1 Symmetry and Triangles

**Problem 1.** For each of the classifications of triangles by side lengths (scalene, isosceles, equilateral), determine how many types of symmetry each kind must have. Be sure to consider both reflections and rotations. Could this be used as the definition of these types of triangles?

**Problem 2.** Can you find an example of a triangle that matches both the row and column adjective for every cell in the table below? E.g. can you draw a triangle that is both an acute triangle and a scalene triangle? If you can find such a triangle, draw it, if not, give a short argument explaining why it is impossible.

<table>
<thead>
<tr>
<th></th>
<th>Acute</th>
<th>Right</th>
<th>Obtuse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scalene</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isosceles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equilateral</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Problem 3. In an isosceles triangle $ABC$, $AB = AC$, and $\angle A = 20^\circ$. Point $P$ is taken on the side $AC$ so that $AP = PB$. Find $\angle PBC$.

2 Definitions

Study the following definitions from Section 2.4 of your textbook before the next class:

1. Quadrilateral
2. Parallelogram
3. Rectangle
4. Rhombus
5. Square
6. Trapezoid
7. Kite

Note: Do not assume that you already know any of these definitions. You must know the precise definitions that we will be using, and you must be able to distinguish between the definition of a shape and the properties of a shape. For example: The definition that we will use for “rectangle” doesn’t say anything about the opposite sides having the same length; that is a property of rectangles, not part of the definition.

You should also preview the following angle properties:

1. Opp. $\angle$s in a $\parallel$-ogram.
2. Int. $\angle$s, $\overline{BC} \parallel \overline{AD}$.