Name _____ Date _____

Problem Solving Workshop: Mixed Problem Solving

For use with the lessons "Write Equations of Parallel and Perpendicular Lines", "Fit a Line to Data", and "Predict with Linear Models"

1. **Multi-Step Problem** The table shows the total goods imported (in billions of dollars) into the U.S. from 1998 through 2003.

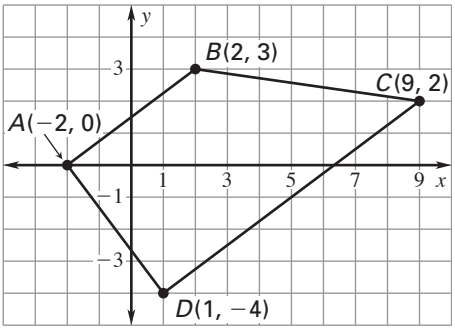
Year	Total Goods Imported
1998	911.9
1999	1024.6
2000	1218.0
2001	1141.0
2002	1164.7
2003	1263.2

   a. Make a scatter plot of the data.

   b. Find an equation that models the total goods imported (in billions of dollars) as a function of the number of years since 1998.

   c. About how much will the total goods imported be in 2010?

2. **Extended Response** Use the graph of the trapezoid.



   a. Find the perpendicular sides of trapezoid *ABCD*. How do you know mathematically that these sides are perpendicular?

   b. Write equations of the lines containing the perpendicular sides.

   c. Write equations of the lines containing the two parallel sides. How do you know these sides are parallel?

3. **Gridded Answer** What is the zero of the function $f(x) = \frac{2}{3}x - 7$?

4. **Short Response** On a street map, Pine Street and Short Street can be modeled by the equations $y = ax - 3$ and $x + 5y = 15$. For what values of a are the streets parallel? For what values of a are the streets perpendicular? *Justify* your answers.

5. **Open-Ended** Give an example of a data set that shows a positive correlation.

6. **Extended Response** The table shows the federal outlays for agriculture (in billions of dollars) from 2000 through 2004.

Year	Federal Outlay (in billions)
2000	36.5
2001	26.3
2002	22.0
2003	22.5
2004	15.4

   a. Find an equation that models federal outlays (in billions of dollars) as a function of the number of years since 2000.

   b. At approximately what rate did the federal outlays change from 2000 to 2004?

   c. Find the zero of the function. *Explain* what the zero means in this situation.

7. **Short Response** The cost of ice skating includes a $7 fee per hour of skating and a skate rental fee. Skates for adults cost $3. Skates for children cost $2.50. Write equations that give the total cost of ice skating for an adult and for a child as functions of the number of hours skated. How are the graphs of the equations related? *Explain*.