

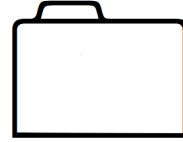
Show *all* your work. Reasonable supporting work must be shown to earn credit. Remember that *communicating* worth as much as the correct answer (and often more!).

1. [4] (1/15 Discussion) The book *Flatland* gives social commentary on Victorian society through metaphors. Choose an aspect/story/characteristic of the book *Flatland* and explain how it is either still relevant today or how it no longer works.

2. [4] (HW3 #1) True or False and *brief* justification:
There are an infinite number of unique tiling signatures (such as 3^*3).

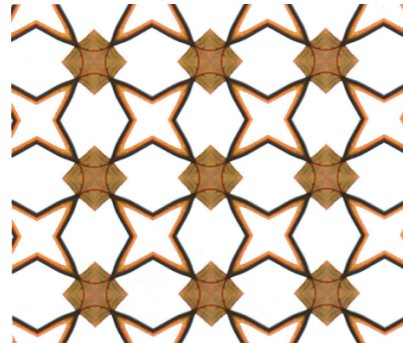
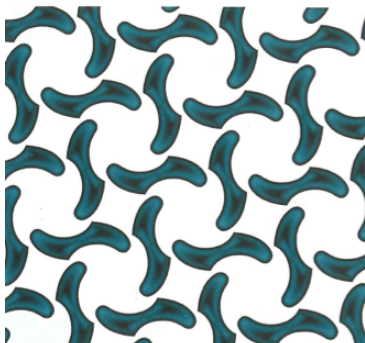
3. [4] (Weeks §1) Explain how A Square's used thread in the book *The Shape of Space* to determine that he was *not* living on a sphere.

4. [3] (HW3 #3) Draw an object that has the same topology but different geometry as the figure to the right.

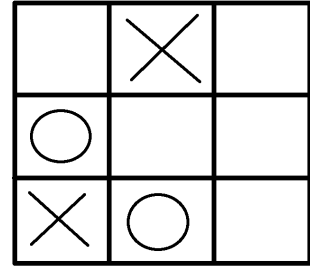


5. [6] (TilingActivity's)
Find the signature for each of the following.
Note the "cost" for symbols are given.

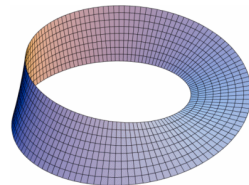
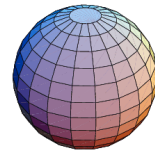
Symbol	Cost (\$)	Symbol	Cost (\$)
○	2	* or ×	1
2	$\frac{1}{2}$	2	$\frac{1}{4}$
3	$\frac{2}{3}$	3	$\frac{2}{6}$ or $\frac{1}{3}$
4	$\frac{3}{4}$	4	$\frac{3}{8}$
5	$\frac{4}{5}$	5	$\frac{4}{10}$ or $\frac{2}{5}$
6	$\frac{5}{6}$	6	$\frac{5}{12}$
...
n	$\frac{n-1}{n}$	n	$\frac{n-1}{2n}$



6. [3] (Weeks §2) A tic-tac-toe board being played on a flat torus is shown to the right. The game was started by X and now it is X 's turn. What is X 's best move? Justify your choice.



7. [4] Match the items on the left to items with the same topology on the right.

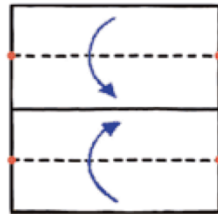


where all edges are identified/glued.

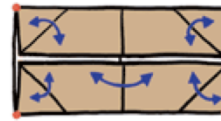
8. Examine the Origami instructions below.

F.W.'s Origami Wombat

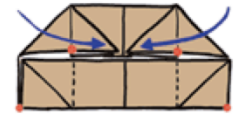
- (a) [2] (1/29 Class)
Describe what the instruction circled above means.



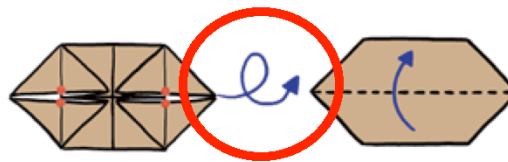
Crease the paper along the middle. Fold the top and bottom edges in to meet the crease.



Crease this shape up the middle. Fold all the corners over creasing them, and then unfold them again.



Bring the corners down while folding where I've made dotted lines. This will create four new points that meet in the middle.

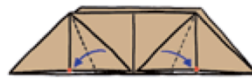


Flip this shape over so that you are looking at the smooth side.

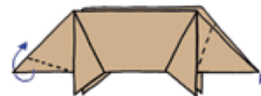
Fold the shape along the middle so that you bring the bottom edge up to meet the top edge.



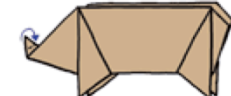
This is the body of the wombat. Now it's time to give it some legs!



Fold the triangles that meet in the middle down so that they now extend down past the bottom of the body.

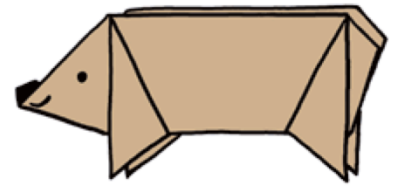


On one end of the wombat fold the point up for the nose. On the other end fold the point in.



Now fold the nose over one more time. Then use the marker to color it in and to add eyes and a mouth.

- (b) [5] Fold the Wombat and turn it in with your exam!



He's almost as cute as the real thing!

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NAMES:

A single copy of this problem can be turned in per group if interested.

Halving the Area of a Patty Square

1. [10] Use Patty Paper Rules to find a square that has half the area of the original patty paper.
 - (a) Explain your process.
 - (b) *Justify* why your method works.

This is a patty paper exercise so the only tools you may use are patty paper(s) and a pencil.