I CHABOD CHALLENGE PROBLEMS
WASHBURN MATH & STATS

(November 2011)

1) A die wins against another die if it rolls a higher number. Can you choose integer values on the faces of a die so that if wins more often against the blue die below, but loses against the yellow one?

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6 6 6 6 6
6
```

```
? ?
```

```
0 9 9 9 9
0
```

Can you make it so that regardless of what two dice are chosen, if you get to decide if the dice are rolled once or rolled twice and the values added you will have determined which side wins more often?

2) Adding up the values of three consecutive entries in a sequence is how you get the next value. If we start with the numbers 1, 1, and 1, what is the 24th number in the sequence?

1, 1, 1, 3, 5, 9, 17, 31, 57, 105, 193, …
3) Start with a right triangle that is 1 unit by 1 unit on either side of its right angle. Using the diagonal of the previous triangle, you keep building right triangles by adding a side of length 1. How many triangles fit in this construction before they start to overlap?

4) Given twelve circles of radius one, what are the radii of the two circles that fit these twelve circles between them tangentially?

5) What is the area of the portion of the square of side length 4 that is closer to the center of the square than to any of the sides?