Given:

Euclidean Axioms

Prove:

Statement	Reason
1. For any 6 points, the number of distinct triangles is $\binom{6}{3}$	1. Choose isn't that hard to prove
2. The only way to have two triangles which don't intersect is having each of the 3 vertices adjacent to each other.	2. Consider if they don't. Then there won't be 3 vertices on one arc of the triangle to make a non-intersecting triangle.
3. Thus, if we choose one group of 3 adjacent vertices, there is only one other triangle (the other 3 adjacent vertices)	3. Elementary by observation
4. The number of ways to choose a group of 3 adjacent vertices is equal to the number of ways to choose distinct triangles, which is $\binom{6}{3}$	4. For each triangle chosen, there is exactly one other triangle to be made because there are only 3 other vertices to choose
5. The number of ways to pick a group of 3 adjacent vertices is 6	5. Count adjacent groups of 3 while going around the circle
6. The final probability is the number of ways to choose a group of 3 adjacent vertices divided by the number of ways to pick triangles, so $\frac{6}{\binom{6}{3}}$	6. Definition of probability is what you want over what you need
7. Final answer is $\boxed{\frac{3}{10}}$	7. Definition of division