

*Geometry and Honors Geometry*  
*Summer Review Packet*  
*2011*

This will not be graded.  
It is for your benefit only.

The problems in this packet are designed to help you review topics from previous mathematics courses that are important to your success in Geometry or Honors Geometry. Please try to do each problem and show the work that goes with that answer. Bring the packet with you to your Geometry or Honors Geometry class on the first day of school.

It is recommended that you work with one or more people. Before you leave school, write down the names, phone numbers, and/or email addresses for at least two people who are also taking Geometry or Honors Geometry in the fall.

Name \_\_\_\_\_ Phone \_\_\_\_\_

Email \_\_\_\_\_

Name \_\_\_\_\_ Phone \_\_\_\_\_

Email \_\_\_\_\_

During the summer, answer keys will be posted on the Sherwood website.

*Enjoy your summer. We are looking forward to seeing you in the fall.*

*(If you have any questions, please contact the math office at (301)924-3253)*

### Solving Linear Equations

Solve each equation. Then check your solution.

1.  $-18 = -61 + d$

8.  $\frac{2}{3}x - 6 = -10$

2.  $x - \frac{3}{5} = -\frac{7}{10}$

9.  $\frac{x+4}{2} = 17$

3.  $-5r = 55$

10.  $3k - 5 = 7k - 21$

4.  $-\frac{v}{5} = -45$

11.  $8s + 9 = 7s + 6$

5.  $\frac{1}{2}x = 80$

12.  $7(x - 3) = 7$

6.  $\frac{z}{45} = \frac{2}{5}$

13.  $8 = 4(3c + 5)$

7.  $18 = 5p + 3$

14.  $8x + 20 + 2x = 120$

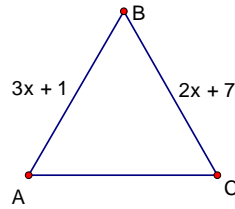
15.  $(7x + 15) + (12x - 3) = 145$

\*\*\* Denotes Honors Only questions.

### Word Problems

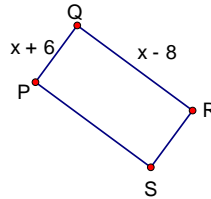
16.  $\triangle ABC$  is an equilateral triangle.

- Find  $x$ .
- Find the length of side AB.

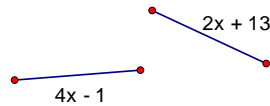


17. The perimeter of rectangle PQRS is 40 cm.

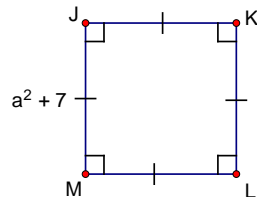
- Find  $x$ .
- Find the area of PQRS.



18. The two line segments below have the same length. Find the length of each segment.



19. The perimeter of square JKLM is 64 units. Find the length of each side.

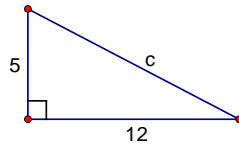


20. \*\*\*The sides of a triangle are in the ratio 2:3:5. The perimeter of the triangle is 55 feet. Find the length of each side.

21. \*\*\*The sides of a rectangle are in the ratio of 3:4. If the area of the rectangle 300 square meters what is the length and width?

22. \*\*\*The base of a triangle is 3 less than twice the height. The area of the triangle is  $27 \text{ cm}^2$ . What is the length of the base and height?

### Pythagorean Theorem



$$a^2 + b^2 = c^2$$

Example:

Step 1: Set-up Equation

$$5^2 + 12^2 = c^2$$

Step 2: Multiply

$$25 + 144 = c^2$$

Step 3: Add

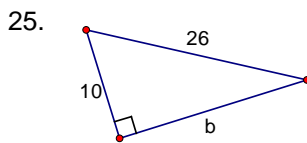
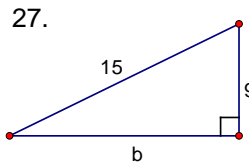
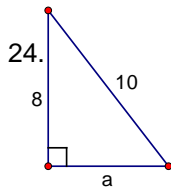
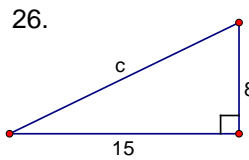
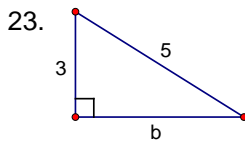
$$169 = c^2$$

Step 4: Take square root of each side.

$$\sqrt{169} = \sqrt{c^2}$$

Step 5: Simplify square roots.

$$13 = c$$



### Distributive Property and FOIL

Expand the following using distributive property and/or FOIL.

