Sec. 12.2 Systems of Equations Containing Three Variables

To Obtain an Equivalent System of Equations -

- 1. Interchange any two equations in the system.
- 2. Multiply (or divide) each side of an equation by the same nonzero constant.
- 3. Replace any equation in the system by the sum (or difference) of that equation and a nonzero multiple of any other equation in the system.

To Solve with 3 Variables -

- 1. Use either substitution or elimination to combine two of the three equations.
- 2. Simplify.
- 3. Use another substitution or elimination to solve for one variable.
- 4. Now use that variable to find the other 2 variables (work in reverse order).

Ex: Solve the following linear equations.

Ex: Solve the following linear equations.
$$\begin{cases}
x + y - z = -1 \\
4x - 3y + 2z = 16 \\
2x - 2y - 3z = 5
\end{cases}$$

$$\begin{cases}
x + y - z = -1 \\
4x - 3y + 2z = 16
\end{cases}$$

$$\begin{cases}
7x - z = 13 \\
2x + 2y - 2z = -2 \\
4x - 3y + 2z = 16
\end{cases}$$

$$\begin{cases}
7x - z = 13 \\
2x + 2y - 3z = 5
\end{cases}$$

$$\begin{cases}
7x - z = 13 \\
2x + 2y - 3z = 5
\end{cases}$$

$$\begin{cases}
7x - z = 13 \\
2x - 2y - 3z = 5
\end{cases}$$

$$\begin{cases}
7x - z = 13 \\
2x - 2y - 3z = 5
\end{cases}$$

$$\begin{cases}
7x - z = 13 \\
2x - 2y - 3z = 3
\end{cases}$$

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2x - 2y - 3z = 3
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Ex: Solve the following linear equations.

Ex: Solve the following linear equations.

$$\begin{cases}
2x+y-z=-2 \\
x+2y-z=-9 \\
x-4y+z=1
\end{cases}$$

$$(3x-3y=-1)x2 \qquad (2x-2y=-P)x-3$$

$$(4x-6y=-2)x-3y=-1 \qquad (2x-2y=-P)x-3$$

$$(5x-6y=-2)x-3y=-1 \qquad (2x-2y=-P)x-3$$

$$(5x-6y=-2)x-3y=-1 \qquad (2x-2y=-P)x-3$$

$$(5x-6y=-2)x-3y=-1 \qquad (2x-2y=-P)x-3$$

Ex: Find real numbers a, b, and c so that the graph of the function $y = ax^2 + bx + c$ contains the points (-1, 4) (2, 3) and (0, 1).

CREATE ONE EQUATION FOR EACH POINT - SOLVE FOR a, b, C.

$$(-1,4) \rightarrow 4 = a(-1)^{2} + b(-1) + C$$

$$(2,3) \rightarrow 3 = a(2)^{2} + b(2) + C$$

$$(0,1) \rightarrow 1 = a(0)^{2} + b(0) + C$$

$$3 = 4a + 2b + C$$

$$3 = 4a + 2b + C$$

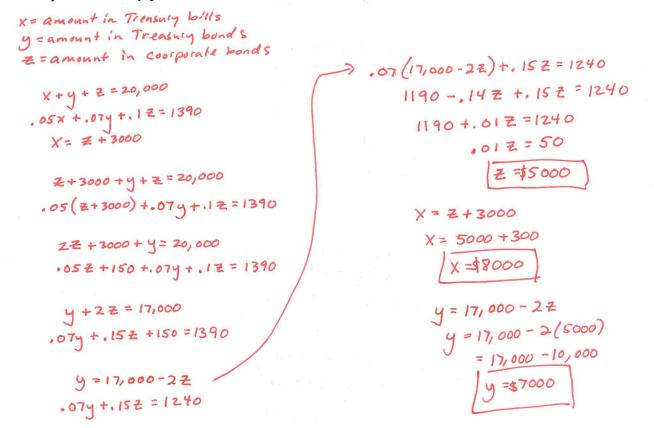
$$3 = 4a + 2b + C$$

$$2 = 4(3+b) + 2b$$

$$3 = 4a + 2b + 1$$

$$2 = 4a + 2b +$$

Ex: Kelly has \$20,000 to invest. As her financial planner, your recommend that she diversify into three investments: Treasury bills that yield 5% simple interest, Treasury bonds that yield 7% simple interest, and corporate bonds that yield 10% simple interest. Kelly wishes to earn \$1390 per year in income. Also, Kelly wants her investment in Treasury bills to be \$3000 more than her investment in corporate bonds. How much money should Kelly place in each investment?



HW: pg 755 #5,8,13,18,21-23*,25**

**Answer first question only.

^{*}Set up system of equations but do not solve.