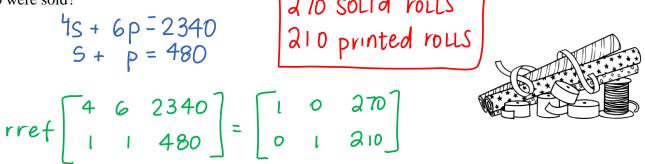
7.3 Notes Day 2

Read through each example, assign variables and set up a system of equations. Use Inverse matrices or Reduced Row Echelon Form to solve each system.

1. Hinsdale Central's marching band sold gift wrap to earn money for a band trip to Orlando, Florida. The gift wrap in solid colors sold for \$4.00 per roll, and the print gift wrap sold for \$6.00 per roll. The total number of rolls sold was 480, and the total amount of money collected was \$2,340. How many rolls of each kind of gift wrap were sold?



2. Last Friday, Regal Cinemas sold a total of 8500 movie tickets. Proceeds totaled \$64,600. Tickets can be bought in one of 3 ways: a matinee admission costs \$5, student admission is \$6 all day, and regular admissions are \$8.50. How many of each type of ticket was sold if twice as many student tickets were sold as matinee tickets?

$$m + S + r = 8500$$

$$5m + 6S + 8.50r = 64600$$

$$2m = S \implies 2m - S = 0$$

$$900 \text{ matinee}$$

$$1800 \text{ student tix}$$

$$5800 \text{ regulan}$$

$$rref \begin{bmatrix} 1 & 1 & 1 & 8500 \\ 5 & 6 & 8.50 & 64600 \\ 2 & -1 & 0 & 0 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 900 \\ 0 & 1 & 0 & 1800 \\ 0 & 0 & 1 & 5800 \end{bmatrix}$$

3. A chemist needs to prepare a 60 liter mixture that is 40% acid using three concentrations of acid. The first is 15% acid, the second 35% acid, and the third 55% acid. She will use twice as much of the 35% mixture than the 55% mixture. How much of each concentration should she use?

4. The following breakdown outlines the number of rooms, bathrooms, fireplaces, and elevators in the U.S. White House. f C b e



- Combined there are 198 rooms, bathrooms, fireplaces, and elevators •
- The number of rooms exceeds the number of bathrooms plus fireplaces • by 69.
- The difference between the number of fireplaces and elevators is 25.
- If the number of bathrooms is tripled, it exceeds the number of fireplaces plus elevators by 74.

Determine the number of rooms, bathrooms, fireplaces and elevators in the White House.

- White House. $ref \begin{bmatrix} 1 & 1 & 1 & 198 \\ 1 & -1 & -1 & 0 & 69 \\ 0 & 0 & 1 & -1 & 25 \\ 0 & 3 & -1 & -1 & 74 \end{bmatrix}$ $r = (b + f) + 69 \implies r 6 f = 69$ f e = 25 $3b = (f + e) + 74 \implies 3b f e = 74$ 132 rooms, 35 baths, 28 fire places, 3elev.r + b + f + e = 198
- 5. Italy and France combined for a total of 46 penalties during the 2006 FIFA World Cup. The penalties were a combination of fouls, yellow cards (cautions), and red cards (expulsions). There was one less red card than half the number of yellow cards and one more foul than 8 times the total number of cards. How many of each type of penalty were there during the match?

$$f + y + r = 46 \qquad \text{rref} \qquad 1 \qquad 1 \qquad 46 \\ r = \frac{1}{2}y - 1 \qquad \Rightarrow -\frac{1}{2}y + r = -1 \\ f = 8(y + r) + 1 \Rightarrow f - 8y - 8r = 1 \qquad 1 \qquad -8 \quad -8 \quad 1 \\ 1 \quad -8 \quad -8 \quad 1 \\ 1 \quad -8 \quad -8 \quad 1 \\ 1 \quad foulo, 4 \text{ yerrow cards,} \\ 1 \quad red \ card \\ 1 \quad red \ red \$$

6. Michelle has a piggy bank that has 75 total coins in it that consists of nickels, dimes, and quarters. The total value of the money in the piggy bank is \$12.75. The number of dimes is also twice the number of nickels in the piggy bank. How many of each coin (nickel, dime, quarter) does she have in the bank?

$$n + d + q = 75$$

$$rref \begin{bmatrix} 1 & 1 & 1 & 75 \\ .05n + .1d + .25q = 12.75 \\ d = 2n \implies -2n + d = 0 \end{bmatrix}$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n = 2n + d = 0$$

$$a = 2n + d = 2n + d = 0$$

$$a = 2n + d = 2n + d = 0$$

$$a = 2n + d = 2n + d = 0$$

$$a = 2n + d = 2n + d = 2n + d = 0$$