

2.5 Application Problems with Matrices

Ex 1 (Encryption)

Use $A = \begin{bmatrix} 1 & -2 & 3 \\ -4 & 5 & -6 \\ 3 & -2 & 2 \end{bmatrix}$

to encrypt "JOYFUL"
where A=1, B=3, etc.

So J=10, O=15, Y=25,
F=6, U=21, L=12

JOY $\rightarrow \begin{bmatrix} 10 \\ 15 \\ 25 \end{bmatrix}$

FUL $\rightarrow \begin{bmatrix} 6 \\ 21 \\ 12 \end{bmatrix}$

2.5 (cont)

Ex 2 (#14) A grocer is going to mix three kinds of nuts to make 40 pounds of a mixture that will be priced at \$5.95/lb. The three kinds of nuts are peanuts priced at \$4.00/lb, cashews at \$6.60/lb and pistachios at \$8.20/lb. The mixture will contain twice as much in peanuts as cashews by weight. How many pounds of each nut are in the mix?

2.5 (cont)

Ex 3 (#22) A company needs to borrow \$150,000. For tax & related reasons, the company wants to pay 7.3% interest on this loan. There are three lenders for this money. The first charges 6%, the second charges 7% and the third charges 10%. The company is going to borrow twice as much from the first lender as from the third. How much should the company borrow from each lender?

3.1 Quadratic Eqns in One Variable

Defn Quadratic Eqn can be written in form
 $ax^2 + bx + c = 0$ $a, b, c \in \mathbb{R}$.

Ex 1 Solve $5x^2 - 32 = x^2 + 8$

Ex 2 Solve $2x(5x + 6) = 16$

Strategies to Solve

- ① Square Root Technique
- ② Factor Technique
- ③ Completing the Square
- ④ Quadratic Formula

3.1 (cont)

Ex 3 Solve

$$y^2 + y - 4 = 0$$

Ex 4

$$x^2 + 4 = 6x$$

3.1 (cont)

Ex 5

$$\frac{1}{x-10} - \frac{1}{x-9} = 1$$