Mirror Activities Solutions (dashed lines indicated where the mirror(s) can be placed):

1) and 2)  

3)   With two mirrors, it it worth asking where the additional reflections are coming from, since there can be many (as one sees in a kaleidoscope).

4) Do half of an equilateral triangle for one mirror. For two mirrors, the second solution for problem 3) above works if, instead of having the mirrors meet at 90º, they meet at 120º.

5) Many have reflection symmetry (including Q the way it is drawn above). Some (N, S, and Z) have rotation symmetry, which requires a spin rather than a reflection. Some have both.

6) The angle needed is $\frac{360}{n}$ for a given *n*-gon. Why? The dashed lines below are the mirrors. The two solid lines are sides of the regular *n*-gon. The blue base is a drawn line. The orange side is an image in a mirrow. The angle measure they make is the interior angle of a regular *n*-gon. That measure, shown by the orange arc, is $\frac{the\ total\ angle\ sum\ of\ the\ polygon}{number\ of\ angles} = \frac{180(n-2)}{n}$. This formula simplifies to $180 - \frac{360}{n}$. The mirror at left bisects the orange interior angle into equal congruent angles because reflections preserve angle measure. The triangle pictured is isosceles (if the mirrors are placed symmetrically with regard to the blue segment), so its base angles are also congruent. Since all angles marked x are congruent, the base angles of the triangle also sum to $180 - \frac{360}{n}$. Since the sum of the angles in a triangle is 180, that means the angle at the top of the triangle is $\frac{360}{n}$.