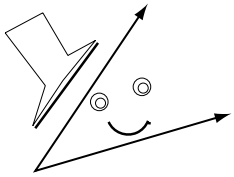
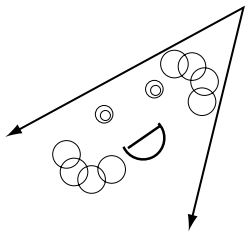
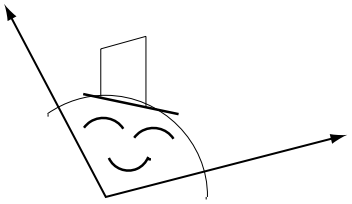
Interesting Angles



Kyle



Ashley



Clint

1. Open a new sketch.

   Use Sketchpad to construct the following:

   a. a pair of angles that intersect at one point
   b. a pair of angles that intersect at two points
   c. a pair of angles that intersect at three points
   d. a pair of angles that intersect at four points
   e. a pair of angles that intersect at an infinite number of points
   f. a pair of angles that intersect at any other number of points

2. If you used the Segment tool to construct your angles and you wish to make arrows at the ends of the segments, you may do the following:

   a. Set the **Script Tool** folder to Utility Scripts (Mac) or Utilities (Windows). (See the Points, Lines, and Angles Quick Reference Guide for how to do this.)
   b. Press and hold down the mouse button on the Script tool. Choose **Open Arrow** from the menu.
   c. Start at the vertex of the angle and drag to the point where you wish to construct the arrowhead.

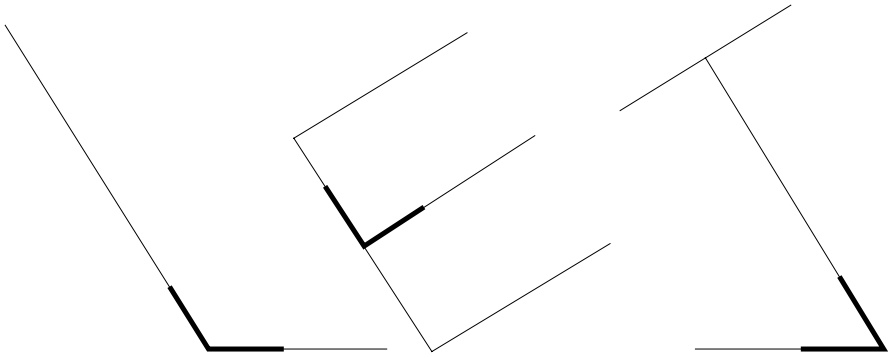
3. Put your name in the sketch and print out a copy to hand in.

Challenge: In how many points can three angles intersect? Use Sketchpad to investigate.

Name Angles

1. Open a new sketch.
2. Use the Segment tool to write your initials in the sketch.
3. Display the measures of three angles in your sketch. Try to show one acute, one obtuse, and one right angle, if possible.

Example:



