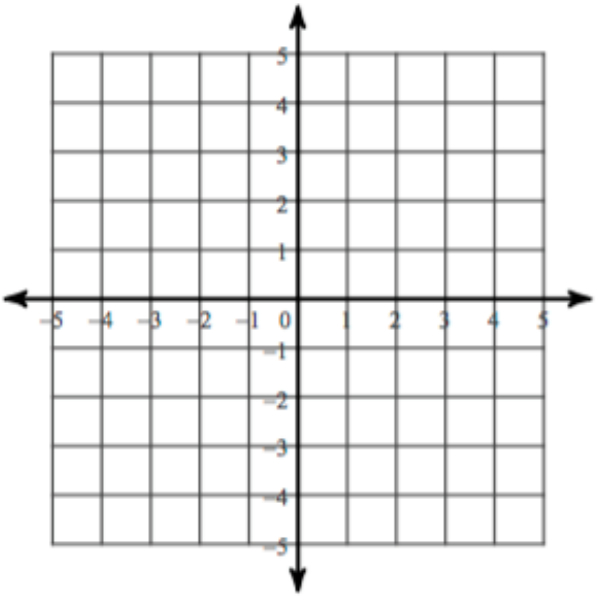
MPM2D – Unit 6 - Review Worksheet #2

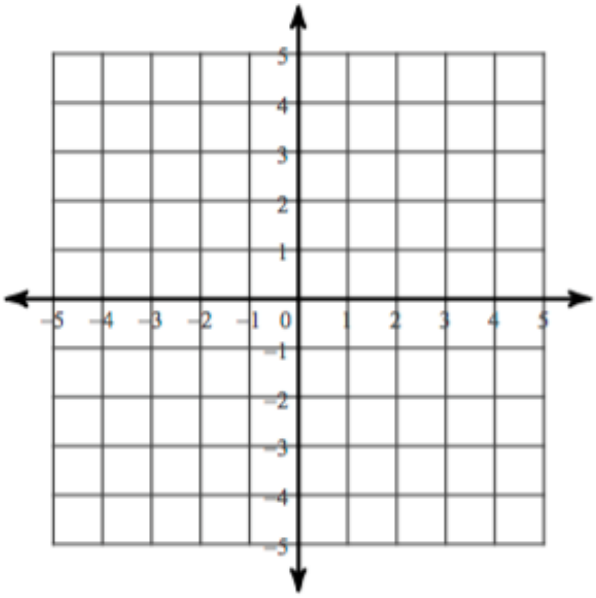
Section 1 – Solving Linear Systems by Graphing

Solve each of the linear systems below by graphing.

1. $-2x + y = -3$
   $3x + y = 2$

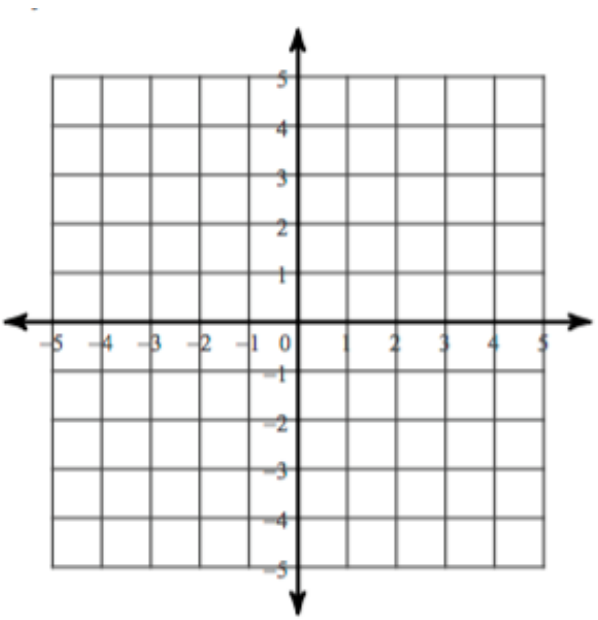
2. $y = -\frac{5}{3}x + 1$
   $y = -\frac{1}{3}x - 3$

