

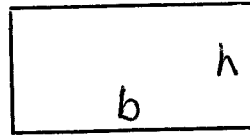
Using Paper Folding to Explore
Area for
Grades 6-8

NCTM Annual Meeting
2013

Cathy Banks
Texas Woman's University
cbanks@twu.edu

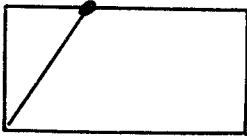
AREA

1. Rectangle $A = b * h$

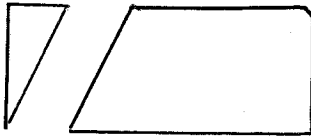


2. Parallelogram

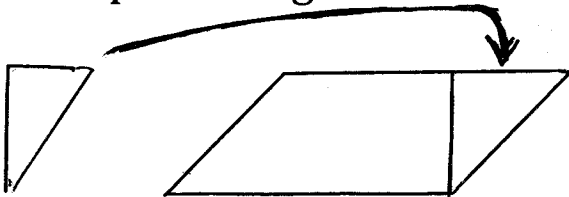
Given the notecard, select a point and draw the line segment from the vertex of the rectangle to that point.



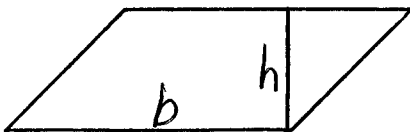
Cut the line segment.



Move the triangle to the opposite side forming a parallelogram.



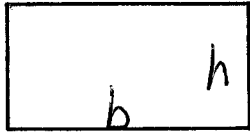
Area of parallelogram is same note card so
 $\text{Area} = b * h$



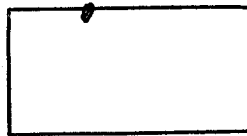
3. Area of a triangle

The area of the notecard is the area of the rectangle.

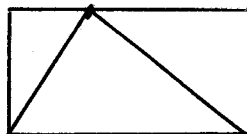
$$\text{Area} = b * h$$



Select a point on the rectangle.



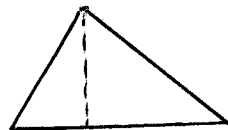
Draw line segments to the opposite vertices.



Cut the line segments.



Rotate the smaller triangles until they are on top of larger triangle.

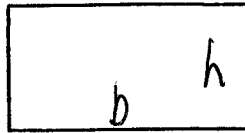


Area of triangle is $\frac{1}{2}$ the area of the rectangle or $\text{Area} = \frac{1}{2} b h$.

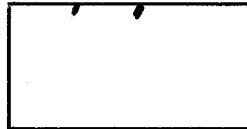
4. Area of a trapezoid.

The area of the notecard is the area of the rectangle.

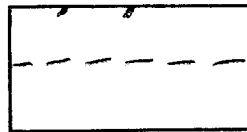
$$\text{Area} = b * h$$



Select 2 points on the longer side of the rectangle.



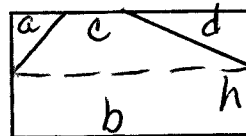
Fold the card in half horizontally.



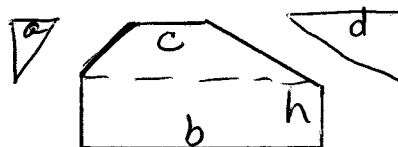
Draw line segments to the fold from the points.



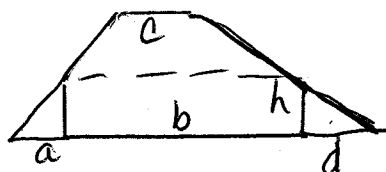
Label the sections keeping the height "h" and base "b".



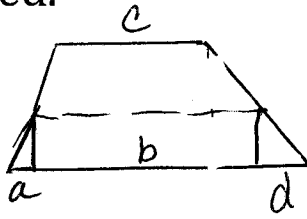
Cut off the two small triangles.



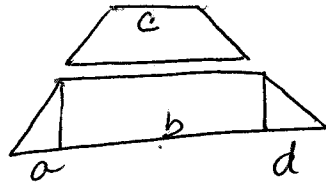
Rotate the triangles to create line segment \overline{AD} .



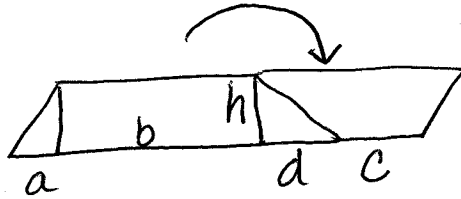
A trapezoid has been formed.



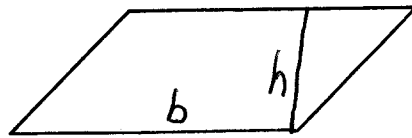
Cut the fold.



Rotate to form line segment $a + b + d + c$.



The figure formed is a parallelogram so the Area = $b * h$.



The area of the figure is base * height

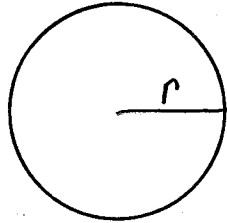
$$A = (a + b + c + d) * \frac{1}{2} h$$

OR

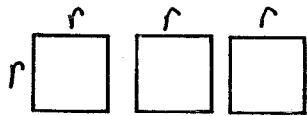
$$A = \frac{1}{2} h (\text{sum of the bases})$$

5. Area of a circle.

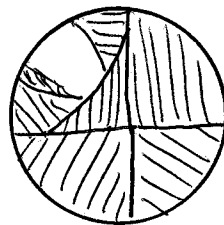
Draw a circle with radius equal to 15 cm on the cm graph paper.



Cut out three squares - each having a side length of the 15 cm. The three squares each represent the "radius square".



Tape the squares on to the circle, trying to put all inside the circle.



Area of a circle is a little more than $3 r^2$.