

Activity 28 Premiership table

Aim: Provide a context for defining matrix operations for addition, subtraction and multiplication.

Part A

Matt and Siji both follow London clubs in the English Premier League (EPL). This table shows the results of those clubs before 14th December 2013.

Arsenal is on top with 10 wins, 1 draw and 2 losses in their first 13 games.

Position	Team	P	W	D	L	GF	GA	GD	Pts
1	Arsenal	13	10	1	2	27	10	17	31
3	Chelsea	12	7	3	2	21	10	11	24
9	Tottenham Hotspur	12	6	2	4	9	12	-3	20
15	West Ham United	13	3	4	6	12	14	-2	13
18	Fulham	13	3	1	9	11	24	-13	10
20	Crystal Palace	13	2	1	10	7	22	-15	7

1. a) Complete a matrix for the number of wins, draws and losses for each of the London clubs.

	Won	Drawn	Lost
Chelsea	7		
Tottenham Hotspur		2	
Arsenal			
West Ham United			
Crystal Palace			10
Fulham			

- b) How many rows are there in this matrix?
- c) How many columns are there in the matrix?

2. Results for the next month are:

$$\begin{pmatrix} 5 & 2 & 3 \\ 7 & 0 & 3 \\ 4 & 5 & 2 \\ 4 & 3 & 2 \\ 5 & 1 & 3 \\ 2 & 2 & 6 \end{pmatrix}$$

Note: the row and column labels are understood to be the same as in Q1.

In this period:

- a) how many games has Crystal Palace won?
- b) how many games has Tottenham drawn?
- c) how many games has Arsenal played?

3.

- a) Add the two matrices together.

- b) What does this matrix represent?

Part B

Results before Christmas	Results end of season
$ \begin{array}{r} \text{Arsenal} \\ \text{Tottenham} \end{array} \begin{array}{ccc} W & D & L \\ \left(\begin{array}{ccc} 12 & 1 & 4 \\ 8 & 3 & 5 \end{array} \right) = C \end{array} $	$ F = \begin{pmatrix} 21 & 7 & 10 \\ 20 & 9 & 9 \end{pmatrix} $

4. How many games did:
 - a) Arsenal win between Christmas and the end of the season?
 - b) Tottenham lose between Christmas and the end of the season?
5. Enter these matrices into ClassPad and store them.
 - a) Record the result of subtracting C from F on your ClassPad, i.e. $F - C$.
 - b) What does this matrix represent?

Three points are awarded for a win, one point for a draw and zero points for a loss.

6. How many points does each team have at Christmas?

Enter the points for wins, draws and losses as a 3×1 column matrix $\begin{pmatrix} 3 \\ 1 \\ 0 \end{pmatrix}$ and

store the result as matrix P .

7. Calculate

a) $C \times P$

b) $F \times P$

8. What do the answers to Q7 represent?

9. Write your own descriptions of how to:

a) add matrices together;

b) subtract one matrix from another

c) multiply two matrices together.

Learning notes

See the previous activity *Matrix arithmetic* for instructions on entering and storing matrices.

This activity is intended to provide a context where the definitions for

- matrix addition
- matrix subtraction and
- matrix multiplication

make sense.