

LESSONS
4.6–4.10

Problem Solving Workshop:

Mixed Problem Solving

For use with pages 275–315

- Multi-Step Problem** The amount s (in pounds per acre) of sugar produced from sugarbeets can be modeled by the function $s = -0.0655n^2 + 7.855n + 5562$ where n is the amount (in pounds per acre) of nitrogen fertilizer used.
 - Write the function in vertex form.
 - Graph the function.
 - What is the maximum amount of sugar that can be produced?
- Multi-Step Problem** A store sells 80 pairs of a jeans per week at a price of \$40 per pair. For each \$1 decrease in price, 5 more pairs of jeans per week are sold.
 - Write a function that models the store's revenue from the sales of jeans.
 - Write an inequality you can use to find the prices that result in revenues over \$3600.
 - Solve the inequality from part (b).
- Open-Ended** Name three different complex numbers with an absolute value of 50. Then plot your answers in the same complex plane.
- Short Response** The path of a football kicked from the ground for a field goal try can be modeled by $y = -0.013x^2 + 0.67x$ where x is the horizontal distance (in yards) from where the ball was kicked and y is the corresponding height (in yards).
 - A football crossbar is 10 feet high. Write and solve an inequality to find at what values of x the ball is high enough to go over the crossbar.
 - A football player kicks the ball toward the goal from a distance of 45 yards away. Will the player make a field goal? *Explain.*
- Gridded Answer** What is the product of $3 + 4i$ and its complex conjugate?
- Extended Response** You throw a baseball from 6 feet above the ground with an initial vertical velocity of 38 feet per second. Your friend catches the ball at a height of 2 feet.
 - Write an equation that models the height of the ball as a function of time.
 - How long is the ball in the air?
 - Describe* three methods you could use to find the maximum height of the ball. Then find the maximum height using each method.
- Short Response** You are designing a rectangular garden with tomatoes along the garden's top and right sides. The tomatoes will take up one quarter of the area of the garden. The garden measures 12 feet by 20 feet. What will the width x of the tomato area be? *Explain* why you must reject one of the solutions.
- Extended Response** The table shows the shipments of audio cassettes in the United States from 1998 through 2003.

Years since 1998, t	Cassettes (millions), c
0	158.5
1	123.6
2	76
3	45
4	31.1
5	17.2

 - Use a graphing calculator to find the best-fitting quadratic model for the data.
 - Graph the model and the data together.
 - Do you think this model will give a good estimate of the shipment of cassettes in 2010? *Explain.*