

# Unit 1: Relationships, Quiz 2 Exemplars!

## Use these exemplars to examine and grow from your mistakes!

Name \_\_\_\_\_

Course: IB MYP 9 Math Extended Level

Teachers: Berg, Connelly, Oberembt, Paulson, Perkins

UNIT 1 Linear: Relationships

Key Concept: **Relationships**

Related Concept(s): **Change, System**

Global Context: **Scientific and technical innovation**

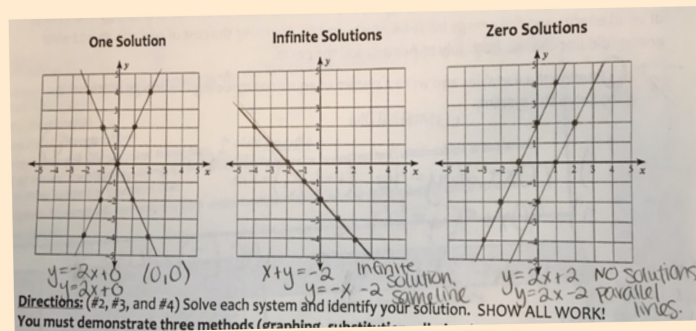
Statement of Inquiry: **Investigating changes among systems enables us to understand relationships in our world.**

Task Title: Solving Systems of Equations Quiz

Task Description: Students will demonstrate their understanding of graphing and using substitution to solve a system of equations.

7	<ul style="list-style-type: none"> <li>Select appropriate mathematics when solving <b>challenging problems in both familiar and unfamiliar situations.</b></li> </ul>	<ul style="list-style-type: none"> <li>All problems are solved <b>without error.</b></li> <li>Special cases illustrated.</li> <li><b>3</b> methods to solve are demonstrated.               <ul style="list-style-type: none"> <li>-Graphing, Substitution, Elimination</li> </ul> </li> <li><b>Matrices must be one method:</b> Row reduction rules are written correctly.</li> <li>-Variables defined correctly.</li> </ul>
8	<ul style="list-style-type: none"> <li>Apply the selected mathematics successfully when solving these problems.</li> <li>Generally solve these problems correctly.</li> </ul>	

### Version 1



Version 1

2)

$$6x + 5y = 3$$

$$y = 4x + 11$$

$$6x + 5(4x + 11) = 3$$

$$6x + 20x + 55 = 3$$

$$\begin{array}{r} 26x + 55 = 3 \\ -55 \quad -55 \\ \hline 26x = -52 \end{array}$$

$$26x = -52$$

$$x = -2$$

$$\frac{11 + 4x = y}{11 + 4(-2) = y}$$

$$11 + 4(-2) = y$$

$$11 - 8 = y$$

$$3 = y$$

$$\boxed{(-2, 3)}$$

Version 1

2)

$$6x + 5y = 3$$

$$y = 4x + 11$$

$$6x + 5(4x + 11) = 3$$

$$6x + 20x + 55 = 3$$

$$\begin{array}{r} 26x + 55 = 3 \\ -55 \quad -55 \\ \hline 26x = -52 \end{array}$$

$$-55 \quad -55$$

$$26x = -52$$

$$\frac{26x}{26} = \frac{-52}{26}$$

$$x = -2$$

$$y = 4(-2) + 11$$

$$y = -8 + 11 \quad \text{check}$$

$$y = 3$$

$$(-2, 3)$$

$$6(-2) + 5(3) = 3$$

$$-12 + 15 = 3$$

$$3 = 3$$

✓

Version 1

3)