28.  $4x(x^2 - 2x + 5) =$

29.  $(-5)(2x - 3y + 8z - 6) =$

30.  $\frac{1}{2}(4x + 10y^2 - 8) =$

33.  $(2x + 1)(3x + 4) =$

31.  $(x + 3)(x - 5) =$

34.  $(x - 7)^2 =$

32.  $(2x + 5)(2x - 5) =$

35.  $(3x - 1)^2 =$

**Evaluating Formulas/Solving for Missing Variables****Example 1:**  $P = 2l + 2w$ ;  $P = 48$ ,  $l = 6$ , solve for  $w$ .

Begin with given equation:

$$P = 2l + 2w$$

Substitute given values for  $P$  and  $l$ :

$$48 = 2(6) + 2w$$

Solve for the remaining variable ( $w$ )

Simplify:

$$48 = 12 + 2w$$

- Subtract 12 from both sides:

$$48 = 12 + 2w$$

$$\begin{array}{r} -12 \quad -12 \\ \hline \end{array}$$

$$36 = 2w$$

- Divide both sides by 2:

$$\frac{36}{2} = \frac{2w}{2}$$

- Simplify both sides:

$$18 = w$$

ANSWER:  $w = 18$

**Example 2:**  $A = 3.14r^2$   $A = 314$ , solve for r

Begin with given equation:

$$A = 3.14r^2$$

Substitute given value for A:

$$314 = 3.14r^2$$

Solve for the remaining variable (r):

- Divide both sides by 3.14

$$\frac{314}{3.14} = \frac{3.14r^2}{3.14}$$

- Simplify

$$100 = r^2$$

- To get rid of the square, take the square root of both sides

$$\sqrt{100} = \sqrt{r^2}$$

- Simplify

$$10 = r$$

ANSWER :  $r = 10$

For each of the equations given below:

1. Substitute the given values for the variable(s) specified
2. Solve for the remaining variable (if necessary, round to nearest hundredth).

36.  $V = lwh$ ;  $V = 60$ ,  $l = 5$ ,  $w = 4$

41.  $V = \frac{1}{3}s^2h$ ;  $V = 120$ ,  $h = 10$

37.  $S = 4(3.14)r^2$ ;  $S = 314$

42.  $S = 6s^2$ ;  $S = 294$

38.  $V = \frac{4}{3}(3.14)r^3$ ;  $r = 3$

43.  $V = s^3$ ;  $s = 4$

39.  $A = \frac{1}{2}(b_1 + b_2)h$ ;  $b_1 = 8$ ,  $b_2 = 4$ ,

$$A = 42$$

44.  $S = 2(3.14)rh + 2(3.14)r^2$ ;  $r = 2$ ,

$$S = 100.4$$

40.  $V = (3.14)r^2h$ ;  $V = 120$ ,  $r = 6$

## GRAPHING

Instruction:

Plot each point on the graph below. Remember, coordinate pairs are labeled (x, y). Label each point on the graph with the letter given.

