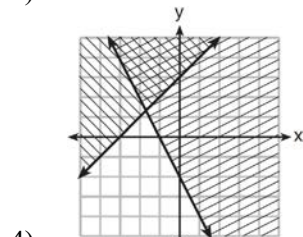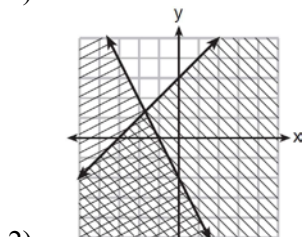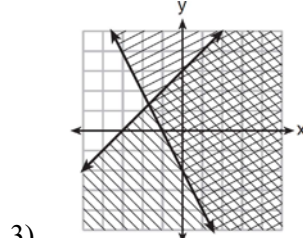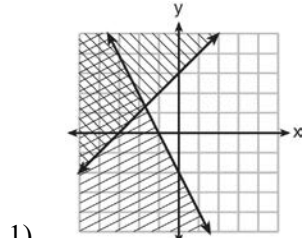## A.REI.D.12: Graphing Systems of Linear Inequalities 1
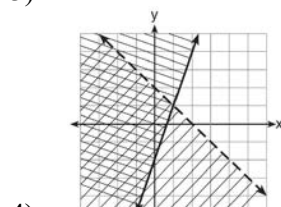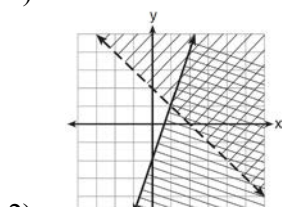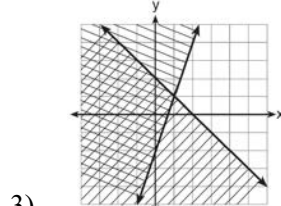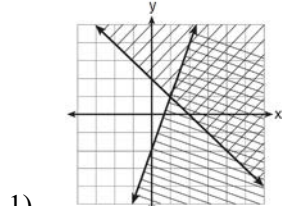
1 Which graph represents the solution of $y \le x + 3$ and $y \ge -2x - 2$?

1)

3)

2)

4)

2 Given: $y + x > 2$

$y \le 3x - 2$

Which graph shows the solution of the given set of inequalities?

1)

3)

2)

4)

3   What is one point that lies in the solution set of the system of inequalities graphed below?
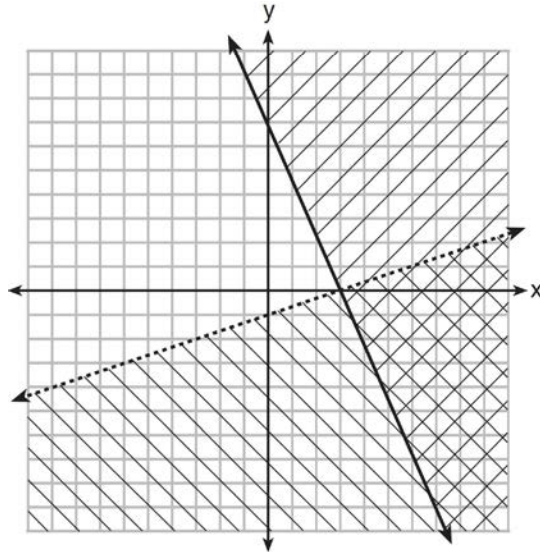
1) (7,0)	3) (0,7)
2) (3,0)	4) (−3,5)

4   Which ordered pair is *not* in the solution set of $y > -\frac{1}{2}x + 5$ and $y \le 3x - 2$?

1) (5,3)	3) (3,4)
2) (4,3)	4) (4,4)

5   Which point is a solution to the system below?
$$2y < -12x + 4$$
$$y < -6x + 4$$

1) $\left(1, \frac{1}{2}\right)$	3) $\left(-\frac{1}{2}, 5\right)$
2) (0,6)	4) (−3,2)

6   First consider the system of equations $y = -\frac{1}{2}x + 1$ and $y = x - 5$. Then consider the system of inequalities

$y > -\frac{1}{2}x + 1$ and $y < x - 5$. When comparing the number of solutions in each of these systems, which statement is true?

1) Both systems have an infinite number of solutions.
2) The system of equations has more solutions.
3) The system of inequalities has more solutions.
4) Both systems have only one solution.

