

Name: \_\_\_\_\_

Date: \_\_\_\_\_

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## MA 162

Week 4 Recitation Worksheet (Tuesday)

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**You must show all work to receive full credit.**

1. Solve the given system of equations using either the substitution method or the elimination method. If the system has no solution, state *no solution*. If there are infinitely many solutions, *parameterize the set of solutions*.

$$\begin{cases} -4x - 8y = 11 \\ 3x + 6y = -8 \end{cases}$$

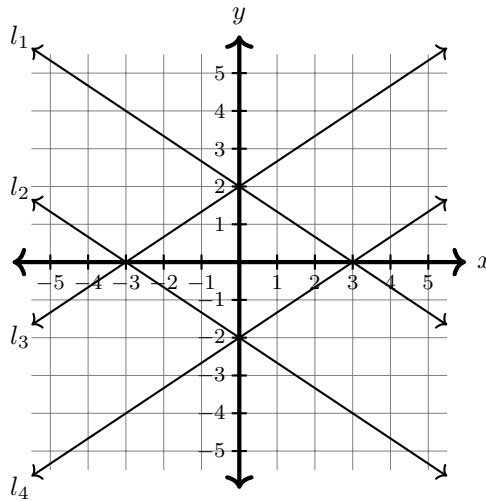
2. Solve the given system of equations using either the substitution method or the elimination method. If the system has no solution, state *no solution*. If there are infinitely many solutions, *parameterize the set of solutions*.

$$\begin{cases} -4x - 8y = 11 \\ 3x + 6y = -\frac{33}{4} \end{cases}$$

3. Determine all values of  $h$  and  $k$  for which the given system has infinitely many solutions.

$$\begin{cases} -5x - 3y = h \\ -2x + ky = 9 \end{cases}$$

4. We have now seen two methods for solving a system of linear equations: (1) the substitution method and (2) the elimination method. The systems that we have considered so far generally involve two equations and two variables. Imagine you are asked to solve a system of *four equations* with two variables. Not sure how to solve such a system, you decide to graph each of the lines corresponding to the four equations. Below is the resulting graph (lines are labeled  $l_1$ ,  $l_2$ ,  $l_3$ , and  $l_4$ ).



How many solutions does the system of equations have? **Explain your reasoning.**

5. An online shop sells knitted hats and sweaters for cats. Each hat sells for \$10 and each sweater sells for \$22. The shop sold a total of 55 items last month, with sales totaling \$1,066. How many sweaters did the shop sell last month?

6. Jake's Surf Shop rents surfboards for \$11.75 plus \$3.25 per hour. Rita's rents them for \$8.00 plus \$4.50 per hour. Which is cheaper for which time intervals?

7. A contractor purchased a backhoe for \$40,000. Fuel and standard maintenance cost \$6.57 per hour, and the operator is paid \$14.98 per hour.
- (a) Write a cost function  $C$  for the cost of operating the backhoe for  $x$  hours. Make sure to include any fixed costs.
  
  
  
  
  
  
  
  
  
  
  - (b) If customers pay \$33.87 per hour for the contractor's backhoe service, write the revenue function  $R$  for the amount of revenue gained from  $x$  hours of use.
  
  
  
  
  
  
  
  
  
  
  - (c) Write the profit function  $P$  for the amount of profit gained from  $x$  hours of use.
  
  
  
  
  
  
  
  
  
  
  - (d) Use part (c) to determine the number of hours the backhoe must be used to break even.
8. The supply equation for a product is  $x = 250p - 7500$  and the demand equation is  $x = -110p + 11220$ , where  $p$  is the price in dollars and  $x$  is the number of items. At what price will the supply equal the demand, and how many items will be produced at that price?