$$\begin{aligned} -6x + y &= -14 \\ -3x - 6y &= 6 \end{aligned}$$
$$\begin{bmatrix} -6 & 1 & -14 \\ -3 & -6 & 6 \end{bmatrix} R_1 \leftrightarrow R_2$$
$$\begin{bmatrix} -3 & -6 & 6 \\ -6 & 1 & -14 \end{bmatrix} 2R_1 + R_2 \rightarrow R_2$$
$$\begin{bmatrix} -3 & -6 & 6 \\ 0 & 13 & -26 \end{bmatrix} \frac{1}{13}R_2 \rightarrow R_2$$
$$\begin{bmatrix} -3 & -6 & 6 \\ 0 & 1 & -2 \end{bmatrix} \frac{1}{3}R_1 \rightarrow R_1$$
$$\begin{bmatrix} 1 & 2 & -2 \\ 0 & 1 & -2 \end{bmatrix} 2R_2 + R_1 \rightarrow R_1$$
$$\begin{bmatrix} 1 & 0 & 2 \\ 0 & 1 & -2 \end{bmatrix} \begin{matrix} x = 2 \\ y = -2 \end{matrix} \quad (2, -2)$$

Version 1

3) elimination:

$$\begin{aligned} -6x + y &= -14 & -6x + 1y &= -14 \\ -3x - 6y &= 6 & -3x + 12y &= -12 \end{aligned}$$
$$\begin{aligned} -6x - 2 &= -14 & & \\ +2 & +2 & & \\ -6x &= -12 & & \end{aligned}$$
$$\boxed{x = 2}$$
$$\boxed{y = -2}$$

$(2, -2)$

Version 1

3) MATRICES

$$\begin{array}{l} -6x + y = -14 \\ -3x - 6y = 6 \end{array} \quad \left[ \begin{array}{cc|c} -3 & -6 & 6 \\ -6 & 1 & -14 \end{array} \right] \begin{array}{l} \xrightarrow{2R_1 + R_2} \\ \rightarrow R_2 \end{array}$$

$$-6(2) + (-2) = -14 \quad \left[ \begin{array}{cc|c} -3 & -6 & 6 \\ 0 & 13 & -26 \end{array} \right] \begin{array}{l} \xrightarrow{\frac{1}{13}R_2 \rightarrow R_2} \end{array}$$

$$-12 - 2 = -14 \quad \left[ \begin{array}{cc|c} -3 & -6 & 6 \\ 0 & 1 & -2 \end{array} \right] \begin{array}{l} \xrightarrow{\frac{1}{3}R_1 \rightarrow R_1} \end{array}$$

$$-14 = -14 \quad \left[ \begin{array}{cc|c} 1 & 2 & -2 \\ 0 & 1 & -2 \end{array} \right] \begin{array}{l} \xrightarrow{-2R_2 + R_1} \\ \rightarrow R_1 \end{array}$$

(TRUE)

$$\left[ \begin{array}{cc|c} 1 & 0 & 2 \\ 0 & 1 & -2 \end{array} \right]$$

$x = 2$   
 $y = -2$        $(2, -2)$

Version 1

3)

$$\begin{array}{l} -6x + y = -14 \\ -3x - 6y = 6 \end{array}$$

Elimination Method:  
 $(2, -2)$

$$-2(-3x - 6y) = (6) = 2$$

$$6x + 12y = -12$$

$$6x + 12y = -12$$

$$+ \quad -6x + y = -14$$


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$$13y = -26$$

$$y = -2$$

$$-3x - 6y = 6$$

$$-3x - 6(-2) = 6$$

$$-3x - 12 = 6$$

$$-3x + 12 = 6$$

$$-12 - 12 = 6$$


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$$-3x = -6$$

$$x = 2$$

check:

$$-6x + y = -14$$

$$-6(2) + (-2) = -14$$

$$-12 - 2 = -14$$

$$-14 = -14 \checkmark$$

$$-3x - 6y = 6$$

$$-3(2) - 6(-2) = 6$$

$$-6 + 12 = 6$$

$$6 = 6 \checkmark$$

Version 1

4) A household in July used 100 kilowatt hours (kWh) of coal energy and 20 kWh of wind energy. The energy bill was \$46. In the month of August, the household used 90 kWh of coal energy and 35 kWh of wind energy and the energy bill for August was \$55. Assuming the cost of coal energy and wind energy did not change from July to August, find the prices.

