 180° . So $y = 100^\circ$.

4. (3 pts) Use your protractor to draw an angle that measures 150° , accurate to within 1° .

5. a. (4 pts) In the figure below, explain why $\triangle EGH \cong \triangle IGF$. *Hint: Use a property of triangle congruence. Be specific and state relevant congruent sides and/or angles.*



Angle First note that $\angle IFG \cong \angle EHG$ because both are 90°

Side $FG = GH$ because they are both of length 3 units

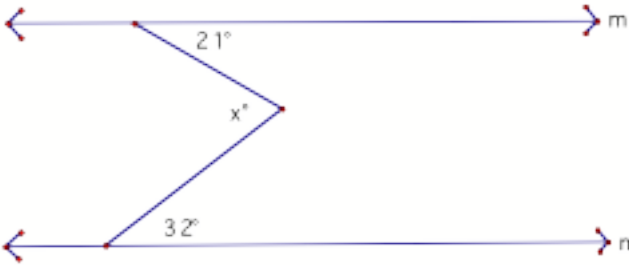
Angle $\angle G \cong \angle G$

Thus by ASA we can say that $\triangle EGH \cong \triangle IGF$

b. (1 pt) Why is $IF = EH$?

CPCTC

6. (5 pts) Determine x assuming m and n are parallel. Show all of your work clearly.



Extending one of the line segments that is a side of the angle with x as its measure, we can make it a transversal of the two parallel lines. Then, using alternate interior angles, and other properties we arrive that $x = 53^\circ$.

7. a. (3 pts) What is the measure of *all* the interior angles of a regular hexagon?

$$(6 - 2)180 = 4 \cdot 180 = 720^\circ$$

b. (2 pts) What is the measure of *each* interior angle of a regular hexagon?

$$\frac{720}{6} = 120^\circ$$

c. (3 pts) What is the measure of *each* exterior angle of a regular hexagon?

$$\frac{360}{6} = 60^\circ$$

8. Find each of the following, showing all necessary steps:

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.

We want to find the other angle measure so that the two angles add up to 90° . Thus, the problem is $90^{\circ} - 13^{\circ}49'27'' = 76^{\circ}10'33''$.

9. (2 pts each) Find the number of vertices (V), edges (E) and faces (F) for the figures named. *Hint: draw the figure first.*

a. Triangular prism:

$$V = 6$$

$$F = 5$$

$$E = 9$$

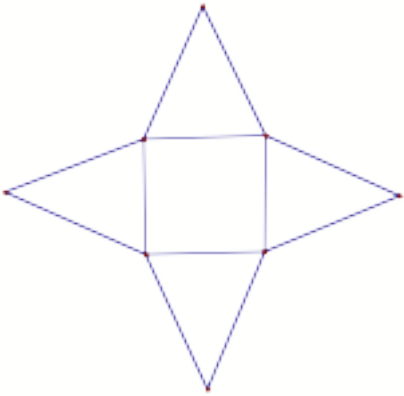
b. Hexagonal pyramid:

$$V = 7$$

$$F = 7$$

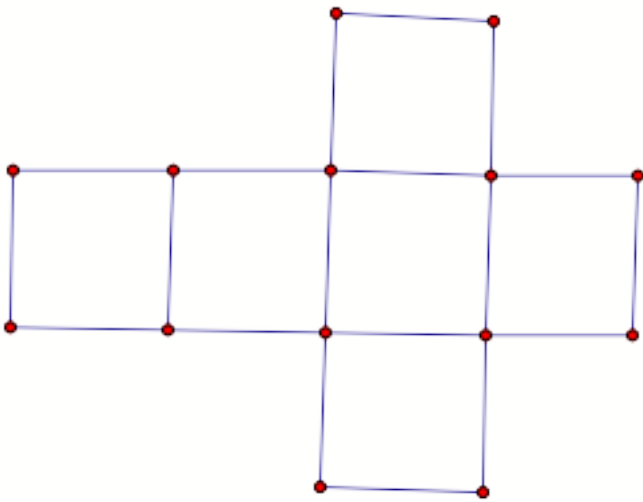
$$E = 12$$

10. a. (3 pts) Name the figure which has the net shown below. Be as specific as possible. *Hint: 3 word answer.*



