Eötvös Mathematical Competition 1898

1. Determine all positive integers n for which $2^n + 1$ is divisible by 3.

2. Prove the following statement: If two triangles have a common angle, then the sum of the sines of the angles will be larger in the triangle with the smaller difference of the other two angles.
   Based on this statement, specify the triangle with the maximum sum of the sines of angles.

3. Four points A, B, C, D are given on a straight line e. Construct a square such that two of its parallel sides (or their extensions) go trough A and B, and the other two sides (or their extensions) go trough C and D.

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