a) Define the variables and write a system of equations modeling the energy relationships.  
 b) Solve the system.

a)  $100c + 20w = 46$   
 $90c + 35w = 55$

b)  $\begin{bmatrix} 100 & 20 & 46 \\ 90 & 35 & 55 \end{bmatrix}$

$\frac{1}{100}R_1 \rightarrow R_1$

$\begin{bmatrix} 1 & \frac{1}{5} & \frac{23}{50} \\ 90 & 35 & 55 \end{bmatrix}$

$-90R_1 + R_2 \rightarrow R_2$

$\begin{bmatrix} 1 & \frac{1}{5} & \frac{23}{50} \\ 0 & 17 & \frac{68}{5} \end{bmatrix}$

$\frac{1}{17}R_2 \rightarrow R_2$

$\begin{bmatrix} 1 & \frac{1}{5} & \frac{23}{50} \\ 0 & 1 & \frac{34}{85} \end{bmatrix}$

$-\frac{1}{5}R_2 + R_1 \rightarrow R_1$

$\begin{bmatrix} 1 & 0 & \frac{310}{85} \\ 0 & 1 & \frac{34}{85} \end{bmatrix}$

$\frac{1}{17}R_2 \rightarrow R_2$

$\begin{bmatrix} 1 & 0 & \frac{310}{85} \\ 0 & 1 & \frac{34}{85} \end{bmatrix}$

$(\frac{310}{85}, \frac{34}{85})$

One kWh of Coal = \$0.3  
 One kWh of Wind = \$0.8

Version 1

variables: cost of coal, cost of wind

4) A household in July used 100 kilowatt hours (kWh) of coal energy and 20 kWh of wind energy. The energy bill was \$46. In the month of August, the household used 90 kWh of coal energy and 35 kWh of wind energy and the energy bill for August was \$55. Assuming the cost of coal energy and wind energy did not change from July to August, find the prices.

$x = \text{coal}$   
 $y = \text{wind}$

a) Define the variables and write a system of equations modeling the energy relationships.  
 b) Solve the system.

$100x + 20y = 46$   
 $90x + 35y = 55$

$-175x - 35y = -80.5$   
 $90x + 35y = 55$

$\frac{85x}{-85} = \frac{-25.5}{-85}$

$x = 0.3$

$(0.3, 0.8)$

$100(0.3) + 20y = 46$   
 $30 + 20y = 46$   
 $-30$   
 $\frac{20y}{20} = \frac{16}{20}$   
 $y = 0.8$

Version 1

4) A household in July used 100 kilowatt hours (kWh) of coal energy and 20 kWh of wind energy. The energy bill was \$46. In the month of August, the household used 90 kWh of coal energy and 35 kWh of wind energy and the energy bill for August was \$55. Assuming the cost of coal energy and wind energy did not change from July to August, find the prices.

- a) Define the variables and write a system of equations modeling the energy relationships.  
 b) Solve the system.

$C$ : Coal energy  
 $W$ : Wind energy

$$\begin{aligned} 100C + 20W &= 46 \\ 90C + 35W &= 55 \end{aligned}$$

$$\begin{aligned} (100C + 20W = 46) \cdot 9 & \rightarrow 900C + 180W = 414 \\ (90C + 35W = 55) \cdot 10 & \rightarrow 900C + 350W = 550 \\ \hline -170W &= -136 \\ \frac{-170W}{-170} &= \frac{-136}{-170} \\ W &= .8 \end{aligned}$$

$$\begin{aligned} 100C + 16 &= 46 \\ & -16 \\ \hline 100C &= 30 \\ \frac{100C}{100} &= \frac{30}{100} \\ C &= .3 \end{aligned}$$

Coal: \$.30  
 Wind: \$.80

Version 1

4) A household in July used 100 kilowatt hours (kWh) of coal energy and 20 kWh of wind energy. The energy bill was \$46. In the month of August, the household used 90 kWh of coal energy and 35 kWh of wind energy and the energy bill for August was \$55. Assuming the cost of coal energy and wind energy did not change from July to August, find the prices.

