

# Module 2 Problem Set

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**Due** Jan 24 by 9:59pm    **Points** 15    **Submitting** an external tool  
**Available** Jan 17 at 10pm - Mar 20 at 9:59pm 2 months

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## Review Assessment Attempts

Uber, Jacques

### Module 2 Problem Set

Started: 1/18/21, 8:01 am

Last Changed: 1/21/21, 11:13 am

Total time questions were on-screen: 359.8 minutes

Due Date: Sun 1/24/21, 9:59 pm

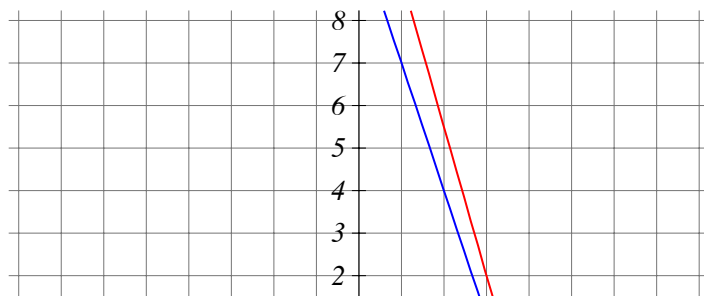
Score in Gradebook: 15/15

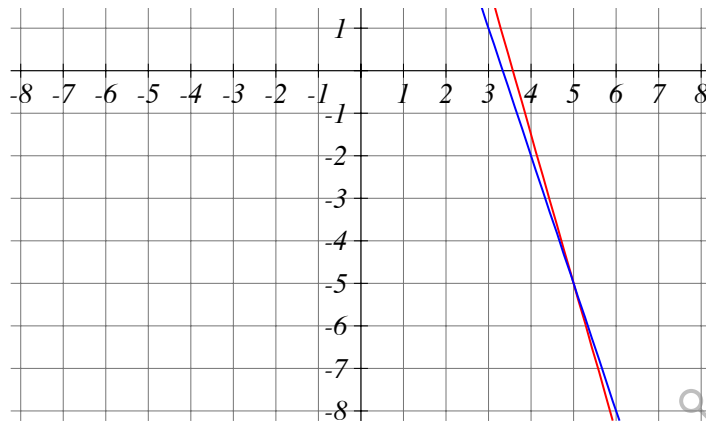
Grade is calculated on the best version of each question

Scored attempt. Score: 15/15.

Question 1.

Version 1\*/1. Score: 1/1





What is the solution of this system of linear equations?

(  ,  )

Score: 0.5/0.5 0.5/0.5

Time spent on this version: 0.2 minutes.

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### Question 2.

Version 1\*/1. Score: 1/1

Consider the following system of equations:

$$\begin{cases} -7x + 5y = -41 \\ -2x - 6y = -40 \end{cases}$$

True or False: The graphs of the equations of the system will intersect at the point (8, 3).

True ☐ False ☒

Score: 1/1

Time spent on this version: 14.4 minutes.

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## Question 3.

