

1. A flu epidemic occurs in Middletown schools and each student is either susceptible, sick, or infected.

The percentage of students in each category by grade level is given below.

$$[S] = \begin{matrix} & \begin{matrix} \text{Elementary} \\ \text{School} \end{matrix} & \begin{matrix} \text{Middle} \\ \text{School} \end{matrix} & \begin{matrix} \text{High} \\ \text{School} \end{matrix} \\ \begin{matrix} \text{Susceptible} \\ \text{Sick} \\ \text{Infected} \end{matrix} & \begin{bmatrix} 60\% & 25\% & 15\% \\ 65\% & 15\% & 20\% \\ 70\% & 10\% & 20\% \end{bmatrix} \end{matrix}$$

The population distribution of the Middletown school district is given below

$$[P] = \begin{matrix} & \begin{matrix} \text{Girls} & \text{Boys} \end{matrix} \\ \begin{matrix} \text{Elementary} \\ \text{Middle School} \\ \text{High School} \end{matrix} & \begin{bmatrix} 1610 & 1580 \\ 830 & 795 \\ 1115 & 1100 \end{bmatrix} \end{matrix}$$

a. Describe the value of S_{32} and what it represents.

b. Describe the value of P_{22} and what it represents.

c. Find $[S] \cdot [P]$. (You can use your calculator if you would like).
INCLUDE LABELS

d. Describe the value of $[[S] \cdot [P]]_{21}$ and what it represents.

e. Based on the flu epidemic in Middletown schools, how many sick girls are there?

f. Based on the flu epidemic in Middletown schools, how many boys are infected?

2. A study is being conducted by Time Warner about the network spending of its Network HBO and 2 online competitors.

The percentage of spending categories by each network is shown below.

$$[S] = \begin{matrix} & \begin{matrix} \text{NetFlix} & \text{HULU} & \text{HBO} \end{matrix} \\ \begin{matrix} \text{Movies} \\ \text{Mini Series} \\ \text{Current TV} \end{matrix} & \begin{bmatrix} 60\% & 35\% & 70\% \\ 30\% & 30\% & 30\% \\ 10\% & 35\% & 0\% \end{bmatrix} \end{matrix}$$

The amount of spending per month by each company is shown below.

$$[P] = \begin{matrix} & \begin{matrix} \text{Monthly Spending} \end{matrix} \\ \begin{matrix} \text{NetFlix} \\ \text{HULU} \\ \text{HBO} \end{matrix} & \begin{bmatrix} \$85 \text{ million} \\ \$33 \text{ million} \\ \$912 \text{ million} \end{bmatrix} \end{matrix}$$

a. Describe the value of S_{23} and what it represents.

b. Describe the value of P_{31} and what it represents.

c. Find $[S] \cdot [P]$. (You can use your calculator if you would like).
INCLUDE LABELS

d. Describe the value of $[[S] \cdot [P]]_{11}$ and what it represents.

e. Based on the study, how much do the 3 companies spend on Mini Series?

f. Based on the study how much does HBO spend on Movies and their licensing?

3. following matrices show information collected by an apparel store in Magic Kingdom park at Disney World

The matrix $[N]$ shows the number of items sold on Monday

$$[N] = \begin{matrix} & & \text{Jackets} & \text{Shirts} & \text{Hats} \\ \text{Infant / Toddler} & & 5 & 37 & 42 \\ \text{Youth} & & 30 & 15 & 8 \\ \text{Adult} & & 24 & 18 & 25 \end{matrix}$$

The matrix $[P]$ shows the Sale Price and Profit of each type of item.

$$[P] = \begin{matrix} & \text{Sale Price} & \text{Profit} \\ \text{Jackets} & \$75 & \$40 \\ \text{Shirts} & \$30 & \$15 \\ \text{Hats} & \$16 & \$9 \end{matrix}$$

a. Describe the value of N_{23} and what it represents.

b. Describe the value of P_{21} and what it represents.

c. Find $[N] \cdot [P]$. (You can use your calculator if you would like).
INCLUDE LABELS

d. Describe the value of $[[N] \cdot [P]]_{32}$ and what it represents.

e. Based on the information what was the total Sales on Monday for Adult Apparel?

f. Based on the information what was the total Profit made on Monday on Infant Apparel?