- a) Define the variables and write a system of equations modeling the energy relationships.  
 b) Solve the system. ( $C$  = Coal  $W$  = Wind | GOAL:  $\begin{bmatrix} 1 & 0 & | & C \\ 0 & 1 & | & W \end{bmatrix}$ )

MATRICES

$$\begin{aligned} 100C + 20W &= 46 \\ 90C + 35W &= 55 \end{aligned}$$

$$\begin{aligned} [100 \ 20 \ | \ 46] \cdot 9 &= R_1 \\ [90 \ 35 \ | \ 55] \cdot 10 &= R_2 \end{aligned}$$

$$\begin{aligned} [900 \ 180 \ | \ 414] &= R_1 \\ [900 \ 350 \ | \ 550] &= R_2 \end{aligned}$$

$$\begin{aligned} [900 \ 180 \ | \ 414] - 10R_2 &= R_1 \\ [0 \ 1 \ | \ .8] &= R_2 \end{aligned}$$

$$\begin{aligned} [900 \ 180 \ | \ 414] &= R_1 \\ [900 \ 350 \ | \ 550] &= R_2 \end{aligned}$$

$$\begin{aligned} [900 \ 180 \ | \ 414] - 10R_2 &= R_1 \\ [0 \ 1 \ | \ .8] &= R_2 \end{aligned}$$

$$\begin{aligned} [900 \ 180 \ | \ 414] &= R_1 \\ [0 \ 1 \ | \ .8] &= R_2 \end{aligned}$$

$$\begin{aligned} [900 \ 180 \ | \ 414] - 10R_2 &= R_1 \\ [0 \ 1 \ | \ .8] &= R_2 \end{aligned}$$

COAL = \$.3  
 WIND = \$.8

Version 1

5) Create a system of equations with a solution of (7, -5) and verify algebraically that the solution works for both equations.

$$\begin{cases} 10x + 13y = 5 \\ 4x + 2y = 18 \end{cases}$$

$$\begin{aligned} 10(-\frac{1}{2}y + 4.5) + 13y &= 5 \\ -5y + 45 + 13y &= 5 \\ 8y + 45 &= 5 \\ 8y &= -40 \\ \frac{8y}{8} &= \frac{-40}{8} \\ \boxed{y = -5} \end{aligned}$$

$$\begin{aligned} 4x + 2y &= 18 \\ -2y \quad -2y & \\ \hline 4x &= -2y + 18 \\ & \quad 4 \\ x &= -\frac{1}{2}y + 4.5 \end{aligned}$$

$$\begin{aligned} 4x + 2(-5) &= 18 \\ 4x - 10 &= 18 \\ 4x &= 28 \\ \frac{4x}{4} &= \frac{28}{4} \\ \boxed{x = 7} \end{aligned}$$

Version 1

5) Create a system of equations with a solution of (7, -5) and verify algebraically works for both equations.

I created my system of equations using a graph. I solved it using the method of substitution.

$$\begin{cases} y = x + 12 \\ y = -x + 2 \end{cases}$$

$$\begin{aligned} y &= x + 12 \\ y &= -x + 2 \\ x + 12 &= -x + 2 \\ +x \quad +x & \\ 2x + 12 &= 2 \\ +12 \quad +12 & \\ \hline 2x &= 14 \\ \frac{2x}{2} &= \frac{14}{2} \\ x &= 7 \end{aligned}$$

$$\begin{aligned} y &= x + 12 \\ y &= (-5) + 2 \\ y &= 5 + 2 \\ y &= 7 \end{aligned}$$







**Version 1**

5) Create a system of equations with a solution of (7, -5) and verify algebraically that the solution works for both equations.

