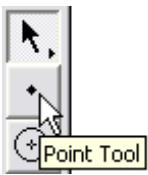


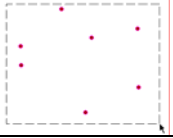
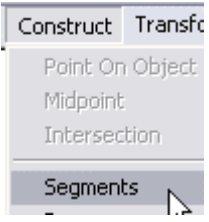
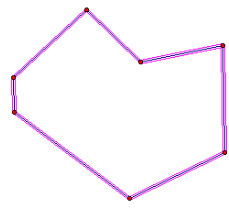
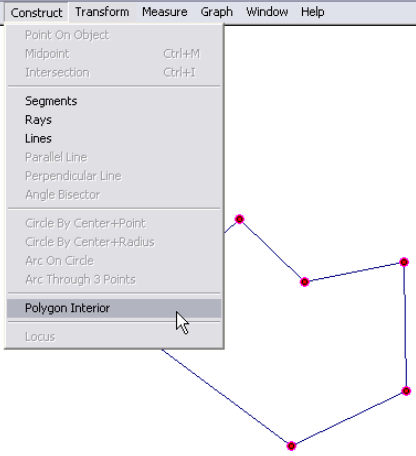


# Transformations on a Computer

- **Alternate Activity** for “Technology”, *Math Makes Sense Grade 4* text, pages 255-257.
- **Using Geometer’s Sketchpad** instead of *Appleworks*.

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 You can use a computer to make a pattern with transformations.

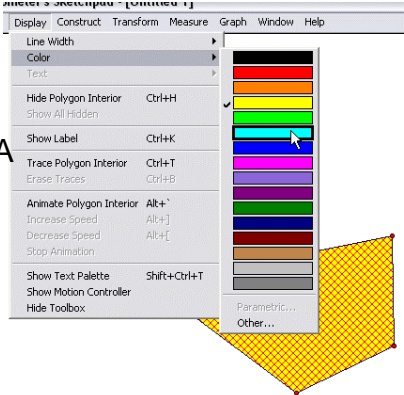
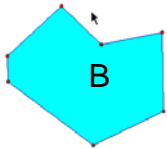
- Work with a partner.
- Use Geometer’s Sketchpad.
- Follow these steps to make a pattern with transformations.

1	Open up <b>Geometer’s Sketchpad</b> .	2	If you get a blank sketch called “Untitled 1”, skip to the next step. If not, then click “File” > “New Sketch” (or click CTRL+N) to get a blank sketch. You should maximize both the programme and the new sketch.
3	Make an interesting polygon.		
<b>A.</b> Turn on the point tool 		<b>B.</b> Click 5-8 points in an interesting “circular” pattern 	
<b>C.</b> Turn on the selection arrow tool  Click anywhere in a blank area of the screen so no dots are highlighted.		<b>D.</b> Click above and left of the points; click and drag to highlight all points (“Marquee” selection) 	
<b>E.</b> 		<b>F.</b> 	
<b>G.</b> Click anywhere in a blank area of the screen so nothing is highlighted.			
4			
		<b>A.</b> Holding the SHIFT key down, click on then points only so they all highlight. <b>B.</b> “Construct” > “Polygon Interior” – you will get a colored interior with red “hatch lines” in it.	

5

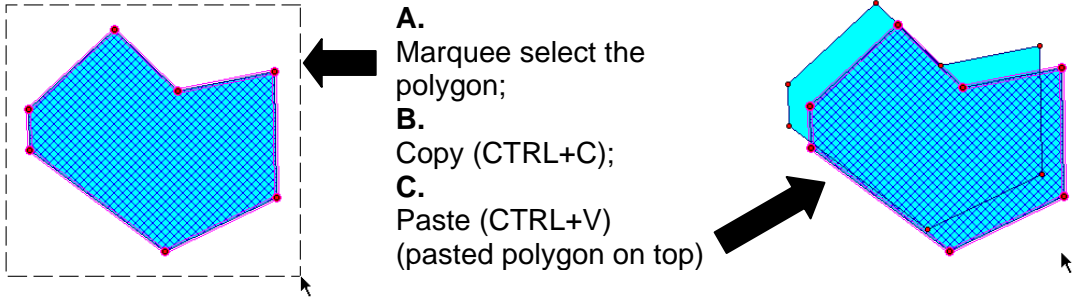
**A.**  
 “Display” > “Color” > [select a new color] – you will see the new color with the red hatch lines still there.

