Calculus 1 Workbook

Applied optimization

krista king
MATH

APPLIED OPTIMIZATION

■ 1. A boater finds herself 2 miles from the nearest point to a straight shoreline, which is 10 miles down the shore from where she parked her car. She plans to row to shore and then walk to her car. If she can walk 4 miles per hour but only row 3 miles per hour, toward what point on the shore should she row in order to reach her car in in the least amount of time?

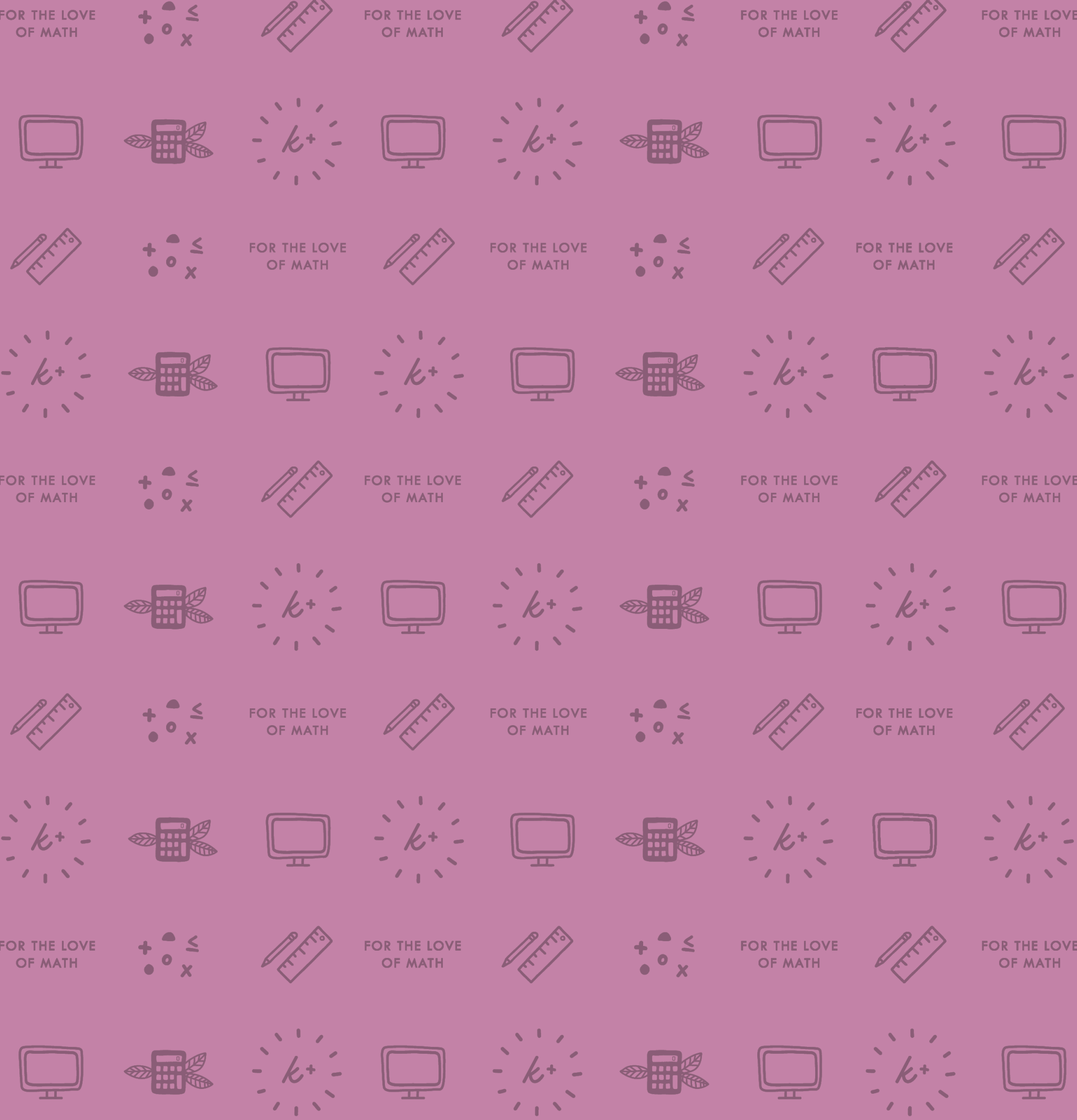
■ 2. Mr. Quizna wants to build in a completely fenced-in rectangular garden. The fence will be built so that one side is adjacent to his neighbor's property. The neighbor agrees to pay for half of that part of the fence because it borders his property. The garden will contain 432 square meters. What dimensions should Mr. Quizna select for his garden in order to minimize his cost?

■ 3. A company is designing shipping crates and wants the volume of each crate to be 6 cubic feet, and each crate's base to be a square between 1.5 feet and 2.0 feet per side. The material for the bottom of the crate costs $\$5$ per square foot, the sides $\$3$ per square foot, and the top $\$1$ per square foot. What dimensions will minimize the cost of the shipping crates?

■ 4. We want to construct a cylindrical can with a bottom and no top, that has a volume of 50 cm^3. Find the dimensions of the can that minimize its surface area.

■ 5. We're building a rectangular window with a a semicircular top. If we have 16 meters of framing material, what dimensions should we use in order to maximize the size of the window in order to let in the most light?

■ 6. Determine the dimensions of the rectangle with maximum area that can be inscribed in a circle of radius 3 cm.



WWW.KRISTAKINGMATH.COM