$x = 7 \quad y = -5$

$(2x + 8y = -26) - 2$

$2x + 8(-5) = -26$

$4x - 3y = 43$

$2x - 40 = -26$

$-4x - 16y = 52$

$+40 \quad +40$

$\frac{-19y = 95}{-19 \quad -19}$

$\frac{2x = 14}{2 \quad 2}$

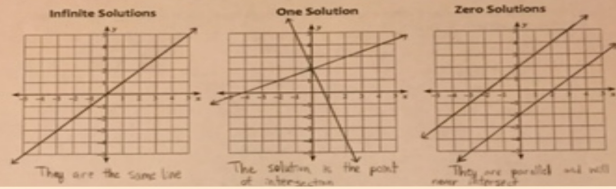
$y = -5$

$x = 7$

$(7, -5)$

**Version 2**

1) Draw graphs of systems demonstrating all cases: one solution, no solution, and infinite solutions.



Version 2

$$\begin{aligned} 2) \\ y &= 2x + 4 \\ -7x + 7y &= 7 \\ -7x + 7(2x + 4) &= 7 \\ -7x + 14x + 28 &= 7 \\ 7x + 28 &= 7 \\ 7x &= -21 \\ x &= -3 \\ y &= -6 + 4 \quad (-3, -2) \\ y &= -2 \end{aligned}$$

Version 2

$$\begin{aligned} 2) \\ y &= 2x + 4 \\ -7x + 7y &= 7 \\ \hline -x + y &= 1 \\ x &= y - 1 \\ y &= x + 1 \end{aligned}$$

Check:  $-7(-3) + 7(-2) = 7$   
 $21 + (-14) = 7$   
 $7 = 7$  ✓

$$\boxed{(-3, -2)}$$
$$\begin{aligned} y &= 2x + 4 \\ -x &= (x + 1) - 2 \\ -x &= x - 1 \\ + & \\ -2x &= 2x - 2 \\ \hline -4x &= 2x - 4 \\ -4x &= 2x - 4 \\ -6 &= 2x - 4 \\ -6 + 4 &= 2x - 4 + 4 \\ -2 &= 2x \\ -2 &= 2x \\ \frac{-2}{2} &= \frac{2x}{2} \quad x = -1 \end{aligned}$$

Version 2

3) Matrices  
 $-6x - 2y = 0$   
 $-3x + 3y = -12$

$$\begin{array}{l} \begin{array}{l} -6 \ -2 \ | \ 0 \\ -3 \ 3 \ | \ -12 \end{array} \\ \xrightarrow{\cdot 2} \\ \begin{array}{l} -6 \ -4 \ | \ 0 \\ -3 \ 3 \ | \ -12 \end{array} \\ \xrightarrow{+R_2} \\ \begin{array}{l} -6 \ -4 \ | \ 0 \\ -1 \ 1 \ | \ -4 \end{array} \\ \xrightarrow{-7R_2 + R_1} \\ \begin{array}{l} -6 \ -4 \ | \ 0 \\ -1 \ 1 \ | \ -4 \end{array} \\ \xrightarrow{R_1 + R_2} \\ \begin{array}{l} -1 \ -9 \ | \ -4 \\ -1 \ 1 \ | \ -4 \end{array} \\ \xrightarrow{+R_2} \\ \begin{array}{l} -1 \ -9 \ | \ -4 \\ 0 \ -8 \ | \ 24 \end{array} \end{array}$$

$$\begin{array}{l} \xrightarrow{-\frac{1}{8}R_2} \\ \begin{array}{l} -1 \ -9 \ | \ -4 \\ 0 \ 1 \ | \ -3 \end{array} \\ \xrightarrow{+R_2} \\ \begin{array}{l} -1 \ -9 \ | \ -4 \\ 0 \ 1 \ | \ -3 \end{array} \\ \xrightarrow{+9R_2 + R_1} \\ \begin{array}{l} -1 \ 0 \ | \ -1 \\ 0 \ 1 \ | \ -3 \end{array} \\ \xrightarrow{\cdot (-1)} \\ \begin{array}{l} 1 \ 0 \ | \ 1 \\ 0 \ 1 \ | \ -3 \end{array} \\ (1, -3) \end{array}$$