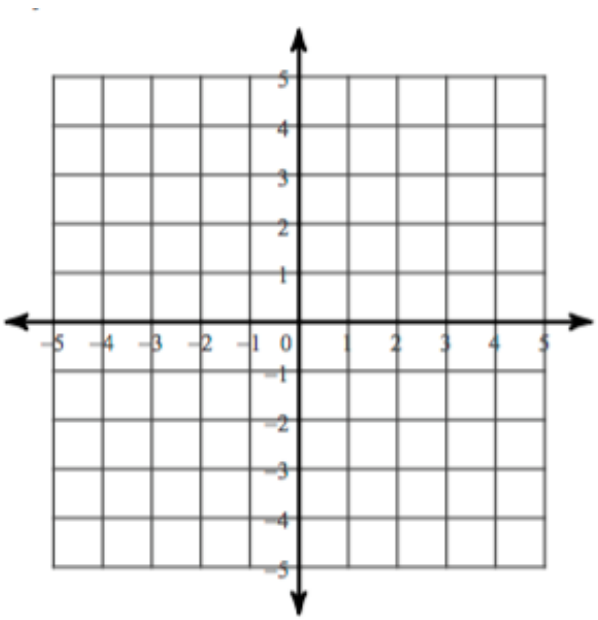




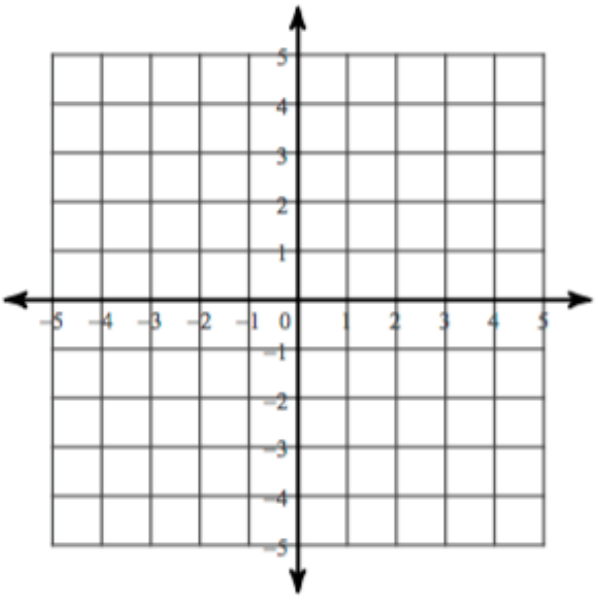
3. $+x + 4y = 12$
   $3x + 2y = -4$

4. $x - 4y = -4$
   $5x - 4y = 12$

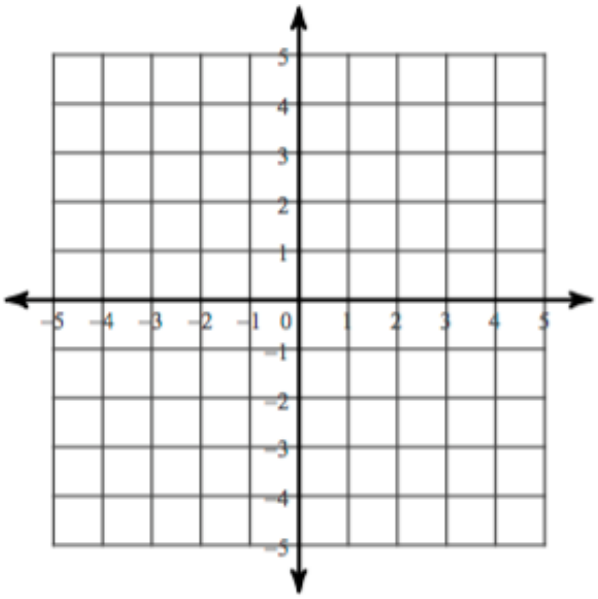




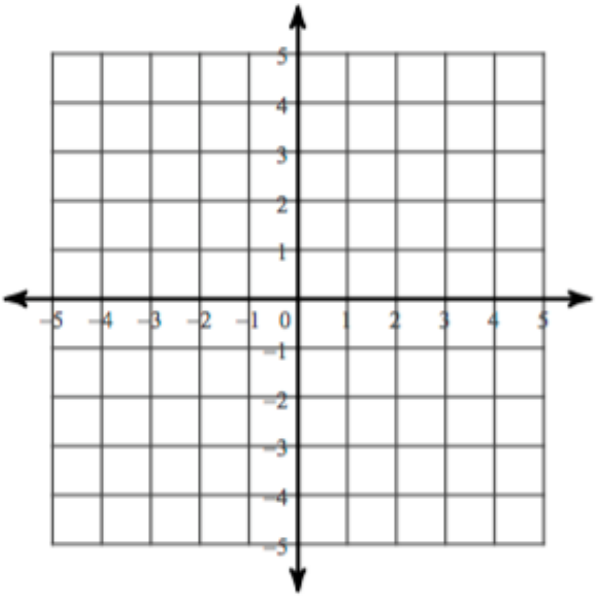
5. $x+3y=-12$
$5x-3y=-6$



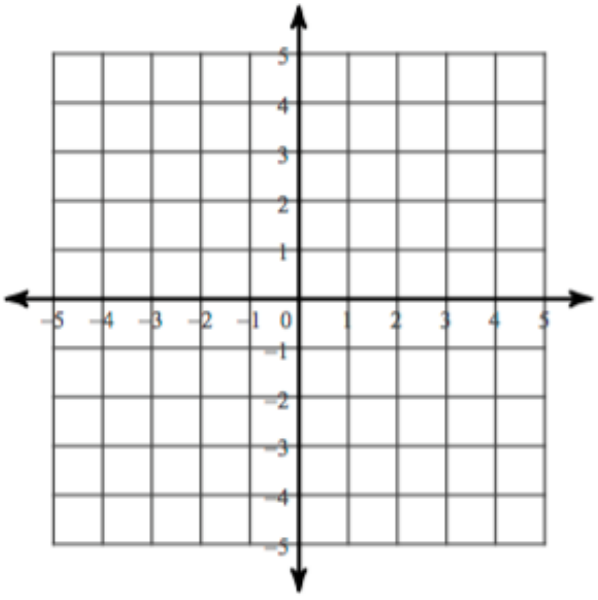
6. $0=-3x-4-2y$
$2-\frac{1}{2}x=y$



7. $-2x-y=1$
$-6x=3y+3$



8. $x-2y+8=0$
$-6-2y=-x$



Section 2 – Solving Linear Systems Algebraically

Solve each of the following linear systems by substitution, comparison, or by elimination.

1. $\begin{cases} y = 2x + 1 \\ x + y = -2 \end{cases}$

2. $\begin{cases} 3x - 2y = 6 \\ 3x + 2y = 6 \end{cases}$

3. $\begin{cases} y = -\frac{1}{2}x + 4 \\ x + 2y = 8 \end{cases}$

4. $\begin{cases} 3y - 3x = 9 \\ x - y = 1 \end{cases}$

5. $\begin{cases} 3x - 5y = 4 \\ -3x + 4y = -8 \end{cases}$

6. $\begin{cases} 2y = x + 6 \\ -3x + 2y = -2 \end{cases}$

7. $\begin{cases} 3x - 6y = 5 \\ 2y = 4x - 6 \end{cases}$

8. $\begin{cases} -9x + 6y = 3 \\ 18x + 30y = 1 \end{cases}$

9. $\begin{cases} 7x - 5y = -1 \\ -3x + 5y = 9 \end{cases}$

10. $\begin{cases} -3x + 5y = 1 \\ 9x - 3y = 5 \end{cases}$

11. $\begin{cases} 3x + 4y = -5 \\ 5x + 6y = -7 \end{cases}$

