Finite Mathematics—Matrix & Linear Programming Review ANSWERS

1. What is the size of $[A]$? … 2 x 5 (2 rows by 5 columns)
2. How many columns does $[B]$ have? … 2
3. How many rows does $[E]$ have? … 4
4. Which of the five matrices is a row matrix? … $[F]$ (because it just has one row)
5. Which of the five matrices is a column matrix? … $[E]$ (because it just has one column)
6. What is entry B_{32}? … 5 (the number in the third row, second column of $[B]$)
7. Which entry of matrix $[F]$ has the value 0? … F_{14} (first row, fourth column)
8. Find $[C]+[D]$ … $\begin{bmatrix} 4+-5 & 9+4 \\ -3+7 & 2+-1 \end{bmatrix} = \begin{bmatrix} -1 & 13 \\ 4 & 1 \end{bmatrix}$
9. Find $[D]-[C]$ … $\begin{bmatrix} -5-4 & 4-9 \\ 7--3 & -1-2 \end{bmatrix} = \begin{bmatrix} -9 & -5 \\ 10 & -3 \end{bmatrix}$
10. Explain why you can't add $[A]+[B]$ … They aren't the same size
11. Find $2[A]$ … $\begin{bmatrix} 6 & -4 & 10 & 14 & 8 \\ 0 & 2 & -12 & -2 & 18 \end{bmatrix}$ (Just double each entry.)
12. Multiply $[F][B]$ … $[4 \quad 50]$ (You can do this on a calculator or take $[7 \bullet 4+3 \bullet -7+-1 \bullet 3+0 \bullet 2+8 \bullet 0 \quad 7 \bullet 1+3 \bullet 0+-1 \bullet 5+0 \bullet -1+8 \bullet 6] = [4 \quad 50]$)
13. Multiply $[B][D]$ … $\begin{bmatrix} -13 & 15 \\ 35 & -28 \\ 20 & 7 \\ -17 & 9 \\ 42 & -6 \end{bmatrix}$
14. Explain why you can't multiply $[A][C]$ … The number of columns in $[A]$ is different from the number of rows in $[B]$. That is, the dimensions of the two are 2 x 5 and 2 x 2; the middle numbers—5 and 2—are different.
15. If you multiply $[A][B]$, what are the dimensions of the answer? … 2 x 2 (because the dimensions of the two are 2 x 5 and 5 x 2; the dimensions of the answers are the outside terms—the rows of the first and the columns of the second)
16. If you multiply $[B][A]$, what are the dimensions of the answer? … 5 x 5
17. Find the determinant $\begin{vmatrix} 2 & 3 \\ 5 & 10 \end{vmatrix}$ … 5 $(2 \bullet 10 - 5 \bullet 3)$
18. Find the determinant $\begin{vmatrix} 4 & 8 \\ -7 & 5 \end{vmatrix}$ … 76 $(4 \bullet 5 - -7 \bullet 8)$
19. Use a calculator to find the determinant $\begin{vmatrix} 1 & 9 & -5 \\ 3 & 0 & 8 \\ 4 & -2 & 7 \end{vmatrix}$ … 145

20. Explain why you can't find a determinant for the matrix $\begin{bmatrix} 4 & 7 & -5 \\ 2 & -1 & 0 \end{bmatrix}$ … It's not a square matrix. (The number of rows and columns are different.)

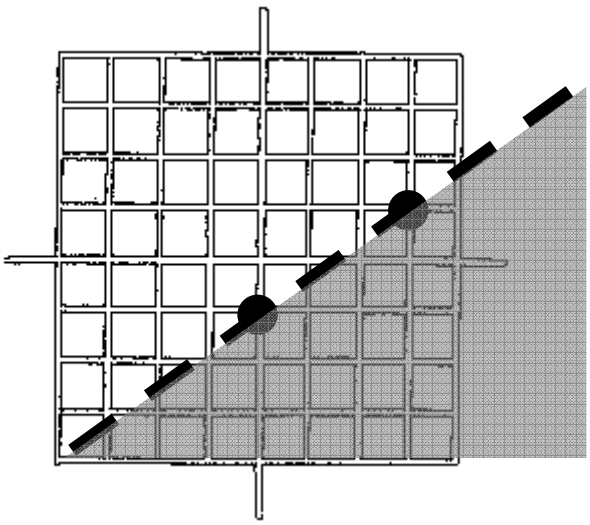
21. Use Cramer's Rule to solve the system of equations $\begin{cases} 3x + 7y = 5 \\ 4x - 2y = 9 \end{cases}$

… $D = \begin{vmatrix} 3 & 7 \\ 4 & -2 \end{vmatrix} = -34$, $D_x = \begin{vmatrix} 5 & 7 \\ 9 & -2 \end{vmatrix} = -73$, $D_y = \begin{vmatrix} 3 & 5 \\ 4 & 9 \end{vmatrix} = 7$,

$x = \dfrac{-73}{-34} \approx 2.147$, $y = \dfrac{7}{-34} \approx -.206$

22. x = 5, y = -2
23. x = 5, y = -2 (same answer as #22)
24. Total number: $a + s = 319$
    Value of tickets: $6a + 4s = 1690$
    Answer: 207 adults and 112 students
25. Total number: $d + q = 30$
    Value of coins: $.10d + .25q = 4.95$
    Answer: 17 dimes and 13 quarters
26. Amount invested: $x + y = 3500$
    Value of interest: $.02x + .03y = 92.50$
    Answer: $1250 invested at 2% and $2250 invested at 3%
27. $x = \dfrac{56}{8} = 7$, $y = \dfrac{-32}{8} = -4$, $z = \dfrac{40}{8} = 5$

A. Graph $y < \dfrac{2}{3}x - 1$ … Slope $\dfrac{2}{3}$, y-intercept -1



B. $3x + 2y \geq 6$ ... $(0,3)$ and $(2,0)$ are intercepts