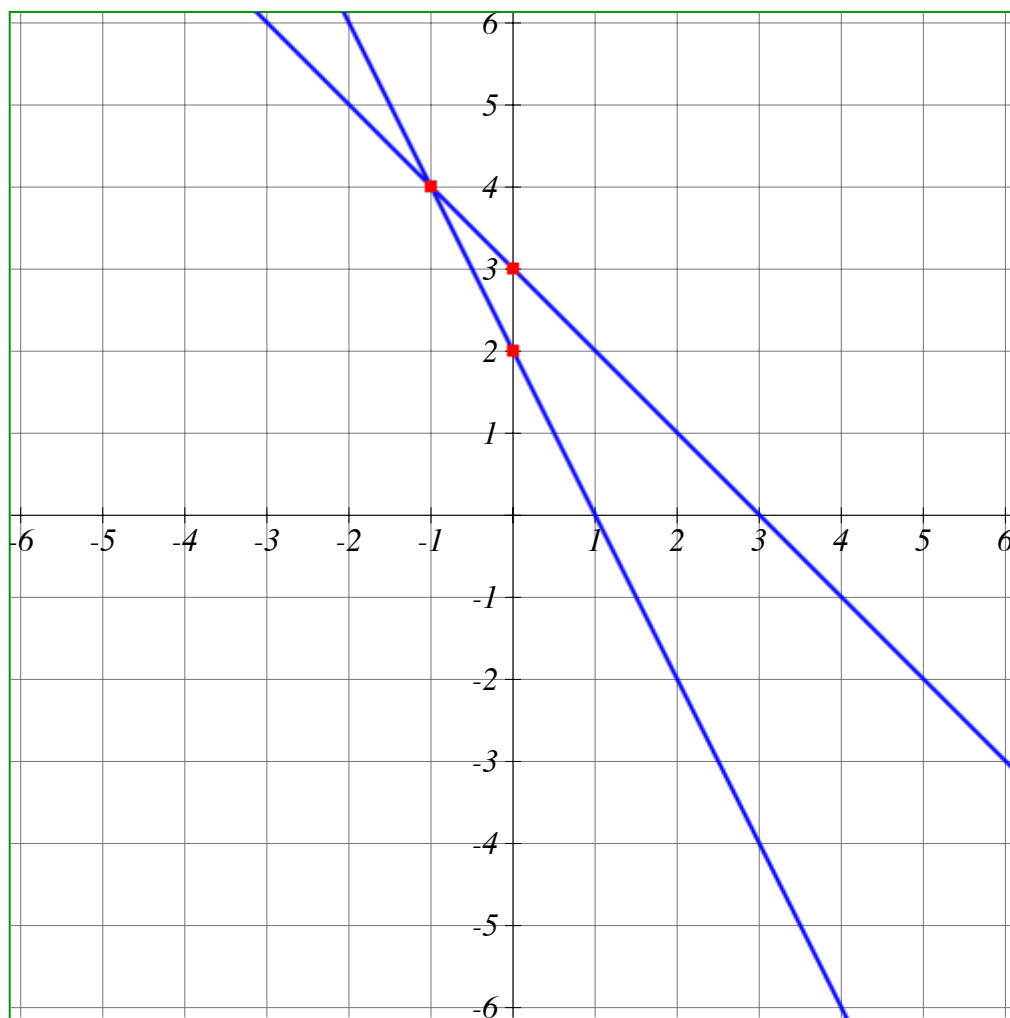
Version 2\*/2. Score: 1/1 ▼

Solve the system of equations by graphing:

$$\begin{cases} 2x + y = 2 \\ 2x + 2y = 6 \end{cases}$$



Enter your answer as an ordered pair.



Score: 0.5/0.5 0.5/0.5

Time spent on this version: 8.2 minutes.

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## Question 4.

Version 1\*/1. Score: 1/1

Solve the system of equations:

$$\begin{cases} -5x + 6y = -29 \\ -2x - 4y = 14 \end{cases}$$

Solution: (  ⚑,  ⚑ )

Score: 0.5/0.5 0.5/0.5

Time spent on this version: 1.3 minutes.

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## Question 5.

Version 3\*/3. Score: 1/1 ▼

In 1982, the US Mint changed the composition of pennies from all copper to zinc with copper coating. Pennies made prior to 1982 weigh 3.1 grams. Pennies made since 1982 weigh 2.5 grams. Suppose you have a bag of 1336 pennies, and the bag weighs 3734.8 grams.

Let  $x$  represent the number of pennies made prior to 1982 and let  $y$  represent the number of pennies made after 1982. Set up the system of equations.

Write the equation that represents the total number of pennies.

$$x + y \text{ ⚑ } = 1336 \text{ ⚑ }$$

Write the equation that represents the total weight of the pennies.

$$3.1x + 2.5y$$



=

$$3734.8$$



How many pennies from each time period are there in the bag?

Number of pennies made prior to 1982:

$$658$$


Number of pennies made after 1982:

$$678$$


Score: 0.167/0.167 0.167/0.167 0.167/0.167 0.167/0.167 0.167/0.167 0.167/0.167

Time spent on this version: 0.8 minutes.

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### Question 6.

Version 2\*/2. Score: 1/1 ▼

Tom goes to a fast food restaurant and orders some tacos and burritos. He sees on the nutrition menu that tacos are `150` calories and burritos are `350` calories. Suppose he ordered `4` items and consumed a total of `1200` calories.

Let `t` be the number of tacos eaten and let `b` be the number of burritos eaten. Set up the system of equations.

Write the equation for the total number of tacos and burritos eaten.

$$t + b$$



=

$$4$$



Write the equation for the total calories consumed.

$$150t + 350b$$



=

$$1200$$



How many tacos and how many burritos did Tom order and eat?