Version 2

3)  $-6x - 2y = 0$   
 $-3x + 3y = -12$

$$\begin{array}{l} \begin{array}{l} \begin{bmatrix} -6 & -2 & | & 0 \\ -3 & 3 & | & -12 \end{bmatrix} \\ \xrightarrow{\cdot 2} \\ \begin{bmatrix} -6 & -4 & | & 0 \\ -3 & 3 & | & -12 \end{bmatrix} \\ \xrightarrow{+R_2} \\ \begin{bmatrix} -6 & -4 & | & 0 \\ -1 & 1 & | & -4 \end{bmatrix} \\ \xrightarrow{-7R_2 + R_1} \\ \begin{bmatrix} -6 & -4 & | & 0 \\ -1 & 1 & | & -4 \end{bmatrix} \\ \xrightarrow{R_1 + R_2} \\ \begin{bmatrix} -1 & -9 & | & -4 \\ -1 & 1 & | & -4 \end{bmatrix} \\ \xrightarrow{+R_2} \\ \begin{bmatrix} -1 & -9 & | & -4 \\ 0 & -8 & | & 24 \end{bmatrix} \\ \xrightarrow{-\frac{1}{8}R_2} \\ \begin{bmatrix} -1 & -9 & | & -4 \\ 0 & 1 & | & -3 \end{bmatrix} \\ \xrightarrow{+R_2} \\ \begin{bmatrix} -1 & 0 & | & 1 \\ 0 & 1 & | & -3 \end{bmatrix} \\ \xrightarrow{\cdot (-1)} \\ \begin{bmatrix} 1 & 0 & | & -1 \\ 0 & 1 & | & -3 \end{bmatrix} \\ (1, -3) \end{array} \end{array}$$

Version 2

$$\begin{aligned}
 &3) \quad -6x - 2y = 0 \\
 &\quad -3x + 3y = -12 \\
 &\left[ \begin{array}{cc|c} -6 & -2 & 0 \\ -3 & 3 & -12 \end{array} \right] R_2 - 2 \cdot R_1 \rightarrow R_2 \\
 &\left[ \begin{array}{cc|c} -6 & -2 & 0 \\ 0 & -8 & 24 \end{array} \right] R_2 \cdot \frac{1}{8} \rightarrow R_2 \\
 &\left[ \begin{array}{cc|c} -6 & -2 & 0 \\ 0 & 1 & -3 \end{array} \right] R_2 - 2 \cdot R_1 \rightarrow R_1 \\
 &\left[ \begin{array}{cc|c} -6 & 0 & -6 \\ 0 & 1 & -3 \end{array} \right] R_1 \cdot \frac{1}{6} \rightarrow R_1 \\
 &\left[ \begin{array}{cc|c} 1 & 0 & 1 \\ 0 & 1 & -3 \end{array} \right] \begin{array}{l} x=1 \\ y=-3 \end{array} \quad \boxed{(1, -3)}
 \end{aligned}$$

Version 2

4) A household in July used 100 kilowatt hours (kWh) of coal energy and 20 kWh of wind energy. The energy bill was \$52. In the month of August, the household used 90 kWh of coal energy and 35 kWh of wind energy and the energy bill for August was \$57. Assuming the cost of coal energy and wind energy did not change from July to August, find the prices.

- a) Define the variables and write a system of equations modeling the energy relationships.  
 b) Solve the system.