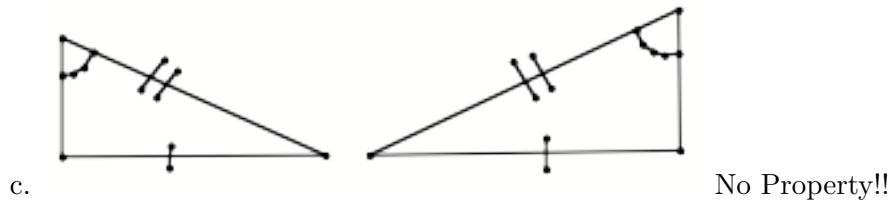
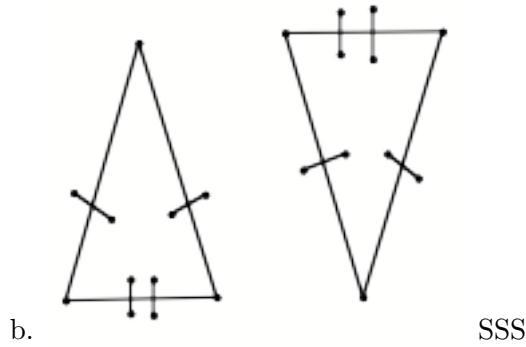
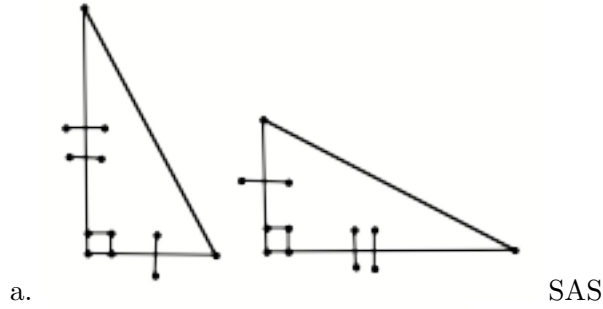
Right Square Pyramid

b. (3 pts) Draw a net for a cube. There are MANY possibilities! Be neat.

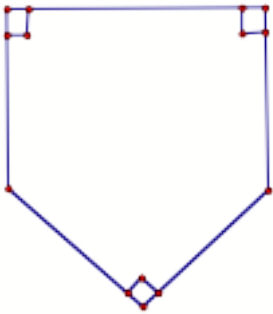


11. (4 pts) If the **exterior** angles of a regular polygon are 24° *each*, how many sides does the polygon have?
 $\frac{360}{n} = 24$ because we know all of the exterior angles for any convex polygon always add up to 360° , and in the case of a regular polygon, each exterior angle is congruent. Solving for n , we obtain that $n = 15$. So that means that the polygon has 15 sides!

12. (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.

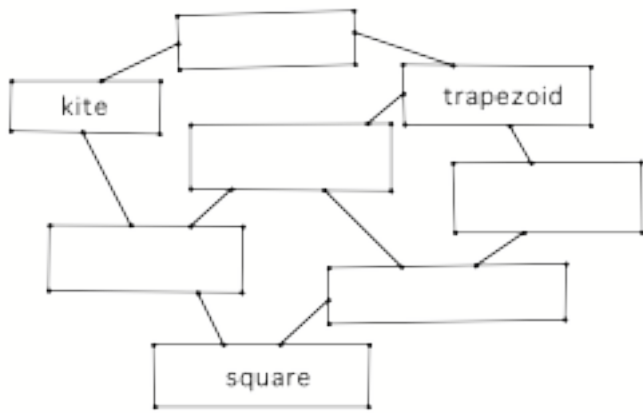


13. (6 pts) Home plate on a baseball field has three right angles and two other congruent angles. Find the measure of each of these two other congruent angles.



All of the angles add up to be $(5 - 2)180 = 540^\circ$. We know three angles are right angles, so we'll subtract this from 540, to obtain that the remaining two congruent angles must add up to be 270° . Since they are congruent, we divide by 2, and the angle measure of each of the remaining two angles is 135° .

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 is in your textbook, pg 596.

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

There are lots of correct answers here. Some correct answers are:

1. A quadrilateral with all sides congruent.
2. Diagonals are perpendicular bisectors
3. The diagonals bisect the interior angles.

CONSTRUCTIONS: you all have in your notes and textbook what these should look like—the solutions will not appear here.

16. (4 pts each) a. Draw a line segment, and construct the **perpendicular bisector** using your compass and straightedge *only*. Leave all relevant pencil marks for the construction and no others. Accuracy and neatness count.

b. 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 *NOT* 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 QUESTIONS:

1. (2 pts each) What are regular polyhedra called? How many distinct regular polyhedra are there? They are called PLATONIC SOLIDS. There are only 5! (this does not mean 5 factorial BTW!)

2. (6 pts) Explain why the sum of the measures of the three angles in any triangle is 180° . You should use a picture and properties of parallel lines. Label your drawing and explain your argument using words and mathematical symbols.

Look in the text or in your notes for this.