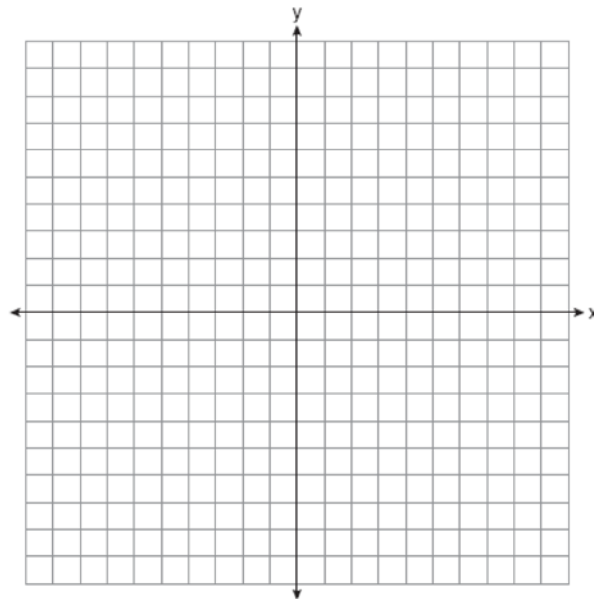7   Determine if the point $(0,4)$ is a solution to the system of inequalities graphed below. Justify your answer.
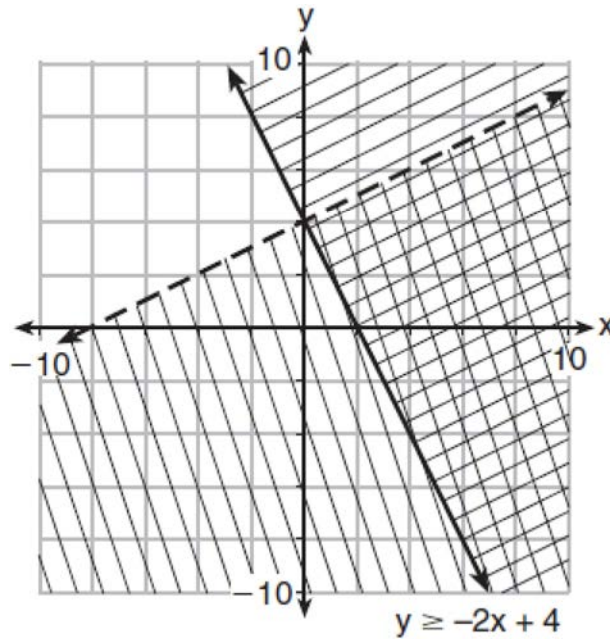
$$y \geq -2x + 4$$

8   Graph the following system of inequalities on the set of axes below:

$$-2y < 3x + 12$$

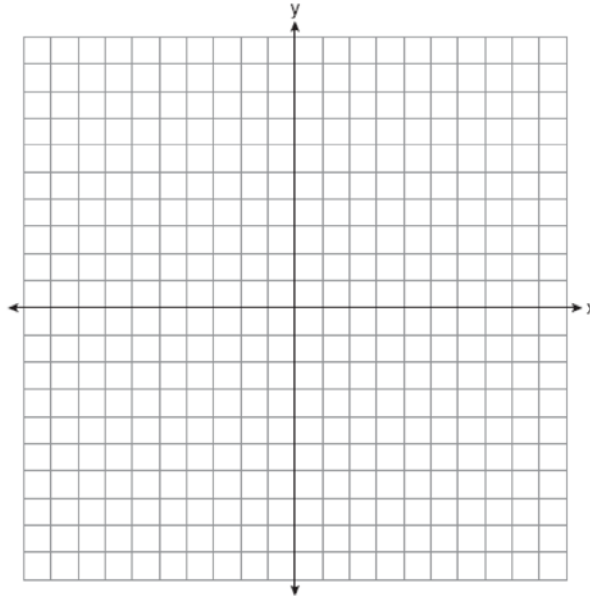$$x \geq -3$$

Label the solution set S.

Allison thinks that $(2,-9)$ is a solution to this system. Determine if Allison is correct. Justify your answer.

9   Given: $3y - 9 \leq 12$

        $y < -2x - 4$

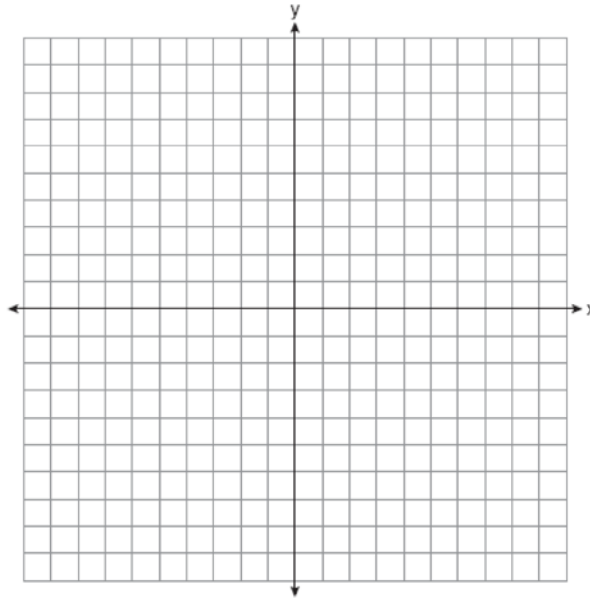Graph the system of inequalities on the set of axes below
.

State the coordinates of a point that satisfies both inequalities. Justify your answer.

