Math 118 - Dr.Miller - Homework #7: Area Versus Perimeter

Draw, if possible, pairs of shapes satisfying the following. Label the key dimensions of each, as well as specifying what the area and perimeter equal.

1. two rectangles with the same area but different perimeters
2. two rectangles with the same perimeter but different areas
3. a rectangle and a square with the same area but different perimeters
4. a rectangle and a triangle that have the same perimeter but different areas
5. a rectangle and a triangle that have the same area but different perimeters
6. two triangles that have the same area but different perimeters
7. a rectangle and a parallelogram with the same perimeters but different areas
8. a rectangle and a parallelogram with the same areas but different perimeters

1. Both a 1x6 and a 2x3 rectangle have an area of 6 square units. However, the "skinny" rectangle has a perimeter of 14 units while the more "square-like" rectangle only has a perimeter of 10 units.
2. Both a 1x6 and a 2x5 rectangle have a perimeter of 14 units, yet they have areas of 6 and 10 square units, respectively.
3. Both a 4x4 square and a 2x8 rectangle have an area of 16 square units, but the square's perimeter is 16 units while the rectangle's is 20.
4. A 6x9 rectangle and a 5x12 right triangle both have perimeters of 30 units. (The triangle's requires the Pythagorean Theorem to compute.) However, the area of the rectangle is 54 square units while that of the triangle is only 30 square units.
5. A 5x6 rectangle and a 5x12 right triangle both have areas of 30 square units. However, the rectangle's perimeter is 22 units, while the triangle's is 30 units.
6. Both a 5x12 and a 6x10 right triangle have areas of 30 square units. However, the first triangle has a perimeter of 30 units while the second has a perimeter of 27.7 units.
7. Take *any* rectangle and let it "lean" a bit. The new shape is a parallelogram having the same perimeter as before: after all, the lengths of the sides didn't change just because the shape got wobbly. However, since the parallelogram no longer stands as tall as it once did, its area has decreased from before.
8. Take *any* parallelogram rearrange it to form a rectangle (by cutting a triangle off of one end and reattaching it at the other). The areas are equal, because the bases and heights of these two shapes are equal. However, the "slant" of the parallelogram is longer than the vertical sides of the rectangle; therefore the perimeter of the parallelogram is more than the rectangle's.