

Problem 1. Solve the following pair of equations for x and y :

$$3x - 2y = 1$$

$$2x - 5y = 2$$

Problem 2. Consider the function $f(x) = \log_2(x)$. Find the line $ax + b$ which intersects f when $x = 0$ and when $x = 4$.

Problem 3. Suppose that there are 40 students in a class made up of freshman, sophomores, and juniors. There are twice as many freshman as sophomores. The number of sophomores and juniors equals the number of freshman. How many freshman, sophomores, and juniors are there?

Problem 4. Let

$$A = \begin{bmatrix} 1 & -1 \\ 3 & 1 \end{bmatrix}, \quad B = \begin{bmatrix} 2 & 3 \\ -2 & 1 \end{bmatrix}$$

Find AB .

Problem 5. If A is the matrix

$$\begin{bmatrix} 1 & 5 & 4 \\ 2 & 5 & 3 \\ 6 & 4 & 1 \end{bmatrix}$$

then it has an inverse

$$A^{-1} = \frac{1}{30} \begin{bmatrix} 14 & -22 & 10 \\ -32 & 46 & -10 \\ 44 & -52 & 10 \end{bmatrix}$$

Use this to solve the system of equations

$$x + 5y + 4z = 1$$

$$2x + 5y + 3z = 2$$

$$6x + 4y + z = 10$$

Problem 6. Find the inverse of the matrix

$$\begin{bmatrix} 2 & 3 \\ 1 & 3 \end{bmatrix}$$

Problem 7. Find the determinant of the following matrix

$$\begin{bmatrix} 1 & 5 & 2 \\ 0 & 1 & 0 \\ 2 & 4 & 4 \end{bmatrix}$$