10 Graph the system of inequalities on the set of axes below:

$$y > 3x - 4$$

$$x + 2y \leq 6$$

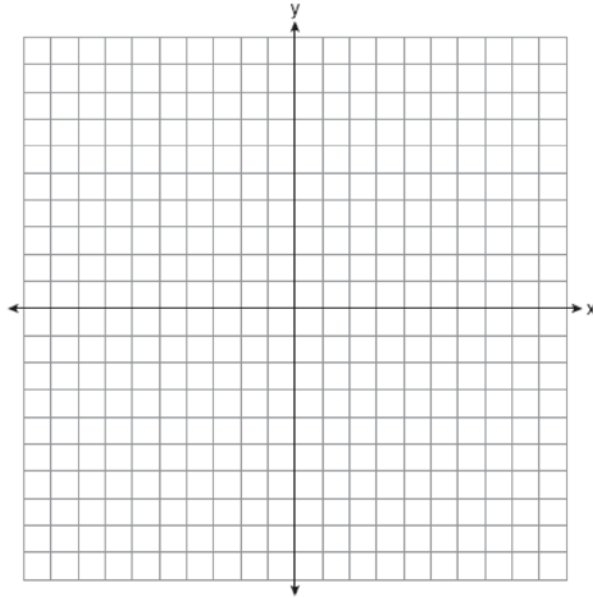Label the solution set S.

.

Is the point $(2,2)$ a solution to the system? Justify your answer.

11   Graph the system of inequalities on the set of axes below.
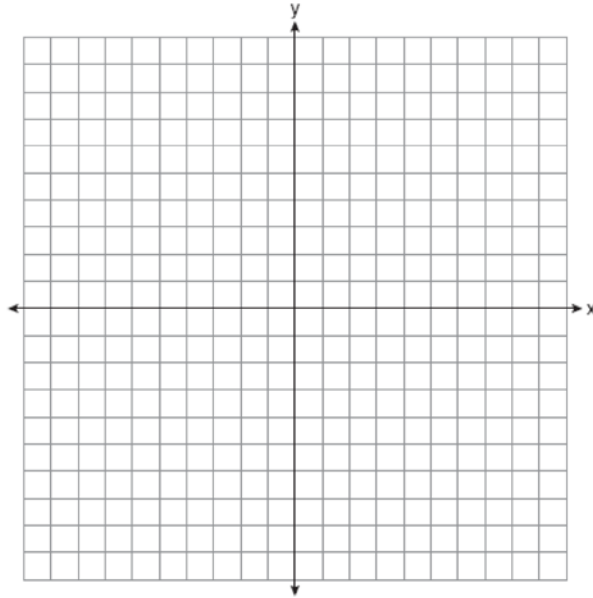
$$3y + 2x \leq 15$$

$$y - x > 1$$

State the coordinates of a point in the solution to this system. Justify your answer.

12   Graph the system of inequalities on the set of axes below:
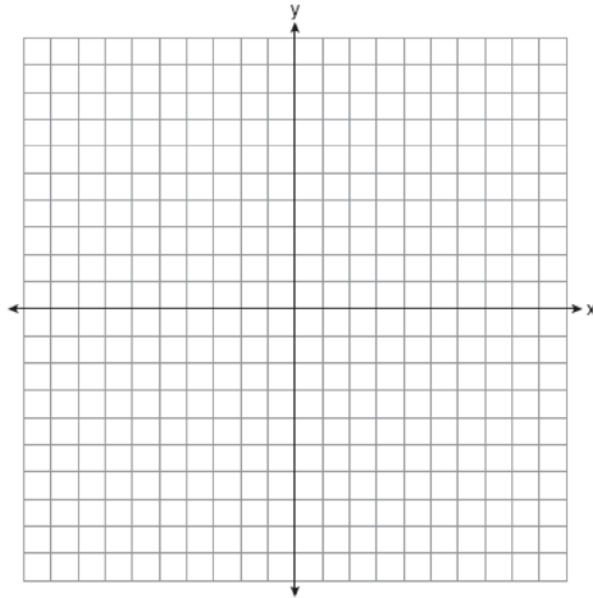
$$y \leq -\frac{3}{4}x + 5$$

$$3x - 2y > 4$$

Is $(6,3)$ a solution to the system of inequalities? Explain your answer.

13 On the set of axes below, graph the following system of inequalities:

$$2x - y > 4$$

$$x + 3y > 6$$

Label the solution set S.
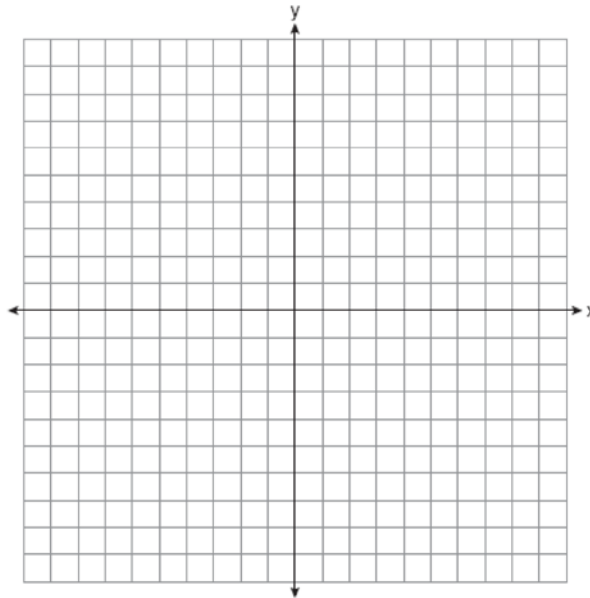

Is $(4, 2)$ a solution to this system? Justify your answer.