12. $\begin{cases} 2x - 5y = 13 \\ 3x + 4y = -15 \end{cases}$

13. $\begin{cases} 2x = 3y + 11 \\ 7x - 4y = 6 \end{cases}$

14. $\begin{cases} x + y = 48 \\ 12x + 14y = 628 \end{cases}$

15. $\begin{cases} 1.5x - 2y = -0.25 \\ 3x + 1.5y = 6.375 \end{cases}$

16. $\begin{cases} 0.24x + 0.6y = 0.58 \\ 0.8x - 0.12y = 0.52 \end{cases}$

17. $\begin{cases} 0.18x + 0.27y = 0.09 \\ 0.06x - 0.54y = -0.04 \end{cases}$

18. $\begin{cases} \frac{1}{4}x + \frac{1}{3}y = 5 \\ x - y = 6 \end{cases}$

19. $\begin{cases} \frac{3x}{2} - \frac{2y}{3} = 10 \\ \frac{1}{2}x + \frac{1}{2}y = -1 \end{cases}$

20. $\begin{cases} \frac{x}{3} - \frac{y}{2} = -\frac{5}{6} \\ \frac{x}{5} - \frac{y}{3} = -\frac{3}{5} \end{cases}$

21. $\begin{cases} \frac{1}{8}x + \frac{1}{4}y = 5 \\ \frac{1}{16}x - \frac{1}{2}y = 7 \end{cases}$

Section 3 – Word Problems

Set up each word problem below by writing a proper let statement and two linear equations to represent the given information. Then solve the linear system algebraically.

1. On Monday, Archie paid $3.40 for three doughnuts and two coffees. On Tuesday he paid $3.60 for two doughnuts and three coffees. What is the price of each item?

