Unit 4 Study Guide

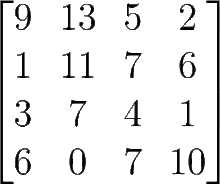
Matrices 

**Concepts:**

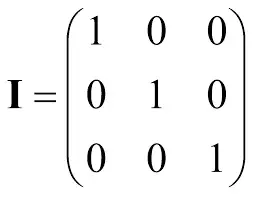
* Basic Operations
* Applications of Basic Operations
* Inverse Matrices
* Solving Systems of Equations (without Matrices)
* Using Matrices to Solve Systems
* Using Matrix Row Operations

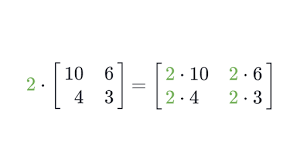
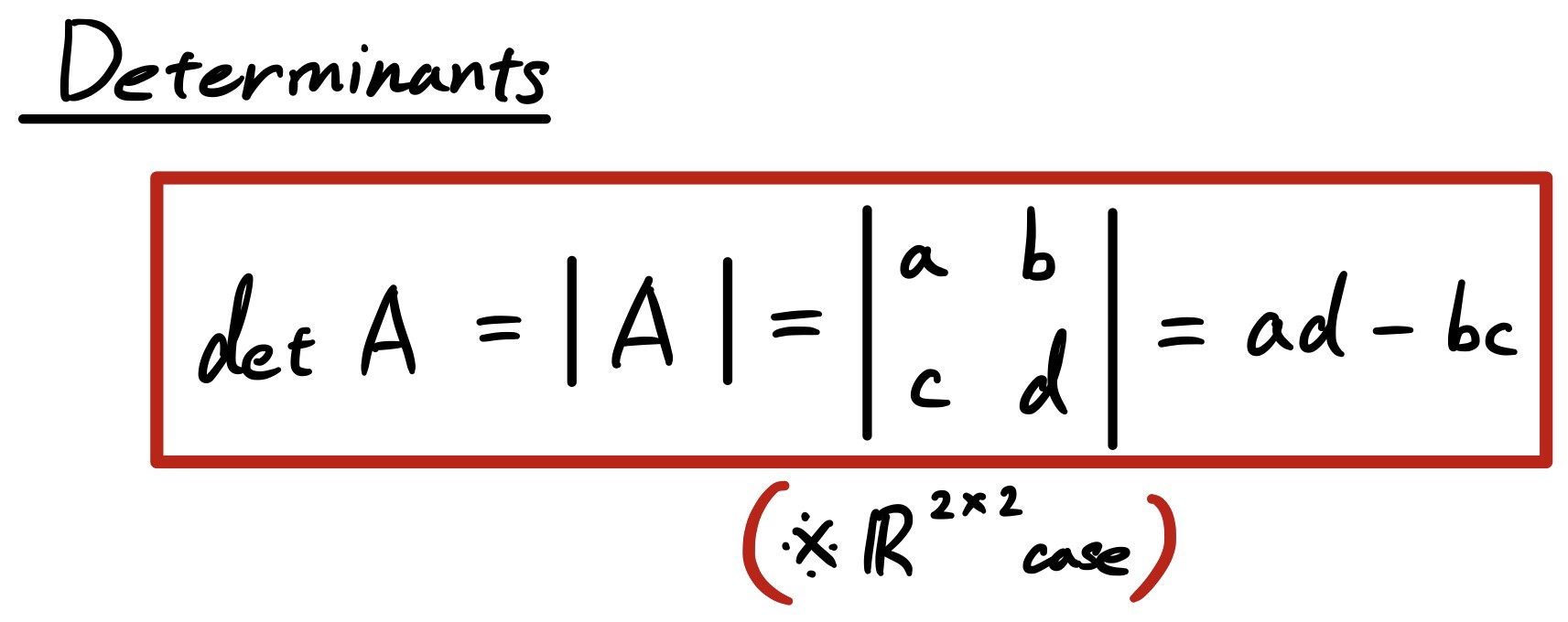
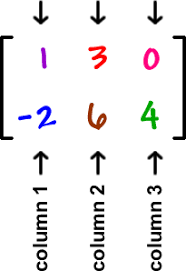
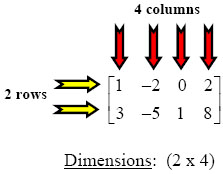
**Vocabulary:**

* *Commutative-*
  + A+ B= B+A
* *Associative-*
  + (A+B) + C= A+ (B+A)
* *Additive Identity*-
  + In a given mathematical system leaves unchanged any element to which it is added.
* *Additive Inverse-* 
  + For a real number, it reverses its sign: the opposite of a positive number is negative, and the opposite to a negative number is positive.
* *Square Matrix*-
  + A matrix that has the same number of columns and rows