**B.**  
 Click outside the polygon to make the hatch lines disappear and the new color only show.

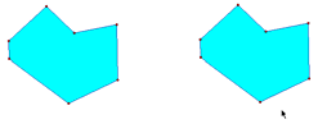



6



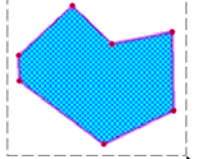
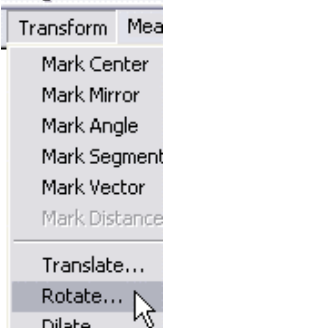
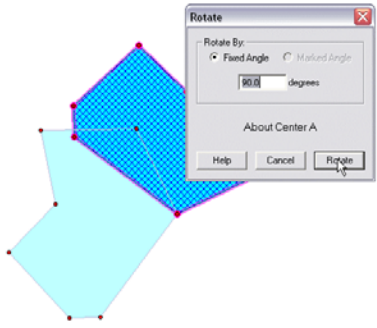
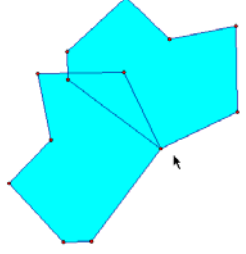
**A.** Marquee select the polygon;  
**B.** Copy (CTRL+C);  
**C.** Paste (CTRL+V) (pasted polygon on top)



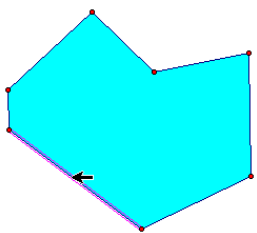


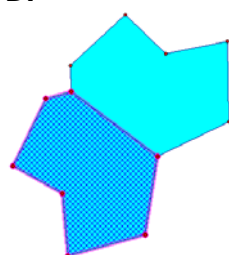
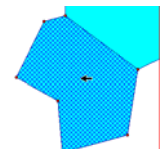
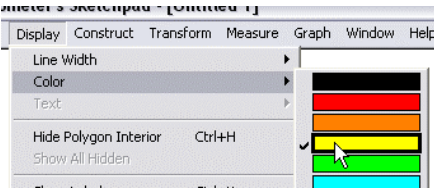
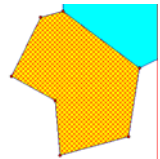

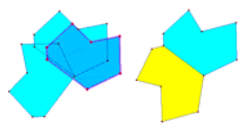
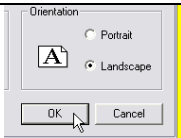
7 **TRANSLATE** the copy simply by placing the arrow on top of the copy, and dragging it to another place on the screen. Make sure it is far away from the original before doing the next step. Click in a clear area of the screen to clear the hatch lines and any selected points or edges.



8 **ROTATE** the original polygon:

<p><b>A.</b> Click on any ONE point</p> 	<p><b>B.</b></p>  <p>(Watch the point!)</p>	<p><b>C.</b> Marquee select the polygon</p> 
<p><b>D.</b></p> 	<p><b>E.</b></p> 	<p><b>F.</b></p>  <p>The finished rotation.</p>

You can experiment with rotations: Use CTRL+Z (or “Edit” > “Undo”) to back up a step or two – then re-do the rotation with a different number of degrees.

9	<p><b>REFLECT</b> the copy of the polygon:</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><b>A.</b> Click on any ONE side of the copy. It will highlight.</p>  </div> <div style="width: 45%;"> <p><b>B.</b> Watch the side you marked when you click "Mark Mirror."</p>  </div> </div> <hr/> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><b>C.</b> Marquee select the polygon, then "Transform" &gt; "Reflect"</p>  </div> <div style="width: 45%;"> <p><b>D.</b></p>  </div> </div>
10	<p>To <b>change the color</b> of any polygon:</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><b>A.</b></p>  <p>Click once inside the polygon.</p> </div> <div style="width: 45%;"> <p><b>B.</b></p>  </div> </div> <hr/> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><b>C.</b></p>  </div> <div style="width: 45%;"> <p><b>D.</b> Click outside of polygon to cause hatch lines to disappear.</p>  </div> </div>
11	<p>Get more polygons to mess with by simply pasting (CTRL+V) more onto the work space. They'll overlap other ones, but just slide them to an empty place.</p> 
12	<p>See how rotations and reflections are closely connected. Click on ANY one point of a polygon, and move it around. See how this affects the rotated or reflected polygon.</p>
13	<p>To print,</p> <ol style="list-style-type: none"> <li>A. "File" &gt; "Page Setup"</li> <li>B. Select "Landscape" then "OK"</li> <li>C. "File" &gt; "Print"</li> </ol> 

**Build your skill:**

Repeat all of the above steps. Start with a new sketch (CTRL+N), make other polygons, and translate, rotated reflect them. Try to make interesting pattern with your sets of polygons.