

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.

		Elementary School	Middle School	High School
[S] =	Susceptible	60%	25%	15%
	Sick	65%	15%	20%
	Infected	70%	10%	20%

The population distribution of the Middletown school district is given below

		Girls	Boys
[P] =	Elementary	1610	1580
	Middle School	830	795
	High School	1115	1100

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

ROW 3, COLUMN 2 | 10% OF MIDDLETOWN MIDDLE SCHOOL STUDENTS ARE INFECTED.

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

ROW 2, COLUMN 2 | THERE ARE 795 BOYS IN MIDDLETON MIDDLE SCHOOLS.

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

INCLUDE LABELS

$$\begin{matrix} [A] & [B] \\ \begin{bmatrix} .6 & .25 & .15 \\ .65 & .15 & .2 \\ .7 & .1 & .2 \end{bmatrix} & \begin{bmatrix} 1610 & 1580 \\ 830 & 795 \\ 1115 & 1100 \end{bmatrix} \\ [A][B] & \\ \begin{bmatrix} 1190.75 & 1311.75 \\ 1194 & 1366.25 \\ 1233 & 1405.5 \end{bmatrix} & \end{matrix}$$

	GIRLS	BOYS
SUS	1190.75	1311.75
SICK	1194	1366.25
INF	1233	1405.5

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

ROW 2, COLUMN 1 | 1194 GIRLS IN MIDDLETON SCHOOLS ARE SICK.

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

1194

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

≈ 1406

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.

		NetFlix	HULU	HBO
[S] =	Movies	60%	35%	70%
	Mini Series	30%	30%	30%
	Current TV	10%	35%	0%

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

		Monthly Spending
[P] =	NetFlix	\$85 million
	HULU	\$33 million
	HBO	\$912 million

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

ROW 2, COLUMN 3 | 30% OF HBO'S MONTHLY SPENDING IS ON MINI SERIES.

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

ROW 3, COLUMN 1 | HBO SPENDS \$912 MILLION EACH MONTH

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

INCLUDE LABELS

$$\begin{matrix} [A] [B] \\ \begin{bmatrix} .7 & .35 & .2 \\ .3 & .3 & .3 \\ .1 & .35 & .0 \end{bmatrix} & \begin{bmatrix} 700.95 \\ 309 \\ 20.05 \end{bmatrix} \end{matrix}$$

	MONTHLY SPENDING
MOVIES	700.95 million
MINI-SERIES	309 million
CURRENT TV	20.05 million

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

ROW 1, COLUMN 1 | 700.95 MILLION DOLLARS IS SPENT MONTHLY BY THE 3 COMPANIES ON MOVIES.

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

309 MILLION

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

$(0.70)(912) = \$638.4$

638.4 million

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.

Row 2, Column 3 | THE STORE SOLD 8 YOUTH HATS

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

Row 2, Column 1 | THE STORE'S PRICE FOR A SHIRT IS \$30

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

$$[A] [B] \\ \begin{bmatrix} 2157 & 1133 \\ 2828 & 1497 \\ 2740 & 1455 \end{bmatrix}$$

	PRICE	PROFIT
INFANT	2157	1133
YOUTH	2828	1497
ADULT	2740	1455

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

Row 3, Column 2 | THE STORE MADE A \$1455 PROFIT ON ADULT APPAREL.

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

\$2740

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

\$1133