14   On the set of axes below, graph the following system of inequalities:
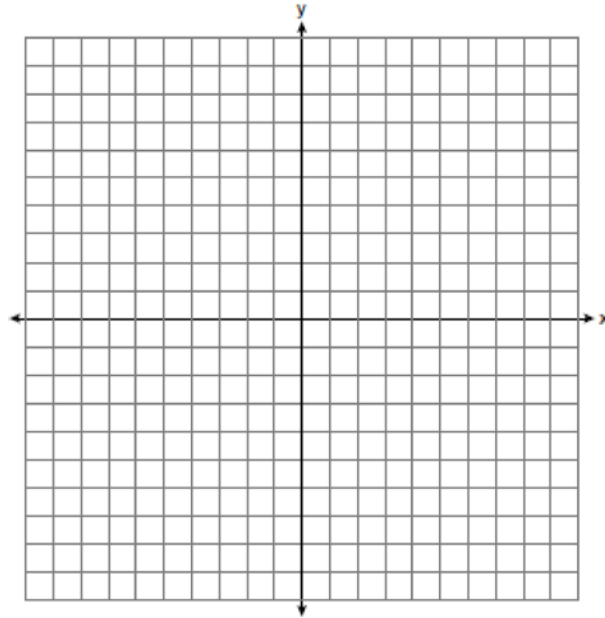
$$2y + 3x \leq 14$$

$$4x - y < 2$$

Determine if the point $(1,2)$ is in the solution set. Explain your answer.

15 Graph the following systems of inequalities on the set of axes below:
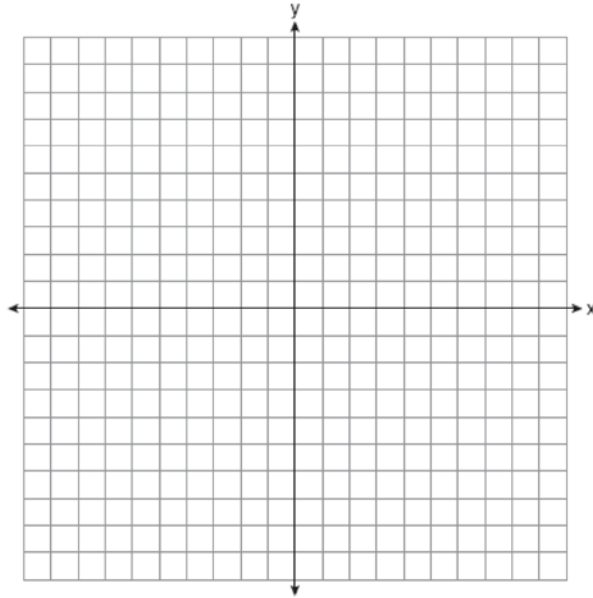
$$2y \geq 3x - 16$$

$$y + 2x > -5$$

Based upon your graph, explain why $(6,1)$ is a solution to this system and why $(-6,7)$ is *not* a solution to this system.

16   Solve the system of inequalities graphically on the set of axes below. Label the solution set S.

$$y + 3x < 5$$

$$1 \geq 2x - y$$
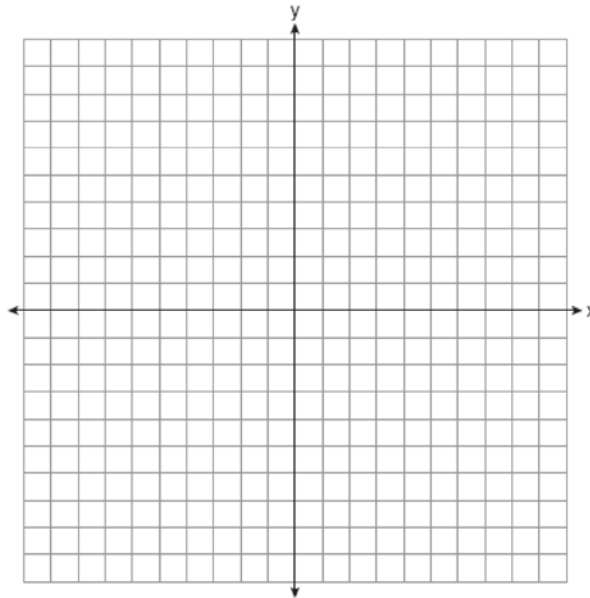

Is the point $(-5,0)$ in the solution set? Explain your answer.

