

- Solve the system of equations.

$$\begin{cases} -3x + 8y = 10 \\ 5x + 6y = 80 \end{cases}$$

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$$\begin{aligned} 5(-3x + 8y) &= (10)5 \\ 3(5x + 6y) &= (80)3 \end{aligned}$$

$$\begin{aligned} -15x + 40y &= 50 \\ 15x + 18y &= 240 \end{aligned}$$

$$58y = 290$$

$$y = 5$$

$$5x + 30 = 80$$

$$x = 10$$

$(10, 5)$

- Solve the system of equations.

$$\begin{cases} .2x + .4y = 1 \\ .03x + .06y = .15 \end{cases}$$

- Solve the system of equations.

$$\begin{aligned} .2x + .4y = 1 &\rightarrow 2x + 4y = 10 \rightarrow x + 2y = 5 \\ .03x + .06y = .15 &\rightarrow 3x + 6y = 15 \rightarrow x + 2y = 5 \end{aligned}$$

Consistent, dependent
 ∞ many solutions

- Hinsdale Central students decided to have a bake sale in order to raise money for gifts to buy for their wonderful math teachers at the end of the year. They decided that they would sell cookies for \$0.50 and brownies for \$0.75. At the end of the bake sale they sold a total of 240 treats and collected \$144.25. How many of each treat did they sell?



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$$\begin{aligned} c &= \# \text{ of cookies} & c + b &= 240 \\ b &= \# \text{ of brownies} & .5c + .75b &= 144.25 \end{aligned}$$

$$.5(240 - b) + .75b = 144.25$$

$$120 - .5b + .75b = 144.25$$

$$\begin{aligned} \neq \frac{1}{4}b &= 24.25 \neq \\ b &= 97 \end{aligned}$$

$$c = 143 \quad b = 97$$



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$t = \# \text{ of } 2 \text{ pt ?'s}$
 $f = \# \text{ of } 5 \text{ pt ?'s}$

$$\begin{aligned} -2(t + f) &= (35) \cdot 2 \\ 2t + 5f &= 100 \\ \hline -2t - 2f &= -70 \\ 2t + 5f &= 100 \\ \hline 3f &= 30 \\ f &= 10 \\ t &= 25 \end{aligned}$$

25-2pt?'s 10-5pt?'s



■ Balloons and More sells balloon bouquets. The cost is \$3.00 plus 75 cents per balloon. The Balloon Company charges \$1.25 per balloon.

- Which company has the better deal if I need 3 or fewer balloons?
- Which company has the better deal if I need 8 or more balloons?
- At what point does it not matter which company I purchase the balloons from?



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$C_1 = .75b + 3$ $C_2 = 1.25b$

- Which company has the better deal if I need 3 or fewer balloons? *The Balloon Company*
- Which company has the better deal if I need 8 or more balloons? *Balloons and More*
- At what point does it not matter which company I purchase the balloons from? *b balloons*

$$\begin{aligned} .75b + 3 &= 1.25b \\ 3 &= \frac{1}{2}b \\ b &= 6 \end{aligned}$$

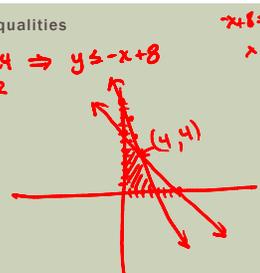

■ Graph the system of inequalities

$$\begin{cases} 3x + 3y \leq 24 \\ 2x + y \leq 12 \\ x \geq 0 \\ y \geq 0 \end{cases}$$

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$$\begin{cases} 3x + 3y \leq 24 \rightarrow 3y \leq -3x + 24 \Rightarrow y \leq -x + 8 \\ 2x + y \leq 12 \rightarrow y \leq -2x + 12 \\ x \geq 0 \\ y \geq 0 \end{cases}$$

$x + 8 = -2x + 12$
 $x = 4$
 $8 - 4 = y$



Write the inequalities for the system.

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The Hinsdale Furniture Company makes wooden desks and chairs. Carpenters and finishers work on each item. On average, the carpenters spend 4 hours working on each chair and 8 hours on each desk. There are enough carpenters for up to 8000 worker-hours per week. The finishers spend about 2 hours on each chair and 1 hour on each desk. There are enough finishers for a maximum of 1300 worker hours per week. Given these constraints, find the feasible region for the number of chairs and desks that can be made per week. The company earns a profit of \$15 on each chair and \$20 on each desk it makes.

- Identify your variables.
- Write a system of inequalities.

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- Identify your variables.
 $x = \# \text{ chairs}$
 $y = \# \text{ desks}$
- Write a system of inequalities.
 $4x + 8y \leq 8000$
 $2x + y \leq 1300$
 $x \geq 0, y \geq 0$

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- Graph the feasible set.
- List all the vertices of the feasible set.

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- Graph the feasible set.
 $y \leq -1/2x + 1000$
 $y \leq -2x + 1300$
- List all the vertices of the feasible set.
Vertices Profit $15x + 20y$

(0, 0)	\$0
(0, 1000)	\$20,000
(200, 1000)	\$21,000
(400, 0)	\$12,000

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5. Write the objective function.
6. What is the maximum profit Hinsdale Furniture Company can make?

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5. Write the objective function. $\text{Profit} = 15x + 20y$
6. What is the maximum profit Hinsdale Furniture Company can make? \$21,000 when they make 200 chairs and 900 desks (4).

[work on previous slide].