Tacos eaten:

$$1$$


Burritos eaten:

$$3$$


Score: 0.167/0.167 0.167/0.167 0.167/0.167 0.167/0.167 0.167/0.167 0.167/0.167

Time spent on this version: 0.8 minutes.

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## Question 7.

Version 1\*/1. Score: 1/1

Quinn and Adriana are selling boxes of fruit for a Habitat for Humanity fundraiser. Customers can buy small boxes of fruit and large boxes of fruit. Quinn sold 20 small boxes of fruit and 19 large boxes of fruit for a total of \$453.5. Adriana sold 17 small boxes of fruit and 15 large boxes of fruit for a total of \$366.5.

Let `S` represent the cost of one small box of fruit and let `L` represent the cost of one large box of fruit. Set up the system of equations.

Write the equation representing the total cost of boxes sold by Quinn.

$$20S + 19L = 453.5$$

Write the equation representing the total cost of the boxes sold by Adriana.

$$17S + 15L = 366.5$$

Find the cost of one small box of fruit and the cost of one large box of fruit.

Cost of small box: \$ 7.0

Cost of large box: \$ 16.5

Score: 0.167/0.167 0.167/0.167 0.167/0.167 0.167/0.167 0.167/0.167 0.167/0.167

Time spent on this version: 3.8 minutes.

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## Question 8.

Version 1\*/1. Score: 1/1

Find the solution to the system of equations:

Find the solution to the system of equations:

$$\{ (x - 2y + z = -3), (y + 2z = -4), (x + y + 3z = -7) \}$$

$$x = -1$$

$$y = 0$$

$$z = -2$$

Score: 0.333/0.333 0.333/0.333 0.333/0.333

Time spent on this version: 2.5 minutes.

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### Question 9.

Version 3\*/3. Score: 1/1

A startup company spent \$116187 on a combination of 134 tablets, laptops, and desktop computers. Each tablet cost \$670, each laptop cost \$987, and each desktop computer cost \$1198. Based on the structure of the company, they purchased twice as many tablets as laptops.

Let  $x$  be the number of tablets purchased,  $y$  the number of laptops purchased, and  $z$  the number of desktops purchased. Set up the system of equations.

$$x + y + z = 134$$

$$670x + 987y + 1198z = 116187$$

$$x - 2y = 0$$

How many of each type of equipment did they buy?

Number of tablets: 70

Number of laptops: 35

Number of desktops: 29

Score: 0 167/0 167 0 167/0 167 0 167/0 167 0 167/0 167 0 167/0 167 0 167/0 167

Score: 0.10/0.10/ 0.10/0.10/ 0.10/0.10/ 0.10/0.10/ 0.10/0.10/ 0.10/0.10/ 0.10/0.10/ 0.10/0.10/ 0.10/0.10/

Time spent on this version: 1.2 minutes.

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### Question 10.

Version 2\*/2. Score: 1/1 ▼

A brass manufacturer makes three different type of wholesale brass blocks from copper and zinc according to the following matrix.

	Brass Blends		
	High brass	Muntz metal	Gilding metal
Copper	.65	.60	.95
Zinc	.35	.40	.5

In addition, the demand (in thousands of pounds) from Plant 1 is 14 High Brass, 5 Muntz metal, and 30 Gilding metal, and the demand from Plant 2 is 14 High Brass, 3 Muntz metal, and 25 Gilding metal.

a) Make a  $2 \times 3$  matrix B that contains the blending information in decimal form.

.65	.60	.95
.35	.40	.05

✓

b) Make a  $3 \times 2$  matrix D for the demands at each plant. Plant 1 demands should be entered in column 1.

14	14
5	3
30	25

✓

c) Find the matrix product to find each locations need for each type of metal.

40.6	34.6
8.4	7.35





d) if the price of zinc is \$0.73 per pound and the price of copper is \$4.34 per pound.

The total cost of Plant 1 is

The total cost of Plant 2 is

Score: 0.2/0.2 0.2/0.2 0.2/0.2 0.2/0.2 0.2/0.2

Time spent on this version: 3.8 minutes.

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### Question 11.

Version 1\*/1. Score: 1/1

A new website allows consumers to purchase various automobiles via the internet and then take delivery at a local dealer. The following table shows the retail price of the cars on the website.