45. A(3, 4)

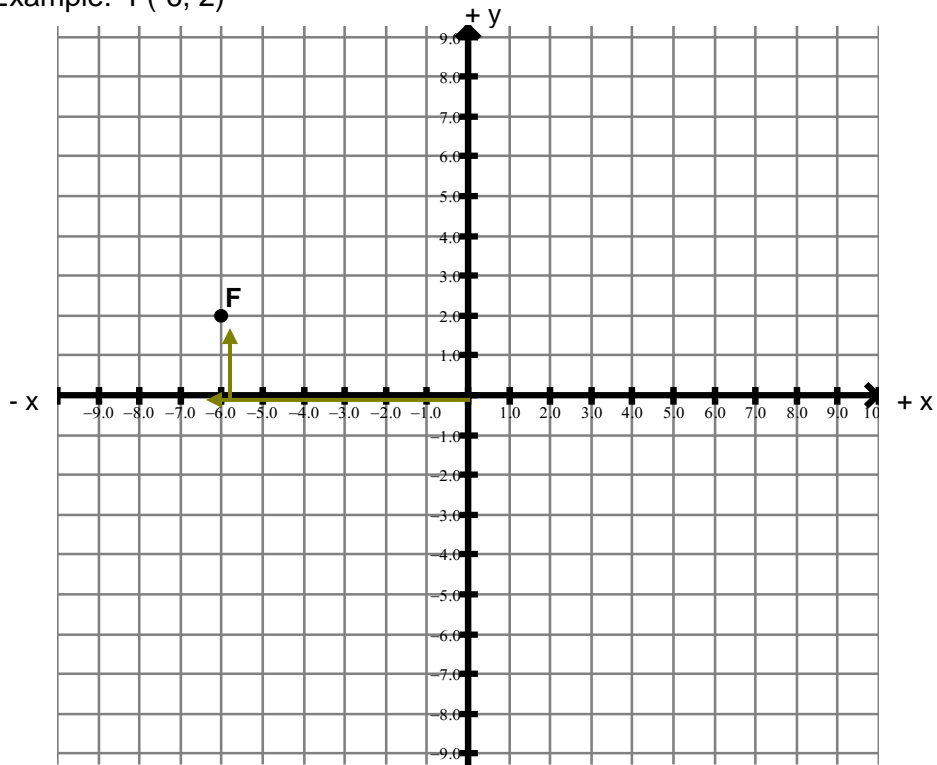
47. C(-4, 2)

49. E(0, 7)

46. B(4, 0)

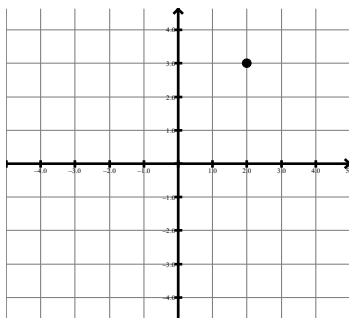
48. D(-3, -1)

Example: F(-6, 2)

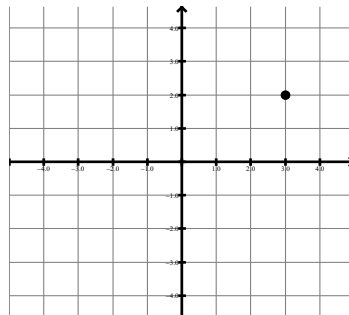


Determine the coordinates for each point below:

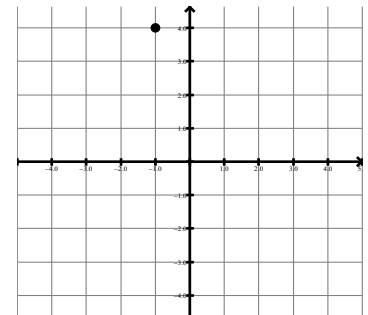
50. Example. (2, 3)



51. (\_\_\_\_, \_\_\_\_)

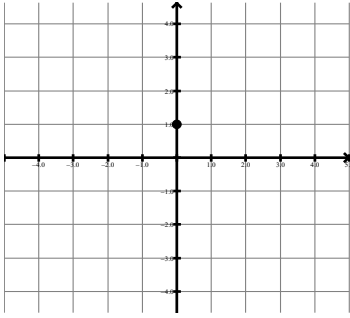


52. (\_\_\_\_, \_\_\_\_)

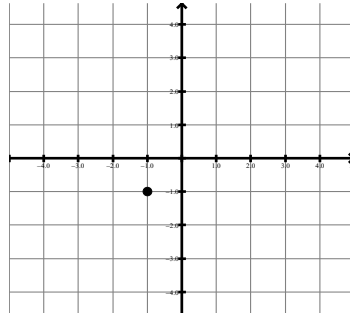


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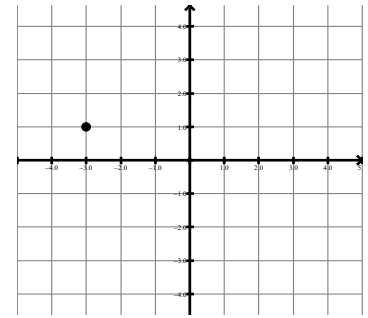
53. (\_\_\_\_, \_\_\_\_)



