

**MA 241**  
**Homework #3**

Due Thursday, September 15, in class

Read Chapter 1 of *Covering and Surrounding*. Answer the following questions from this book and justify your answers.

1. #45 on page 23.
2. #54 on page 25.
3. #60 on page 26.
4. #64 on page 27.
5. #75 on page 31.
6. How many square centimeters are in one square inch? Round your answer to two decimal places. Justify your answer.
7. Consider all rectangles having an area of 10 square centimeters.
  - (a) Use algebra to express the perimeter  $P$  of such a rectangle as a function  $f(x)$  of one side length  $x$ .
  - (b) Graph this function using Desmos, <https://www.desmos.com/calculator> (you may have to zoom out), and print the graph (right-click the graph).
8. Consider all rectangles having a perimeter of 18 centimeters.
  - (a) If all side lengths are positive whole numbers, what are the dimensions of the rectangle with the largest area? Justify your answer.
  - (b) If all side lengths are positive whole numbers, what are the dimensions of the rectangle with the smallest area? Justify your answer.
  - (c) Use algebra to express the area  $A$  of such a rectangle as a function  $f(x)$  of one side length  $x$ . Graph it with Desmos and print the graph.
  - (d) If all side lengths are positive real numbers but not necessarily whole numbers, what are the dimensions of the rectangle with the largest area? Justify your answer using algebra.
  - (e) If all side lengths are positive real numbers but not necessarily whole numbers, what are the dimensions of the rectangle with the smallest area? Justify your answer using algebra.