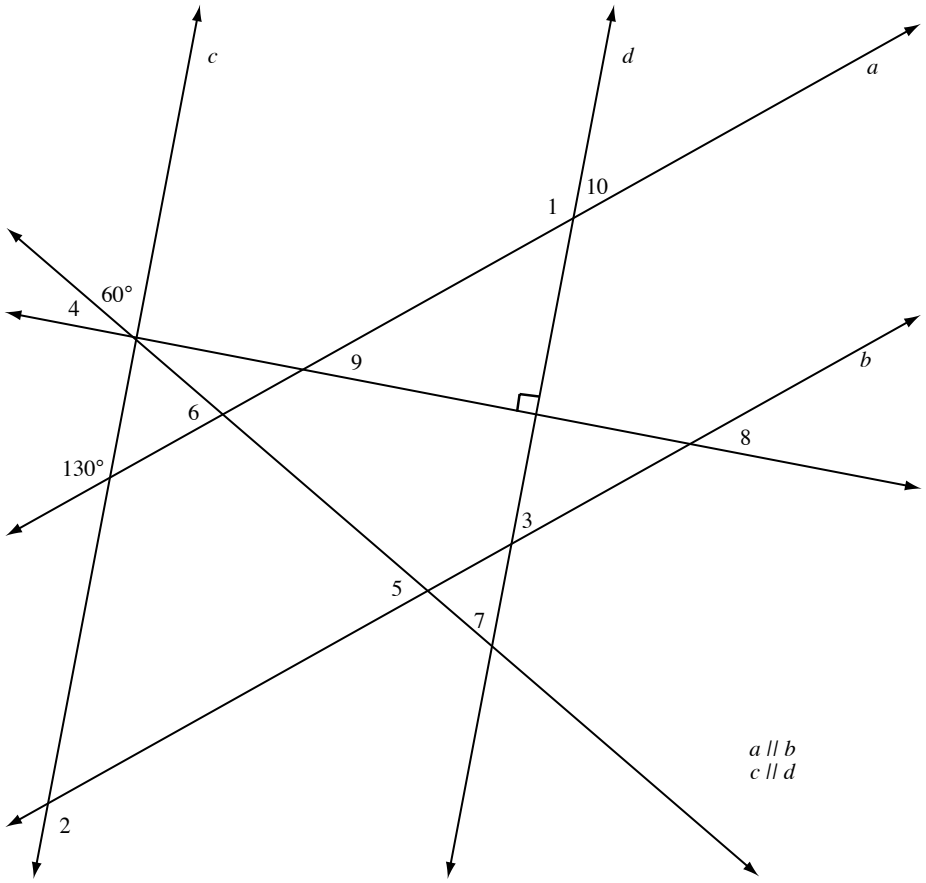
Lathem Emily Jenkins

L's angle measure = 122° **E**'s angle measure = 90° **J**'s angle measure = 58°

4. Put your name in the sketch and print out a copy to hand in.

Angle Puzzle

1. Using only the information you are given in the drawing below, work with the students in your group to find the measure of each numbered angle.
2. Use what you know about the measures of special pairs of angles and angles formed by parallel lines and a transversal to help you. Also, remember that the sum of the angles of any triangle is 180°.



m∠1 = _____ m∠2 = _____ m∠3 = _____ m∠4 = _____

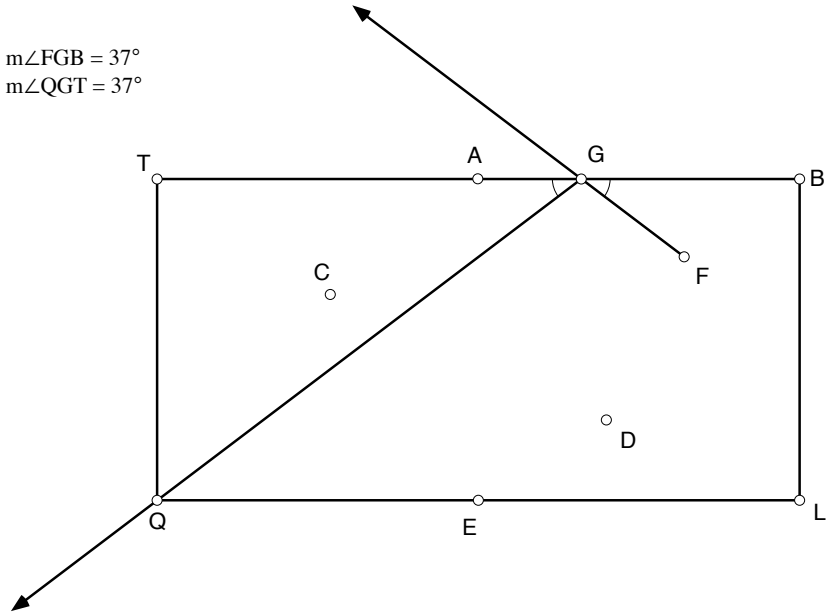
m∠5 = _____ m∠6 = _____ m∠7 = _____ m∠8 = _____

m∠9 = _____ m∠10 = _____

Challenge: Use Sketchpad to design your own Angle Puzzle. You must be careful to construct parallel lines that will stay parallel. Also, try only a few angles at first! Have another student try your first draft, and don't be surprised if you have to revise.

Sharp Shooter

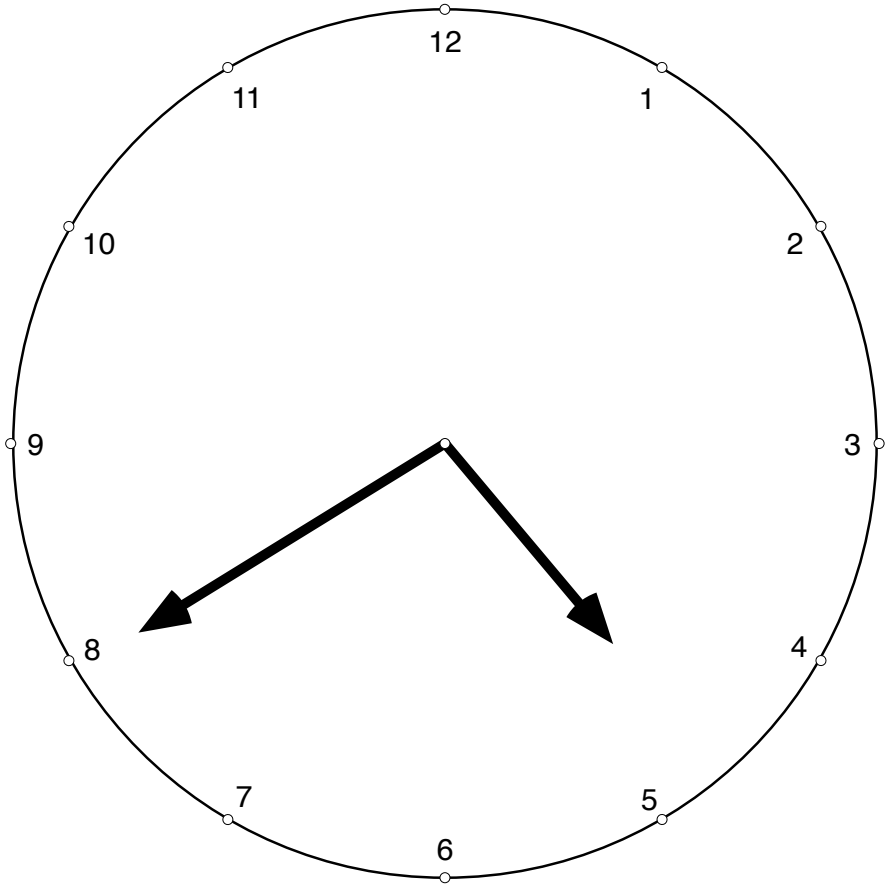
The figure below is a scale drawing of a pool table, with points **C**, **D**, and **F** representing balls. Points **T**, **A**, **B**, **L**, **E**, and **Q** represent pockets. Suppose you want the ball to bounce off one of the sides of the pool table and roll into one of the pockets. Where on the table would you aim for the ball to strike? Remember that the path of a ball must make equal angles with a side of the pool table to model or simulate a real pool ball, as shown in the figure.