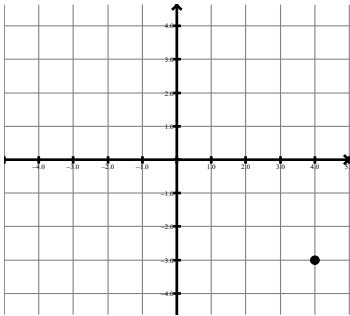
55. (\_\_\_\_, \_\_\_\_)



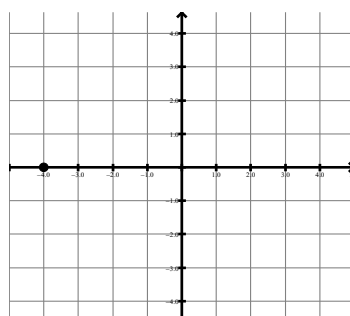
57. (\_\_\_\_, \_\_\_\_)



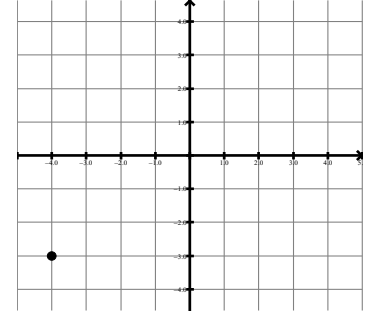
54. (\_\_\_\_, \_\_\_\_)



56. (\_\_\_\_, \_\_\_\_)



58. (\_\_\_\_, \_\_\_\_)



### Slope and Midpoint

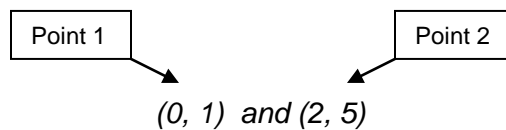
$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\text{midpoint} = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

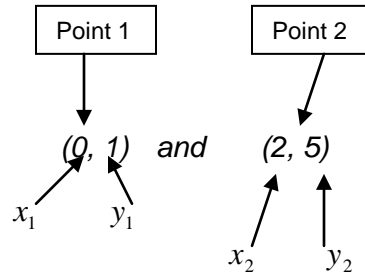
**Before** using the slope or midpoint formula, you must label your  $x_1$ ,  $y_1$ ,  $x_2$ , and  $y_2$ .

Example: For the points (0, 1) and (2, 5), label your  $x_1$ ,  $y_1$ ,  $x_2$ , and  $y_2$  so that you can use them in your slope or midpoint formula.

Step 1: Label one point as point 1  
and the other as point 2.

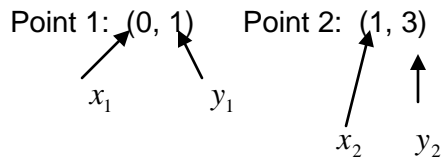


Step 2: Label the x- and y-coordinates of point 1 as  $x_1$  and  $y_1$ , respectively.  
Then, label the x- and y-coordinates of point 2 as  $x_2$  and  $y_2$ .



Example 1: Use the slope formula to find the slope of the line between  $(0, 1)$  and  $(1, 3)$ .

Step 1: Label  $x_1$ ,  $y_1$ ,  $x_2$ , and  $y_2$ .



Step 2: Plug values into the slope formula.

$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\text{slope} = \frac{3 - 1}{1 - 0}$$

Step 3: Simplify.

$$\text{slope} = \frac{2}{1} = 2$$

59. Find the slope of the line between  $(1, 3)$  and  $(5, 5)$ .

60. Find the slope of the line between  $(2, 3)$  and  $(9, 7)$ .

61. Find the slope of the line between (2, 6) and (-1, 3).

62. Find the slope of the line between (-3, 9) and (-7, 6).

63. Find the slope of the line between (4.5, -1) and (5.3, 2).

Example 2: Use the midpoint formula to find the midpoint of the segment below.

Step 1: Find the coordinates of the 2 endpoints

(-4, 1) and (4, 3)

Step 2: Label  $x_1$ ,  $y_1$ ,  $x_2$ , and  $y_2$ .

