

I will present this problem to the rest of the class.

Stock Market Losses In 2008 Gerhart lost twice as much in the futures market as he did in the stock market. If his losses totaled \$18,630, then how much did he lose in each market?

1. Assign variables (verbal description AND units involved)
2. Set up system of equations
3. Solve system of equations
4. Interpret Solution

① Let $x =$ the amount lost in futures mkt (\$)
 $y =$ stock (\$)

The amt lost in futures is twice the amt lost on stocks.

$$\begin{aligned} x &= 2y \\ x + y &= 18,630 \end{aligned} \quad \left. \begin{array}{l} x - 2y = 0 \\ x + y = 18,630 \end{array} \right\}$$

$$\left[\begin{array}{cc|c} 1 & -2 & 0 \\ 1 & 1 & 18630 \end{array} \right] \begin{array}{l} R1 \\ -R1+R2 \end{array} \rightarrow \left[\begin{array}{cc|c} 1 & -2 & 0 \\ 0 & 3 & 18630 \end{array} \right] \begin{array}{l} \text{Echelon} \\ \text{Form is} \\ \text{cool.} \end{array}$$

$$3y = 18630$$

$$y = \frac{18630}{3} = \$6,210 = \text{amt lost on stocks.}$$

$$x = 2y = 2(6210) = \$12,420 = \text{amt lost on futures.}$$

He lost \$6210 on stocks and \$12420 on futures.

check

$$\left[\begin{array}{cc} 1 & -2 \\ 1 & 1 \end{array} \right] \begin{array}{l} \rightarrow 12420 \\ \rightarrow 6210 \end{array} = \left[\begin{array}{c} 12420 - 12420 \\ 12420 + 6210 \end{array} \right] = \left[\begin{array}{c} 0 \\ 18630 \end{array} \right]$$

$$-25x - 3y = -41$$

$$10x + y = 17$$

$$\left[\begin{array}{cc|c} -25 & -3 & -41 \\ 10 & 1 & 17 \end{array} \right] \xrightarrow[-\frac{1}{25}R_1]{R_2} \left[\begin{array}{cc|c} 1 & \frac{3}{25} & \frac{41}{25} \\ 10 & 1 & 17 \end{array} \right]$$

$$\begin{array}{l} R_1 \\ -10R_1 + R_2 \end{array} \left[\begin{array}{cc|c} 1 & \frac{3}{25} & \frac{41}{25} \\ 0 & -\frac{1}{5} & \frac{3}{5} \end{array} \right] \xrightarrow[-10R_1]{-10R_2} \left[\begin{array}{cc|c} 1 & \frac{3}{25} & \frac{41}{25} \\ 0 & -\frac{1}{5} & \frac{3}{5} \end{array} \right]$$

$$-\frac{30}{25} = -\frac{6}{5}$$

$$-\frac{410}{25} = -\frac{82}{5}$$

$$17 \cdot \frac{5}{5} = \frac{85}{5}$$

$$\begin{array}{l} R_2 \quad 10 \quad 1 \quad 17 \\ R_2 \quad 10 \quad \frac{5}{5} \quad \frac{85}{5} \end{array}$$

$$\begin{array}{cccc} -10R_1 & -10 & -\frac{30}{25} & -\frac{410}{25} \\ -10R_1 & -10 & -\frac{10}{5} & -\frac{108}{5} \\ R_2 & 10 & \frac{10}{5} & \frac{108}{5} \\ \hline & 0 & -\frac{1}{5} & -\frac{3}{5} \end{array}$$

$$\begin{array}{l} R_1 \\ -5R_2 \end{array} \left[\begin{array}{cc|c} 1 & \frac{3}{25} & \frac{41}{25} \\ 0 & 1 & +3 \end{array} \right]$$

$$\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} \frac{12}{25} \\ -3 \end{bmatrix}$$

$$y = +3$$

$$x + \frac{3}{25}(+3) = \frac{41}{25}$$

$$x + \frac{9}{25} = \frac{41}{25}$$

$$x = \frac{32}{25}$$

Check $\left[\begin{array}{cc} -25 & -3 \\ 10 & 1 \end{array} \right] \begin{bmatrix} \frac{32}{25} \\ +3 \end{bmatrix} = \begin{bmatrix} -32 & -9 \end{bmatrix}$ ~~None.~~

$$\frac{320}{25} + 3$$

Your team will present this problem to the rest of the class on the WhiteBoard (or SmartBoard, if you prefer).

Book Prices At the Book Exchange, all paperbacks sell for one price and all hardbacks sell for another price. Tanya got six paperbacks and three hardbacks for \$8.25, while Gretta got four paperbacks and five hardbacks for \$9.25. What was Todd's bill for seven paperbacks and nine hardbacks?

1. Assign variables (verbal description AND units involved)
2. Set up system of equations
3. Solve system of equations
4. Interpret Solution

Team: _____

Just Numbers The sum of three numbers is 40. The difference between the largest and the smallest is 12, and the largest is equal to the sum of the two smaller numbers. Find the numbers.

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Quizzes The Rabbit had an average (mean) score of 7 on the first three College Algebra 101 quizzes. His second quiz score was one point higher than the first quiz score and the third was 4 points higher than the second. What were the three scores?

HINT Mean is the total of the scores divided by the number of scores.

1. Assign variables (verbal description AND units involved)
2. Set up system of equations
3. Solve system of equations
4. Interpret Solution

Team: _____

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Stocks, Bonds, and a Mutual Fund Marita invested a total of \$25,000 in stocks, bonds, and a mutual fund. In one year she earned 8% on her stock investment, 10% on her bond investment, and 6% on her mutual fund, with a total return of \$1860. Unfortunately, the amount invested in the mutual fund was twice as large as the amount she invested in the bonds. How much did she invest in each?

1. Assign variables (verbal description AND units involved)
2. Set up system of equations
3. Solve system of equations
4. Interpret Solution

Team: _____

$$\begin{array}{l} -R_1 + R_2 \\ -4R_1 + R_3 \end{array} \left[\begin{array}{ccc|c} 1 & 1 & 1 & 6 \\ 0 & -2 & 4 & 14 \\ 0 & -3 & -3 & -24 \end{array} \right] \xrightarrow{-\frac{1}{2}R_2} \left[\begin{array}{ccc|c} 1 & 1 & 1 & 6 \\ 0 & 1 & -2 & -7 \\ 0 & -3 & -3 & -24 \end{array} \right]$$

$$\begin{array}{l} -3R_2 + R_3 \\ R_1 \end{array} \left[\begin{array}{ccc|c} 1 & 1 & 1 & 6 \\ 0 & 1 & -2 & -7 \\ 0 & 0 & 3 & -3 \end{array} \right] \begin{array}{l} x + y + z = 6 \\ y - 2z = -7 \end{array}$$

$\hookrightarrow 3z = -3$
 $z = -1$