2. At Gwen's garage sale, all books were one price and all magazines were another price. Harriet bought four books and three magazines for $1.45, and June bought two books and five magazines for $1.25. What was the price of a book and what was the price of a magazine?

3. The Chocolate Factory in Vancouver blends its double-dark-chocolate fudge, which is 35% fat, with its peanut butter fudge, which is 25% fat, to obtain double-dark-peanut fudge, which is 29% fat. What amount of each type must be mixed to obtain 50 lbs of double-dark-peanut fudge?

4. Two hundred people were on a charter flight to Las Vegas. Some paid $200 for their tickets and others paid $250. If the total revenue for the flight was $44 000, then how many tickets of each type were sold?

5. A total of 150 tickets were sold for the annual concert to students and nonstudents. Student tickets were $5 and nonstudent tickets were $8. If the total revenue for the concert was $930, then how many tickets of each type were sold?

6. A chemist wants to mix a 5% acid solution with a 25% acid solution to obtain 50 liters of a 20% acid solution. How many liters of each solution should be used?

7. A farmer wants to mix a liquid fertilizer that contains 2% nitrogen with one that contains 10% nitrogen to obtain 40 gallons of a fertilizer that contains 8% nitrogen. How many gallons of each fertilizer should be used?

8. Suppose you bought supplies for a party. Three rolls of streamers and 15 party hats cost $30. Later, you bought 2 rolls of streamers and 4 party hats for $11. How much did each roll of streamers cost? How much did each party hat cost?

9. A group of people bought movie tickets at the AMC Century City. They bought a total of 7 tickets, some adult and some child tickets and spent a total of $72. If an adult ticket costs $12 and child ticket costs $9, how many of each type did they purchase?

10. A Honda dealership sells both motorcycles and cars. There are a total of 200 vehicles on the dealership's lot. The detailer cleaned all the wheels of all the vehicles, which totaled 698 wheels. How many motorcycles are there on the lot?

11. Members of a senior class held a car wash to raise funds for their senior prom. They charged $3 to wash a car and $5 to wash a pick-up truck or sport utility vehicle. If they earned a total of $275 by washing a total of 75 vehicles, how many cars did they wash?

12. A bulk food store has ordered two kinds of muesli. "Fruit First": boasts 32% raisins, while "Morning Sunshine" has only 14% raisins. How many kilograms of each kind of muesli must the owner mix together in order to prepare 5 kg of a special blend, "Just Right," with 20% raisins?

13. A health food store just received a 3.6 kg package of "On the Run" trail mix that contains 18% raisins. The store wants to add more raisins so that it contains 30% raisins. How many grams of raisins should they add to the mix? How much trail mix will they have in total after adding the raisins?

14. A metallurgist needs to make 12.4 lb of an alloy containing 50% gold. He is going to melt and combine one metal that is 60% gold with another metal that is 40% gold. How much of each should he use?

15. Bronze, which costs $9.10/kg is made by combining copper which costs $8.90/kg with tin which costs $9.50/kg. find the number of kg of copper and tin required to make 15.3 kg of bronze.

16. How many pounds of tea that cost $4.20 per pound must be mixed with 12 lb of tea that cost $2.25 per pound to make a mixture that costs $3.40 per pound?

17. A certain grade of milk contains 10% butter fat and a certain grade of cream contains 60% butter fat. How many quarts of each must be taken to obtain a 100 quart mixture that will be 45% butter fat?

Section 4 – Shortest Distance

1. Determine the shortest distance from P (–3, 14) to the line $y = -\frac{1}{6}x - 5$.

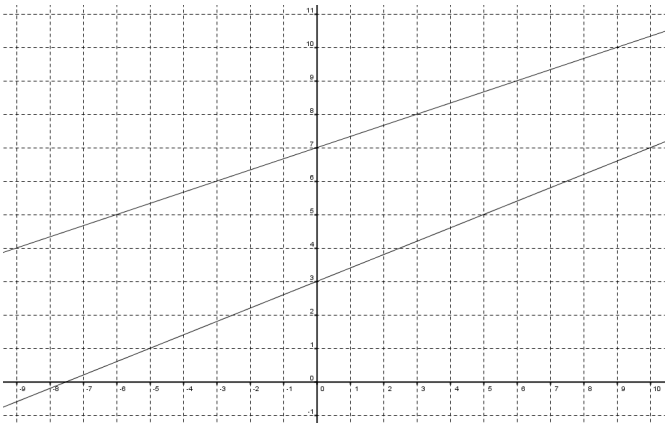
2. Determine the shortest distance from P (–17, 33) to the line $y = \frac{5}{8}x - 12$.

