1. (Section 3.4 #6) The price *p* (in dollars) and the quantity x sold of a certain product obey the demand equation

$$x = -20p + 500, \quad 0 \le p \le 25$$

(a) express the revenue R as a function of *x* **(b)** What is the revenue if 20 units are sold? **(c)** What quantity *x* maximizes revenue? What is the maximum revenue? **(d)** What price will maximize revenue?

2. (Section 3.5 #22) Solve:

$$2(2x^2 - 3x) > -9$$

3. (Section 4.1 #54 modified) **(a)** List all real zeros and their multiplicity **(b)** Sketch (do not graph) the function **(c)** Determine whether the graph crosses or touches the x axis near the x intercepts **(d)** Determine the maximum number of turning points **(e)** Determine the end behavior

$$f(x) = -2(x^2 - 3)^3$$

4. (Section 3.4 #12) A projectile is fired at an inclination of 45 degrees to the horizontal, with a muzzle velocity of 100 feet per second. The height *h* of the projectile is given by:

$$h(x) = -\frac{32}{100^2}x^2 + x$$

where *x* is the horizontal distance of the projectile from the firing point.
(a) At what horizontal distance from the firing point is the height of the projectile a maximum?
(b) Find the maximum height of the projectile. **(c)** At what horizontal distance from the firing point will the projectile hit the ground? **(f)** When the height of the projectile is 50 ft above the ground, how far has the projectile traveled horizontally?

Challenge problems

5. Determine the end behavior of:

$$(a)\ f(x) = \frac{1}{x}, \qquad (b)\ f(x) = x^{n^n}, \quad (c)\ f(x) = \sqrt{x}$$

6. Form a polynomial with zeros of $0, 0, 7, 2, 2$. Expand the resulting equation to obtain a polynomial of the form $f(x) = a_5x^5 + a_4x^4 + a_3x^3 + a_2x^2 + a_1x + a_0$.

7. A value that the function approaches, but **never reaches** is called an *asymptote*. Sketch each function and find all asymptotes of the function:

$$(a)\ f(x) = \frac{1}{x^2} \quad (b)\ \ f(x) = \frac{5x^2}{x+3}$$

8. You and 5 friends (6 people total) decide to go out for Chinese food at Village Wok. The host/hostess greets you and takes your group to a circular table with 6 identical chairs. Being the Math whizzes you are, you decide to figure out how many different ways you can sit at the table before actually sitting at the table. How many ways can your group sit at the circular table? (Hint: a picture might help as well as thinking about the number of options, or people, available for each chair…)