17   Solve the system of inequalities graphically on the set of axes below. Label the solution set S.

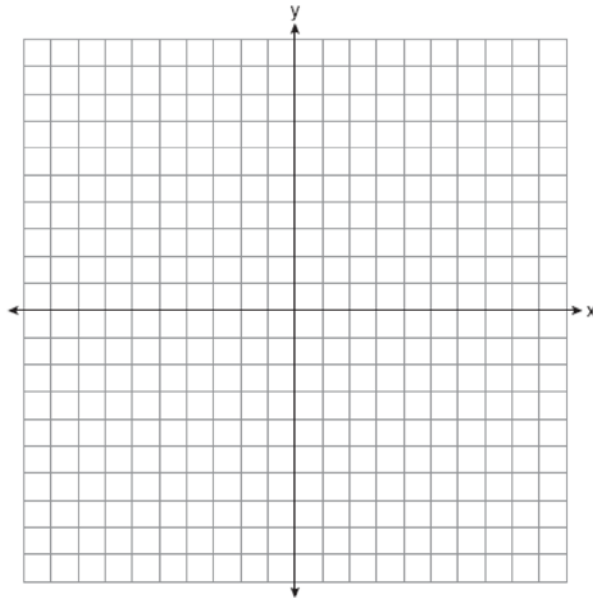$$2x + 3y < 9$$

$$2y \geq 4x + 6$$

Determine if the point $(0,3)$ is a solution to this system of inequalities. Justify your answer.

18   On the set of axes below, graph the following system of inequalities:
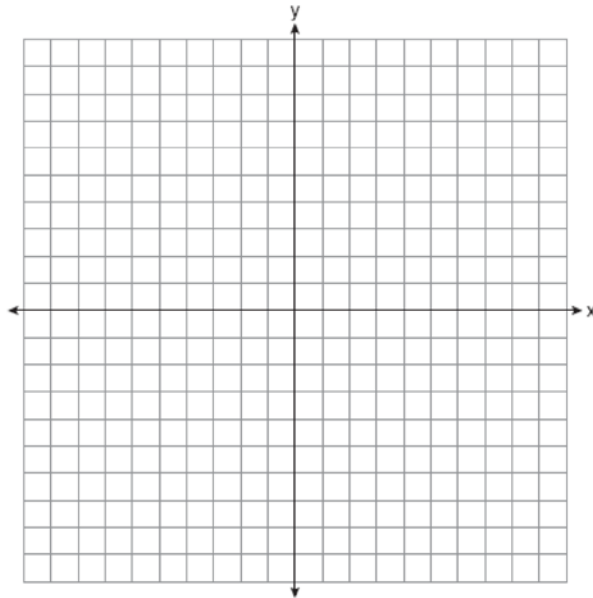
$$2x + y \geq 8$$

$$y - 5 < 3x$$

Determine if the point $(1, 8)$ is in the solution set. Explain your answer.

19   Graph the system of inequalities:

$$-x + 2y - 4 < 0$$

$$3x + 4y + 4 \geq 0$$

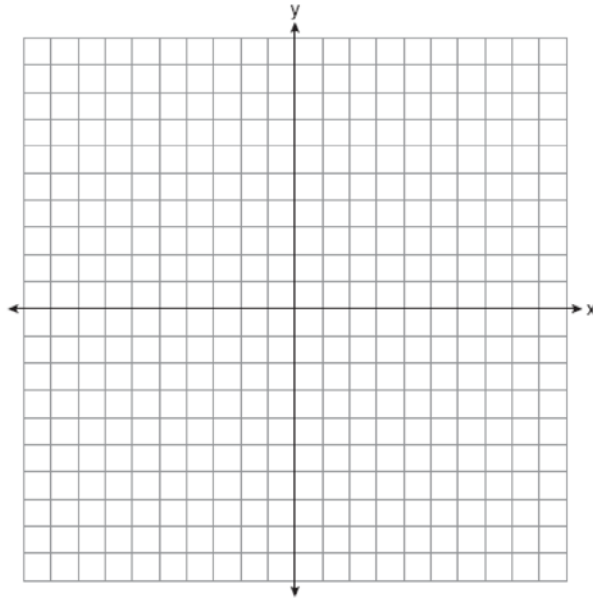Stephen says the point $(0,0)$ is a solution to this system. Determine if he is correct, and explain your reasoning.

20   Solve the following system of inequalities graphically on the set of axes below.

$$2x + 3y \geq -6$$

$$x < 3y + 6$$

Label the solution set S.

.

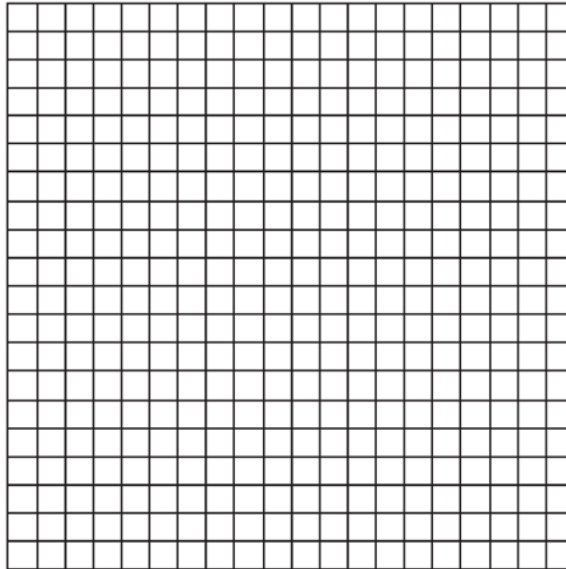Is the point $(4, -2)$ in the solution set? Explain your answer.