3. Determine the shortest distance from P (2, 3.5) to the line $25x + 10y = -31$.

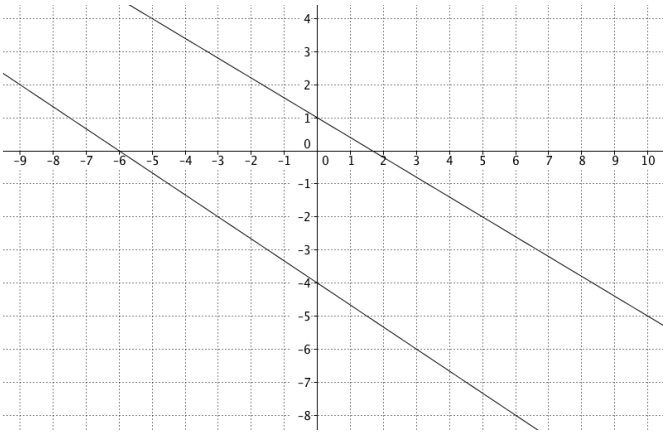
4. Determine the shortest distance from P $\left(6, -\frac{7}{3}\right)$ to the line $x - 3y = -12$.

Section 5 – Mixed Problems

1. Determine the point of intersection of the two lines graphed below.



2. Determine the point of intersection of the two lines graphed below.



Answer Key

Section 1

1. (1, -1)
2. (3, -4)
3. (-4, 4)
4. (4, 2)
5. (-3, -3)
6. (-4, 4)
7. Infinite POI
8. No POI

Section 2

1. (-1, -1)
2. (2, 0)
3. Infinite POI
4. $\left(\frac{13}{9},\frac{1}{9}\right)$
5. (8, 4)
6. (4, 5)
7. $\left(-\frac{2}{9},\frac{1}{6}\right)$
8. (2, 3)
9. $\left(\frac{7}{9},\frac{2}{3}\right)$
10. (1, -2)
11. (-1, -3)
12. (22, 26)
13. $\left(\frac{3}{4},\frac{2}{3}\right)$
14. $\left(\frac{1}{3},\frac{1}{9}\right)$
15. (12, 6)
16. (4, -6)
17. (2, 3)
18. $\left(\frac{272}{5},-\frac{36}{5}\right)$

Section 3

1. A doughnut is $0.60 and a cup of coffee is $0.80.
2. Each book was $0.25 and each magazine was $0.15.
3. They will mix 20 lbs of double dark chocolate fudge and 30 lbs of peanut butter fudge.
4. 120 tickets were sold for $200 and 80 tickets were sold for $250.
5. 90 student tickets and 60 nonstudent tickets were sold.
6. $\frac{25}{2}L$ of the 5% solution and $\frac{75}{2}L$ of the 25% solution were mixed.
7. 10 L of the 2% fertilizer was mixed with 30 L of the 10% fertilizer.
8. A roll of streamers is $2.50 and a party hat is $1.50.
9. 3 adult tickets and 4 child tickets were sold.
10. 51 motorcycles and 149 cars were sold.
11. 50 cars and 25 trucks/SUVs were washed.
12. $\frac{5}{3}kg$ of Fruit First was mixed with $\frac{10}{3}kg$ of Morning Sunshine.

13. 0.62 kg of raisins were added to make 4.22 kg of the new mixture.
14. 6.2 lbs of 60% gold is mixed with 6.2 lbs of 40% gold.
15. 10.2 kg of copper is mixed with 5.1 kg of tin.
16. 17.25 lbs of the $4.20/lb tea will be mixed to make 29.25 lbs of the new mixture.
17. 30 quarts of the 10% milk will be mixed with 70 quarts of the 60% milk

Section 4

1. The shortest distance is $\sqrt{333}$ (approximately 18.25) units from (–3, 14) to (–6, –4).

2. The shortest distance is $\sqrt{2225}$ (approximately 47.17) units from (–17, 33) to (8, –7).

3. The shortest distance is $\sqrt{18.56}$ (approximately 4.31) units from (2, 3.5) to (–2, 1.9).

4. The shortest distance is $\sqrt{62.5}$ (approximately 7.91) units from $\left(6,-\frac{7}{3}\right)$ to $\left(\frac{7}{2},\frac{31}{6}\right)$.

Section 5

1. The POI is (60, 27)

2. The POI is (–75, 46)