price per kWh of coal =  $x$   
 price per kWh of wind =  $y$

100 kWh coal 20 kWh wind \$52 bill JULY	90 kWh coal 35 kWh wind \$57 bill AUGUST	$  \begin{aligned}  &100x + 20y = 52 \\  &90x + 35y = 57  \end{aligned}  $ $  \begin{array}{r}  100x + 20y = 52 \\  -20y \quad -20y \\  \hline  100x = 52 - 20y \\  x = .52 - .2y  \end{array}  $	$  \begin{aligned}  &90(.52 - .2y) + 35y = 57 \\  &46.8 - 18y + 35y = 57 \\  &46.8 + 17y = 57 \\  &-46.8 \quad -46.8 \\  &\hline  17y = 10.2 \\  y = 0.6  \end{aligned}  $ $  \begin{array}{r}  100x + 20(.6) = 52 \\  100x + 12 = 52 \\  -12 \quad -12 \\  \hline  100x = 40 \\  x = .4  \end{array}  $	$  \boxed{(.4, .6)}  $ <p>The price per kWh of coal is 40¢ or \$0.40          The price per kWh of wind is 60¢ or \$0.60</p> <p>Check:  <math>100(.4) + 20(.6) = 52</math>  <math>40 + 12 = 52</math>  <math>52 = 52 \checkmark</math></p>
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Version 2

4) A household in July used 100 kilowatt hours (kWh) of coal energy and 20 kWh of wind energy. The energy bill was \$52. In the month of August, the household used 90 kWh of coal energy and 35 kWh of wind energy and the energy bill for August was \$57. Assuming the cost of coal energy and wind energy did not change from July to August, find the prices.

- a) Define the variables and write a system of equations modeling the energy relationships.  
 b) Solve the system. Elimination

$c = \text{kWh of coal energy}$   
 $w = \text{kWh of wind energy}$

$$\begin{aligned} 100c + 20w &= 52 \\ 90c + 35w &= 57 \end{aligned}$$

First equation  $\times -13/4$

$$\begin{aligned} -175c - 35w &= -91 \\ + 90c + 35w &= 57 \\ \hline -85c &= -34 \\ \frac{-85c}{-85} &= \frac{-34}{-85} \\ c &= 0.40 \end{aligned}$$

(one kWh of coal energy costs \$0.40)

$$\begin{aligned} 90(0.4) + 35w &= 57 \\ 36 + 35w &= 57 \\ 35w &= 21 \\ w &= 0.6 \end{aligned}$$

(one kWh of wind energy costs \$0.60)

$c = \$0.40$   
 $w = \$0.60$

Version 2

5) Create a system of equations with a solution of (5, 8) and verify algebraically that the solution works for both equations.

$$\begin{bmatrix} 1 & 0 & | & -5 \\ 0 & 1 & | & 8 \end{bmatrix}$$

$3R_1 \rightarrow R_1$

$$\begin{bmatrix} 3 & 0 & | & -15 \\ 0 & 1 & | & 8 \end{bmatrix}$$

$2R_2 + R_1 \rightarrow R_1$

$$\begin{bmatrix} 3 & 2 & | & 1 \\ 0 & 1 & | & 8 \end{bmatrix}$$

$-4R_2 + R_2 \rightarrow R_2$

$$\begin{bmatrix} 3 & 2 & | & 1 \\ 0 & 1 & | & 8 \end{bmatrix}$$

$-4R_2 + R_2 \rightarrow R_2$

$$\begin{bmatrix} 3 & 2 & | & 1 \\ 0 & 1 & | & 8 \end{bmatrix}$$

$-4R_2 + R_2 \rightarrow R_2$

To verify I put the augmented matrix in the calculator

$$\begin{bmatrix} 3 & 2 & | & 1 \\ 12 & 7 & | & -4 \end{bmatrix}$$

and I get  $\rightarrow \begin{bmatrix} 1 & 0 & | & -5 \\ 0 & 1 & | & 8 \end{bmatrix}$

So I know my system of equations is correct

$$\begin{aligned} 3x + 2y &= 1 \\ 12x + 7y &= -4 \end{aligned}$$

Version 2

5) Create a system of equations with a solution of  $(-5, 8)$  and verify algebraically that the solution works for both equations.

$$\begin{cases} 3x + 2y = 1 \\ -5x + 6y = 73 \end{cases}$$

$$(-5, 8)$$

$$3(-5) + 2(8) = 1$$

$$-15 + 16 = 1$$

$$1 = 1$$

$$-5(-5) + 6(8) = 73$$

$$25 + 48 = 73$$

$$73 = 73$$