Quiz 6 Around the Isoperimetric Inequality, February 24, 2015. You have 25 minutes to solve the problem below. Please write on both sides of the page.   **Good Luck!**

Problem (the two parts are of equal value).

- Of all the parallelograms of area 1, which one has the least perimeter?

- Of all the parallelepipeds of volume 1, which has the smallest surface area?

```
o = {0, 0}; a = {1, 0}; b = {1, 1};
Graphics[{
  Red, Line[{o, a}], Line[{b, a + b}],
  Green, Line[{o, b}], Line[{a, a + b}]
}]
```
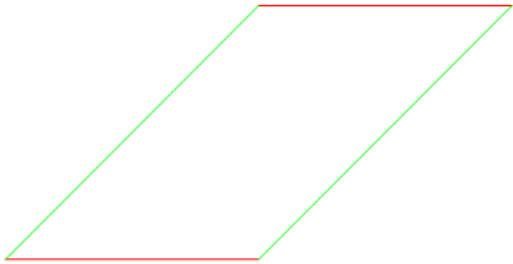
```
o = {0, 0, 0}; a = {1, 0, 0}; b = {1, 1/2, 0}; c = {1, 1, 1};
Graphics3D[{Opacity[0.8],
  Glow@Red, Polygon[{o, a, a + b, b}], Polygon[{c, c + a, c + a + b, c + b}],
  Glow@Green, Polygon[{o, a, a + c, c}], Polygon[{b, b + a, b + a + c, b + c}],
  Glow@Blue, Polygon[{o, b, b + c, c}], Polygon[{a, a + b, a + b + c, a + c}]
}, Boxed → False, Lighting → None]
```
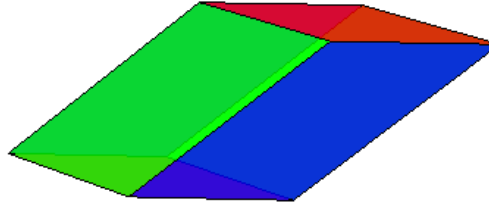

Extra Problem (no credit). If you are bored, think about the following; we will talk about it in class later: Let an angle α be given, and consider triangles ABC with internal angle α near A and side lengths $AB = c$, $AC = b$, and $BC = c$. Of all such triangles with a fixed value for $a - (b + c)$, which one has the least area?

- Solve the problem.

- Why am I asking it?