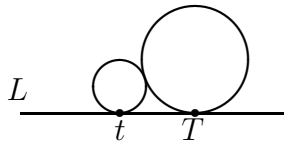


2000 Maritime Mathematics Competition

1. At a meeting, one mathematician remarked to another, “There are nine fewer of us here than twice the product of the two digits of our total number.” How many mathematicians were at the meeting?
2. Suppose that two circles with radii r and R intersect in a single point and that the straight line L is tangent to both circles at t and T respectively, as in the diagram below. Determine the distance between the points t and T .



3. There are 120 four digit numbers that contain only the digits 1, 2, 3, 4, 5, each at most once. Find the sum of all such numbers.
4. A cubic box with edges 1 metre long is placed against a vertical wall. A ladder $\sqrt{15}$ metres long is placed so that it touches the wall as well as the free horizontal edge of the box. Find at what height the ladder touches the wall.
5. A circular grass plot 12 metres in diameter is cut by a straight gravel path 3 metres wide, one edge of which passes through the centre of the plot. Determine the number of square metres in the remaining grass area.
6. Consider decompositions of an 8×8 chessboard into p non-overlapping rectangles subject to the following two conditions.
 - Each rectangle has the same number of white squares and black squares.
 - No two rectangles have the same number of squares.

Find the maximum value of p for which such a decomposition is possible. For this maximum value of p , determine all corresponding decompositions of the chessboard into p rectangles.