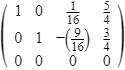
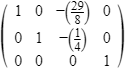


* *Identity Matrix*-
  + Contains 1 on the main diagonal and 0s elsewhere



* *Scaler Multiplication-*
  + to multiply a matrix by a real number,k, multiply each number each number by k
  + 
* *Determinant*-
  + 
    - Remember that if the determinant does not equal 0 it has an inverse
* *Matrix*-
  + A rectangular array of numbers enclosed in a single set of brackets
  +  also… 
* *Dimensions*-
  + The description of the shape of a Matrix
  + given row by column
  + 
    - Calculator Function:

1. Function-2nd x^-1 - 1- Enter your matrix
2. 2nd quit- 2nd x^-1- math- 1- 2nd x^-1- 1- Enter to get your answer

* *Interpretation-*
  + One solution or independent
    - Each x, y, and z have answers and diagonal are 1s.
    - ex:
  + Many solutions or dependent
    - Last row is all 0’s
    - ex:
  + No solution or inconsistent
    - Last row is 0 0 0 1
    - ex:

Practice Problems:

**4.1 Basic Operations:**

1. State the dimensions of the matrix.

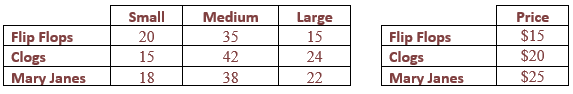


1. Identify the indicated element in the following matrix.

**A=** ****  **a3, 1**

1. +
2. -
3. +
4. 
5. 
6. +
7. 

**4.2 Applications of Basic Operations**

10. The following matrix consists of a shoe store’s inventory of flip flops, clogs, and Mary Janes in sizes small, medium, and large:

How much their inventory is worth for all the shoes?

11. A nut distributor wants to know the nutritional content of various mixtures of almonds, cashews, and pecans. Her supplier has provided the following nutrition information:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Almonds** | **Cashews** | **Pecans** |
| **Protein** (g/cup) | 26.2 | 21 | 10.1 |
| **Carbs** (g/cup) | 40.2 | 44.8 | 14.3 |
| **Fat** (g/cup) | 71.9 | 63.5 | 82.8 |

Her first mixture, a protein blend, consists of 6 cups of almonds, **3** cups of cashews, and **1** cup of pecans. Her second mixture, a low fat mix, consists of **3** cups of almonds, **6** cups of cashews, and **1** cup of pecans. Her third mixture, a low carb mix consists of **3** cups of almonds, **1** cup of cashews, and **6** cups of pecans. **Determine the amount of protein, carbs, and fats in a 1 cup serving of each of the mixtures.**

**4.3 Inverse Matrices and Finding the Determinant**

12. Find the determinate and the inverse.



13. Find the determinate and the inverse.



14. Find the determinate and the inverse.



15. Are these inverses? Explain.

 = 

**4.4 Examples- Solving Systems with 3 Variables**

16. 20x+5y+5z=25

15x+15y-10z=110

5x-10y-5z=15

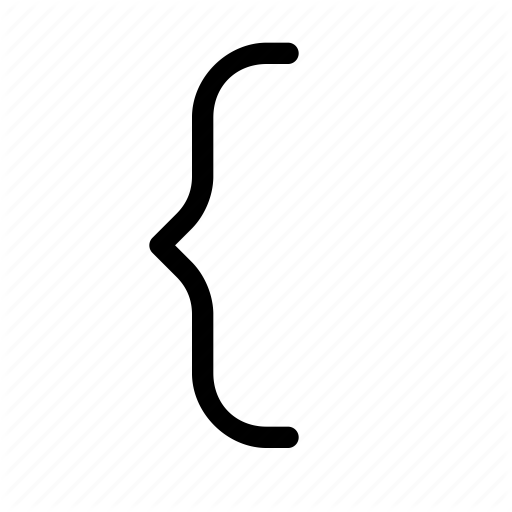
17. -4y-12z=8

2y+8z=-10

2x+4y+14z=-2

**4.5 Using Matrices to Solve Systems**

18.



Solve if possible, by using a matrix equation. If not possible,

classify the system.

19. Lydia wants to invest $16,000 in a low-risk investment that earns 7% per year and some of the money a high-risk investment that earns 12% per year. How much money should be invested at each interest rate to earn $1,200 in interest per year?

**4.6 Using Augmented Matrices to Solve Systems**

20. -1x+2y+2z=15

x+y-2= z

3y-z-18=-2x

21. y= -3x+3z+13

-3x+7z-7y= 6

-2x+2z-6y= 30