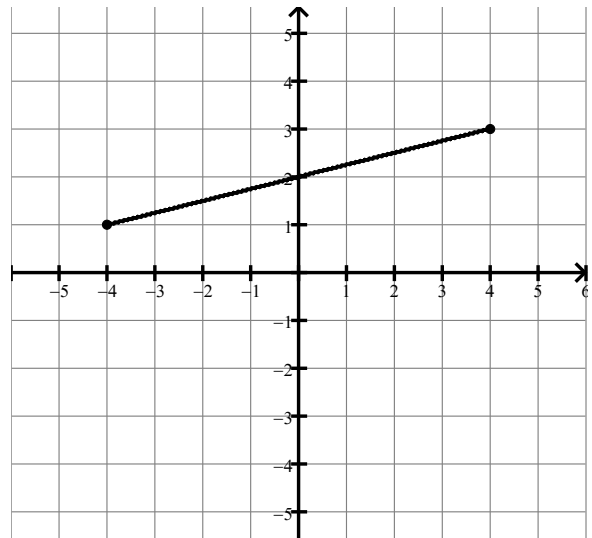
(-4, 1) and (4, 3)  
↑     ↑     ↑     ↓  
 $x_1$   $y_1$   $x_2$   $y_2$

Step 3: Plug into midpoint formula. and simplify.

$$\text{midpoint} = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

$$\text{midpoint} = \left( \frac{(-4) + 4}{2}, \frac{1 + 3}{2} \right)$$

$$\text{midpoint} = \left( \frac{0}{2}, \frac{4}{2} \right) = (0, 2)$$

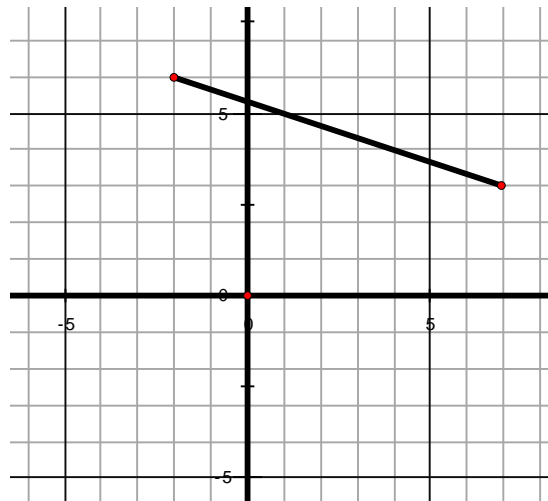


64. Find the midpoint of the segment with endpoints  $(0, 0)$  and  $(4, 2)$ .

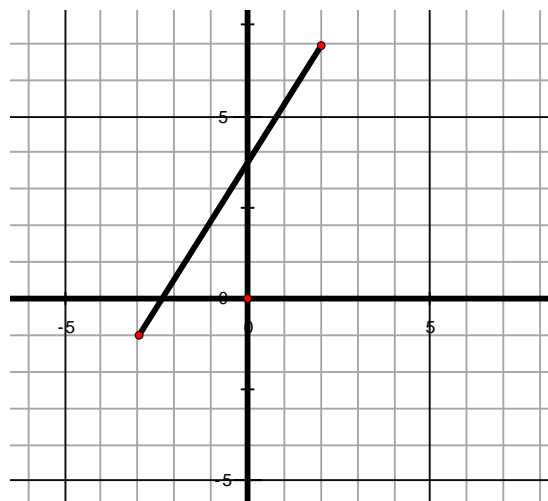
65. Find the midpoint of the segment with endpoints  $(-3, -1)$  and  $(3, 3)$ .

66. Find the midpoint of the segment with endpoints  $(-5, 2)$  and  $(1, -3)$ .

67. Find the midpoint of the segment below.



68. Find the midpoint of the segment below.



\*\*\* Denotes Honors Only questions.

**Factoring (Honors Only Section)**

69.  $3x^2 + x$

74.  $x^2 - 3x - 40$

70.  $x^2 - 9$

75.  $2x^2 + 10x + 12$

71.  $16x^2 - 25$

76.  $2x^2 - 11x - 6$

72.  $x^2 + 7x + 10$

77.  $3x^2 + 10x - 25$

73.  $x^2 - 9x + 18$

78.  $4x^2 - 28x + 49$

**Solve for x (Honors Only Section)**

79.  $6x^2 - x = 12$

81.  $x^2 = 16$

80.  $m^2 + 21 = 10m$

82.  $3x^2 - 1 = 26$

\*\*\* Denotes Honors Only questions.

