

MA 241
Homework #1

Due Thursday, September 1, in class

Read Chapters 1 and 2 of *Shapes and Designs*. Be sure you know all of the definitions and vocabulary. Answer the following questions from this book.

1. p. 36, #65. Justify your answers.
2. p. 56, #16
3. p. 57, #19. Make a careful drawing.
4. p. 57, #20. Make a careful drawing.
5. p. 57, #21
6. p. 58, #22. For parts (a) and (b), also write down general formula in terms of the number of sides n and prove that the formula is correct.
7. p. 58, #23
8. p. 58, #24
9. p. 59, #25. For part (d), also prove that your rule is correct.
10. For each of the following, make a careful drawing. GeoGebra is helpful but not required.
 - (a) A nonconvex kite.
 - (b) A convex kite that is not a rhombus.
 - (c) A trapezoid that is neither a parallelogram nor isosceles.
 - (d) A parallelogram that is neither a rhombus nor a rectangle.
 - (e) An isosceles trapezoid that is not a rectangle.
 - (f) A rhombus that is not a square.
11. For each of the following statements, determine if it is true or false, and justify your answers.
 - (a) If a quadrilateral is both a kite and a parallelogram, then it must be a rhombus.
 - (b) If a quadrilateral is both an isosceles trapezoid and a parallelogram, then it must be a rectangle.
 - (c) If a quadrilateral is both a rhombus and a rectangle, then it must be a square.