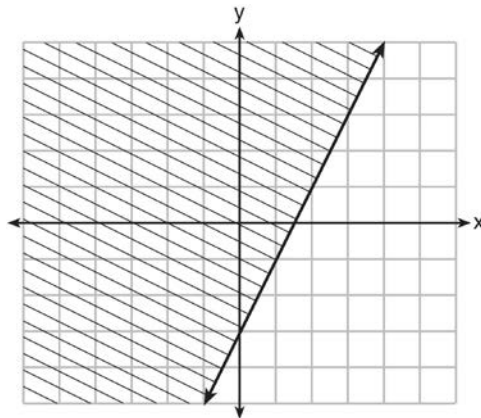21 Solve the following system of inequalities graphically on the grid below and label the solution S.

$$3x + 4y > 20$$

$$x < 3y - 18$$

Is the point $(3,7)$ in the solution set? Explain your answer.

22 The graph of an inequality is shown below.

a) Write the inequality represented by the graph.
b) On the same set of axes, graph the inequality $x + 2y < 4$.
c) The two inequalities graphed on the set of axes form a system. Oscar thinks that the point $(2,1)$ is in the solution set for this system of inequalities. Determine and state whether you agree with Oscar. Explain your reasoning.

Regents Exam Questions   Name: _____
A.REI.D.12: Graphing Systems of Linear Inequalities 1
www.jmap.org

23   The sum of two numbers, x and y, is more than 8. When you double x and add it to y, the sum is less than 14. Graph the inequalities that represent this scenario on the set of axes below.
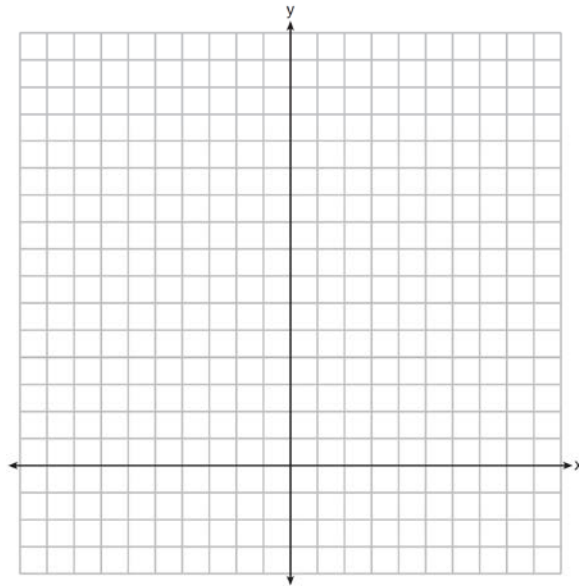

     Kai says that the point $(6,2)$ is a solution to this system. Determine if he is correct and explain your reasoning.

24 The Reel Good Cinema is conducting a mathematical study. In its theater, there are 200 seats. Adult tickets cost $12.50 and child tickets cost $6.25. The cinema's goal is to sell at least $1500 worth of tickets for the theater. Write a system of linear inequalities that can be used to find the possible combinations of adult tickets, x, and child tickets, y, that would satisfy the cinema's goal. Graph the solution to this system of inequalities on the set of axes below. Label the solution with an S. Marta claims that selling 30 adult tickets and 80 child tickets will result in meeting the cinema's goal. Explain whether she is correct or incorrect, based on the graph drawn.
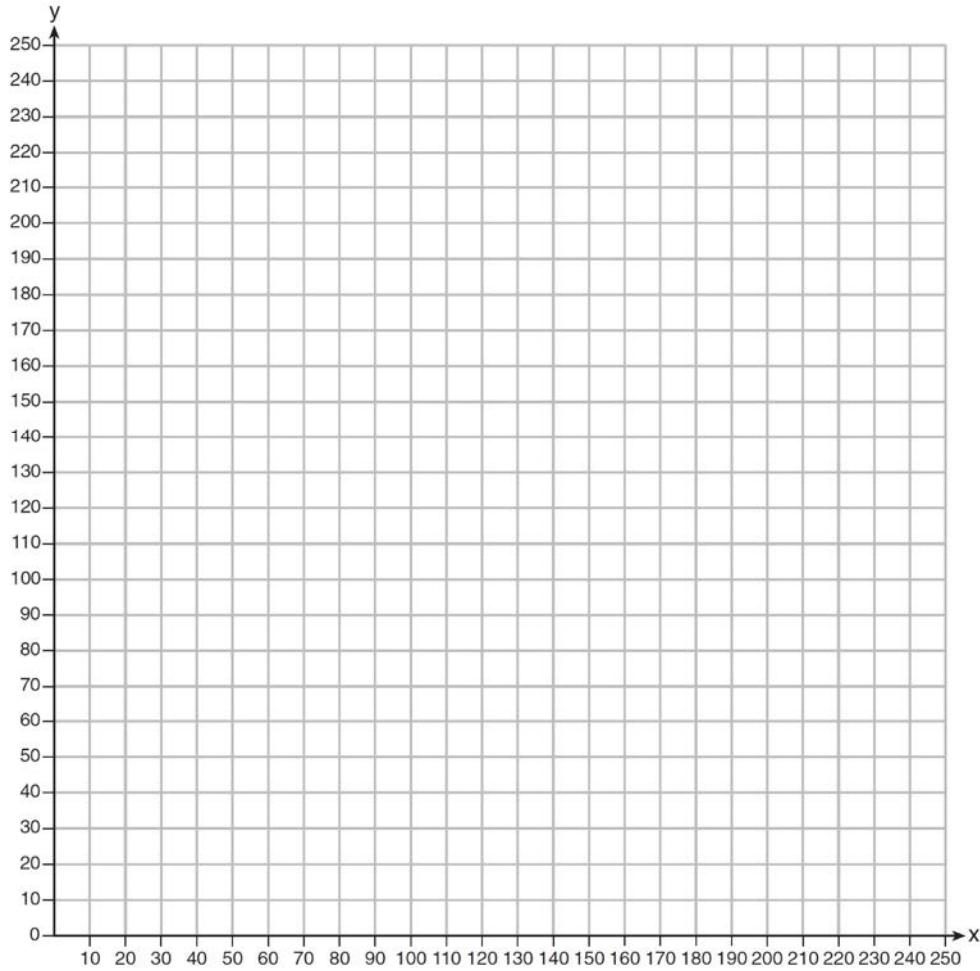
A.REI.D.12: Graphing Systems of Linear Inequalities 1
Answer Section

