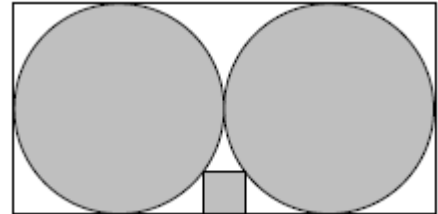


Problem Set of the Week

Problem 1 - Geometry

(★)

Two circles of radius 1 are tangent to each other and to the large rectangle. The vertices of the small square lie on the circles and on the large rectangle. What is the length of the side of the small square?



Problem 2 - Algebra

(★★)

Find a polynomial with integer coefficients whose zeros include the number $\sqrt{2} + \sqrt[3]{3}$.

Problem 3 - Analytic Geometry

(★★★)

The lines $y = 1$ and $y = -1$ are simultaneously tangent to both the circles $(x - 2)^2 + y^2 = 1$ and $(x + 2)^2 + y^2 = 1$ at the points $(-2, -1)$, $(2, -1)$ and $(-2, 1)$, $(2, 1)$, respectively. Find the equations of the other two lines that are simultaneously tangent to both circles.

Rules: Solve one problem or solve them all. Submit solutions to Dr. Luke Grabarek in Snodgrass Hall 103A or via e-mail at lgrabarek@matsu.alaska.edu. All submissions will be awarded a ★ and, in addition, correct solutions receive the ★ rating of the problem.

“Medicine makes people ill, mathematics makes them sad, and theology makes them sinful.” - Martin Luther