	Brand A	Brand B
Compact	` 17,000 `	` 11,000 `
Midsize	` 23,000 `	` 19,000 `
Luxury	` 33,000 `	` 35,000 `
Pickup	` 54,000 `	` 56,000 `

The dealers makes the following profit:

On compact cars they make 13%

On midsize cars they make 11%

On luxury cars they make 9%

On pickup trucks they make 22%

Use the following matrix and multiply to the price matrix to find a matrix of profit per car.

$$\begin{bmatrix} 0.13 & 0 & 0 & 0 \\ 0 & 0.11 & 0 & 0 \\ 0 & 0 & 0.09 & 0 \\ 0 & 0 & 0 & 0.22 \end{bmatrix}$$

The profit matrix is

2210	1430
2530	2090
2970	3150
11880	12320



How much total profit does the dealer make on 3 Brand B pickup trucks?

36960



Score: 0.9/0.9 0.1/0.1

Time spent on this version: 5.1 minutes.

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### Question 12.

Version 2\*/2. Score: 1/1 ▼

Consider the system of linear equations

$$5x - 5y = 2$$

$$-x + 3y = -1$$

(a) The coefficient matrix of this system is

5	-5
-1	3



(b) The inverse of the coefficient matrix is

0.3	0.5
0.1	0.5

✓

(Write your entries as decimal numbers, rounded to two decimal places if necessary.)

(c) The solution to the system, rounded to two decimal places (if necessary), is  $x = 0.1$  and  $y = -0.3$ .

Score: 0.25/0.25 0.25/0.25 0.25/0.25 0.25/0.25

Time spent on this version: 1.8 minutes.

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### Question 13.

Version 1\*/1. Score: 1/1

Scott is trying to plan a meal to meet specific nutritional goals. He wants to prepare a meal containing rice, tofu, and peanuts that will provide 217 grams of carbohydrates, 244 grams of fat, and 169 grams of protein. He knows that each cup of rice provides 49 grams of carbohydrates, 0 grams of fat, and 5 grams of protein. Each cup of tofu provides 4 grams of carbohydrates, 5 grams of fat, and 15 grams of protein. Finally, each cup of peanuts provides 33 grams of carbohydrates, 73 grams of fat, and 28 grams of protein.

Let  $r$  be the number of cups of rice,  $t$  the number of cups of tofu, and  $p$  the number of cups of peanuts. Set up the system of equations.

Write the equation for the amount of carbohydrates in his meal.

$$49r + 4t + 33p = 217$$

Write the equation for the amount of fat in his meal.

$$0r + 5t + 73p = 244$$

Write the equation for the amount of protein in his meal.

$$5r + 15t + 28p = 169$$

How many cups of rice, tofu, and peanuts should he eat?

cups of rice:  cups of tofu:  cups of peanuts:

Score: 0.111/0.111 0.111/0.111 0.111/0.111 0.111/0.111 0.111/0.111 0.111/0.111 0.111/0.111 0.111/0.111

Time spent on this version: 5.9 minutes.

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#### Question 14.

Version 1\*/1. Score: 1/1

Solve the system using Cramer's Rule.

$$-4x - 2y = -6$$

$$5x - y = 18$$

Find the determinant `D` (denominator).

$$D = 14$$

Find the determinant `D\_x` associated with `x`.

$$D_x = 42$$

Find the determinant `D\_y` associated with `y`.

$$D_y = -42$$

The solution is `(x,y) = ( 3, -3 )`.

Score: 0.2/0.2 0.2/0.2 0.2/0.2 0.2/0.2 0.2/0.2

Time spent on this version: 3.3 minutes.

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## Question 15.

Version 1\*/1. Score: 1/1

Solve the system using Cramer's Rule.

$$6x + 5y - 5z = 40$$

$$2x + 3y - z = 18$$

$$x - 6y - 2z = -24$$

Find the determinant `D` (denominator).

$$D = 18$$

Find the determinant `D\_x` associated with `x`.

$$D_x = 0$$

Find the determinant `D\_y` associated with `y`.

$$D_y = 90$$

Find the determinant `D\_z` associated with `z`.

$$D_z = -54$$

The solution is `(x,y,z) = (0, 5, -3)`.

Score: 0.143/0.143 0.143/0.143 0.143/0.143 0.143/0.143 0.143/0.143 0.143/0.143 0.143/0.143

Time spent on this version: 3.2 minutes.

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