1 ANS: 3   REF: 081506ai
2 ANS: 2   REF: 061404ai
3 ANS: 1   REF: 081407ai
4 ANS: 2

$(4,3)$ is on the boundary of $y > -\dfrac{1}{2}x + 5$, so $(4,3)$ is not a solution of the system.

REF: fall1301ai
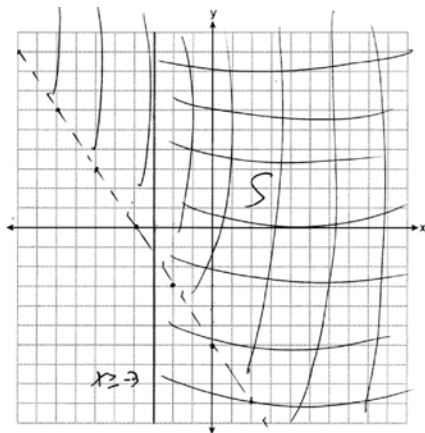
5 ANS: 4
$2(2) < -12(-3) + 4 \quad 4 < -6(-3) + 4$

$\quad\quad 4 < 40 \quad\quad\quad\quad 4 < 22$

REF: 011716ai

6 ANS: 3   REF: 011820ai

7 ANS:

No, because the point $(0,4)$ does not satisfy the inequality $y < \dfrac{1}{2}x + 4$. $\quad 4 < \dfrac{1}{2}(0) + 4$ is not a true statement.

REF: 011828ai

8 ANS:

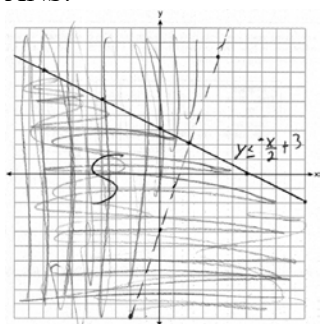
No, as $-2(-9) = 3(2) + 12$.

REF: 082336ai

9 ANS:
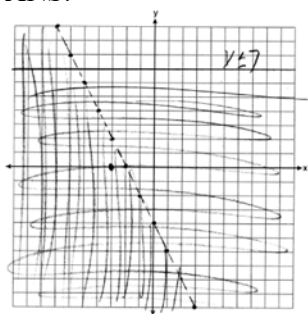
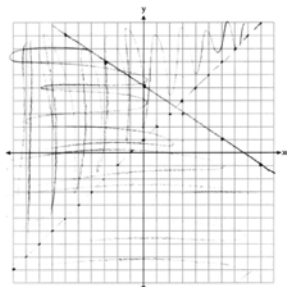(−3,0) falls within the double-shaded area.

REF: 012336ai

10 ANS:
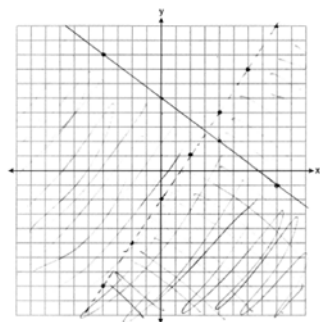

; No, because $2 > 3(2) − 4$ is false.

