More problems for section 3.1 of *Essentials of Precalculus with Calculus Previews* by Zill and Dewar, 6e.

1. Make a rough sketch of the following functions by hand. Check your work by graphing the functions on a graphing calculator.

   a. $-2(x + 1)^2(x + 2)(x - 1)(x - 3)^2$
   b. $2(x + 2)(x + 3)^3(x - 1)^2(x - 4)$
   c. $3(x - 3)^3(x - 1)^3(x + 1)(x + 3)$
   d. $-(x + 5)^3(x + 2)^4(x + 1)^3(x - 1)^5$
   e. $-(x + 1)^2(x + 2)^2(x - 1)^2(x - 2)(x - 4)$
   f. $-2(x + 4)^3(x + 2)(x + 1)^3x(x - 3)$
   g. $7(x + 1)(x + 2)(x - 3)(x - 4)(x - 1)$
   h. $2x(x - 1)^3(x - 3)^2(x + 4)^3(x - 5)^2$
   i. $-2(x + 4)^2(x + 3)(x + 2)(x^2 - 1)$
   j. $-(x - 2)(x + 3)^3(x + 1)^5(x^2 - 4x + 3)$
   k. $x^3(x + 5)(x - 3)(x^2 - x - 12)^2$
   l. $7(x - 2)^2(x + 1)^3(x - 3)^5(x + 1)(x - 4)$

2. What can you conclude about the degrees of the polynomials graphed below? Remember that there may be more to the graph offscreen.

   ![Graphs](image)

   Answers
   2a. deg $\geq 6$  2b. deg $\geq 8$  2c. deg $\geq 4$  2d. deg $\geq 6$  2e. deg $\geq 10$  2f. deg $\geq 9$  2g. deg $= 1$  2h. deg $\geq 12$  2i. deg $= 0$