## System of Equations (Honors Only Section)

### Substitution Method

Example

$$\begin{aligned} \text{solve: } x + y &= 14 \\ 3x + 2y &= 48 \end{aligned}$$

1. Solve for a variable in one equation.  
We solved for  $y$  in the 1<sup>st</sup> equation.
$$\begin{aligned} x + y &= 14 \\ y &= 14 - x \end{aligned}$$
2. Substitute this value for  $y$  in the other equation and solve for  $x$ .
$$\begin{aligned} 3x + 2y &= 48 \\ 3x + 2(14 - x) &= 48 \\ 3x + 28 - 2x &= 48 \\ x + 28 &= 48 \\ x &= 20 \end{aligned}$$
3. Substitute this value for  $x$  in the equation found in Step 1 and find  $y$ .
$$\begin{aligned} y &= 14 - x \\ y &= 14 - 20 \\ y &= -6 \end{aligned}$$
4. Go back and check answers in both equations.
$$\begin{array}{ll} x + y = 14 & 3x + 2y = 48 \\ 20 + (-6) = 14 & 3(20) + 2(-6) = 48 \\ 14 = 14 & 60 + (-12) = 48 \\ & 48 = 48 \end{array}$$

Solve by substitution.

$$\begin{aligned} 1. \quad y &= x - 2 \\ x + y &= 12 \end{aligned}$$

$$\begin{aligned} 2. \quad 2x - 3y &= 5 \\ x + 3y &= -2 \end{aligned}$$

$$\begin{aligned} 3. \quad 5a + b &= -17 \\ 3b &= 4a + 6 \end{aligned}$$

$$4. \quad \frac{3x + y}{4} = \frac{x + 1}{2}$$

$$\frac{x - y}{4} = 1$$

**Solve by linear combination.**

**Example 1**      solve:  $3x - y = 8$   
 $2x + y = 7$

1. Since the coefficients of  $y$  are opposites add the two equations together.  
$$\begin{array}{r} 3x - y = 8 \\ 2x + y = 7 \\ \hline 5x = 15 \\ x = 3 \end{array}$$
2. Solve the equation.
3. Substitute answer into one of the original equations and solve.  
$$\begin{array}{r} 3x - y = 8 \\ 3(3) - y = 8 \\ -y = 8 - 9 \\ y = 1 \end{array}$$
4. Check solution in both equations.  
$$\begin{array}{r} 3x - y = 8 \\ 3(3) - 1 = 8 \\ 8 = 8 \end{array} \qquad \begin{array}{r} 2x + y = 7 \\ 2(3) + 1 = 7 \\ 7 = 7 \end{array} \qquad \text{Solution (3,1)}$$

**Example 2**      solve:  $2x - 3y = 6$   
 $3x + 4y = -25$

1. The coefficients of either  $x$  or  $y$  are not opposite. However, the variable  $x$  could be eliminated by adding the equations together if we first multiply the first equation by 3 and the second by  $-2$ . The variable  $y$  could be eliminated by adding the equations together if we first multiply the first equation by 4 and the second by 3. We will do the latter.  
$$\begin{array}{r} 4(2x - 3y = 6) \rightarrow 8x - 12y = 24 \\ 3(3x + 4y = -25) \rightarrow 9x + 12y = -75 \end{array}$$

2. Add two equations       $17x = -51$
3. Solve       $x = -3$
4. Substitute into either of the original equations to find  $y$ .  
$$\begin{array}{r} 2x - 3y = 6 \\ 2(-3) - 3y = 6 \\ -6 - 3y = 6 \end{array}$$
5. Check answer in both equations  
$$\begin{array}{r} -3y = 12 \\ y = -4 \end{array}$$
  
**Solution (-3, -4)**

Solve by linear combination.

1.  $2x - 3y = 17$   
 $2x + 3y = -1$
2.  $2x - 5y = 30$   
 $2x + 7y = 6$
3.  $5x - 2y = 1$   
 $4x + 5y = 47$
4.  $2x + 3y = 7$   
 $3x + 4y = 10$