1. Open the sketch Pool (Mac) or Pool.gsp (Windows).
2. Use the Ray tool to construct a path for one of the balls. The ball must be the endpoint of your ray, and the other control point must be constructed on the side at which you decide to aim. Construct a second ray with the intersection point of the first ray and the side as its endpoint and the other control point the pocket for which you are aiming. Measure the angles made by the path of the ball and the side of the pool table. Drag the point on the side to adjust the measures of the angles until they are congruent.
3. Print out a copy with your results.
4. Repeat this for the other two balls.
5. Go to the **Edit** menu and choose **Undo** until you see the original pool table on the screen. This time, try to find the path of a ball that bounces off two sides and then enters a pocket.

Creating a Sketchpad Clock

1. Open a new sketch and create an accurate model of a clock.
2. Display correct measures for any time of day.

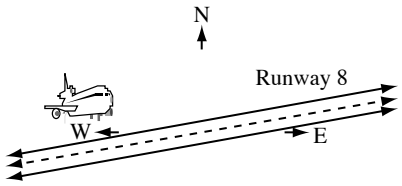


hands' angle = 100°

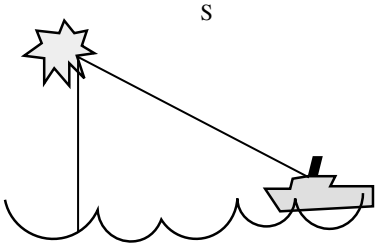
Challenge: Animate the hands of your clock so that they move just like the hands of a real clock. Make sure the hands rotate clockwise.

More Ideas for Points, Lines, and Angles Projects

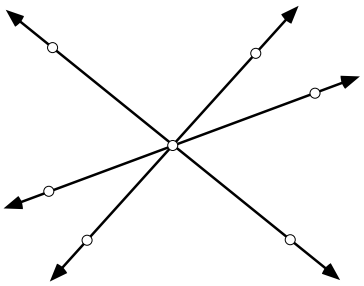
1. Investigate how runways are numbered at airports. Use Sketchpad to illustrate how angles determine the numbers and what they mean to pilots.



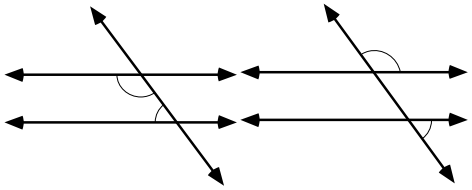
2. Investigate how angles are used in celestial navigation. Use Sketchpad to create a sketch that illustrates this means of determining your position.



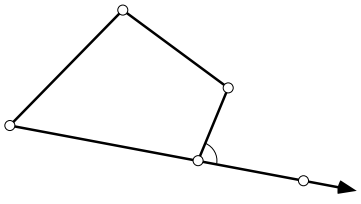
3. Use Sketchpad to construct three lines intersecting at a single point to form six angles. Construct a point on each ray that doesn't already have a point on it. Notice special pairs of angles formed. Experiment to discover how many angle measures you would need to know in order to find the rest.



4. Investigate the relationship between the measures of pairs of consecutive interior angles formed by a pair of parallel lines and a transversal. Also, investigate the relationship between the measures of pairs of consecutive exterior angles formed by a pair of parallel lines and a transversal.



5. Explore the relationship between the measures of an exterior angle of a triangle and the two remote (nonadjacent) interior angles. Then investigate the relationship between the measures of an exterior angle of a quadrilateral and the three nonadjacent interior angles.



6. Explore with diagonals in polygons to find a pattern for the maximum number of intersection points of the diagonals of a convex polygon.