REF: 082432ai

11 ANS:

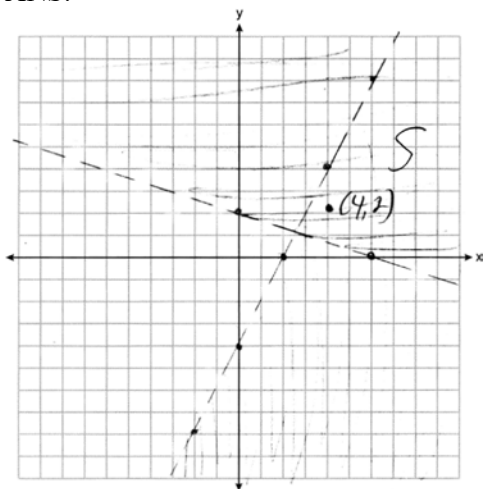(−1,1) is a solution as it is in the overlap area.

REF: 062434ai

12 ANS:

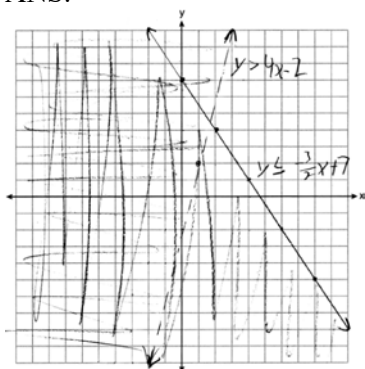No, as (6,3) does not lie in the solution set.

REF: 062135ai

13 ANS:

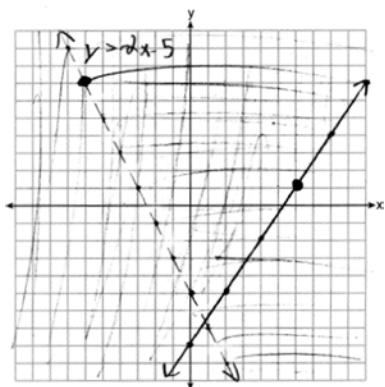Yes, as $(4,2)$ falls within S.

REF: 012436ai

14 ANS:

$(1,2)$ is not in the solution set since it does not fall in an area where the shadings overlap.
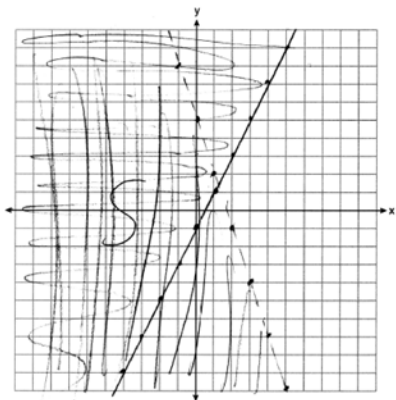
REF: 061835ai

15 ANS:

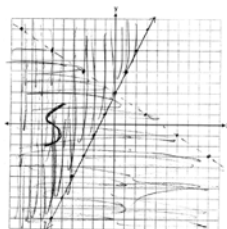$(6,1)$ is on a solid line. $(-6,7)$ is on a dashed line.

REF: 081835ai
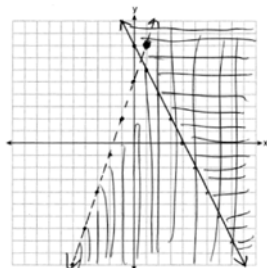
16 ANS:

Yes, as $0 + 3(-5) < 5$

$$1 \geq 2(-5) - 0$$

REF: 082236ai

17 ANS:

No, as $2(0) + 3(3) = 9$.

REF: 062236ai

18 ANS:

No, $(1, 8)$ falls on the boundary line of $y - 5 < 3x$, which is a strict inequality.
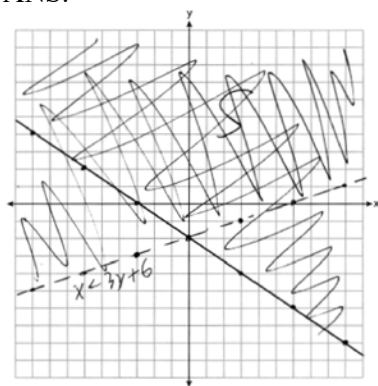
REF: 081933ai

19 ANS:
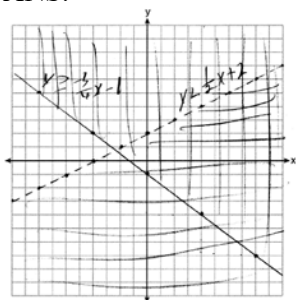
Correct, as $0 + 2(0) - 4 < 0$

$$3(0) + 4(0) + 4 \geq 0$$

REF: 012034ai
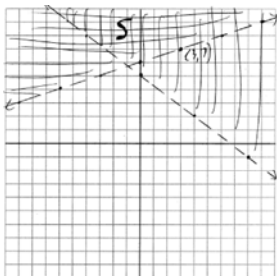
20 ANS:

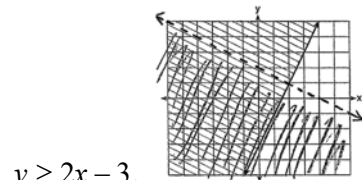; No, because $4 < 3(-2) + 6$ is false.

REF: 062335ai

21 ANS:

No, $(3,7)$ is on the boundary line, and not included in the solution set, because this is a strict inequality.
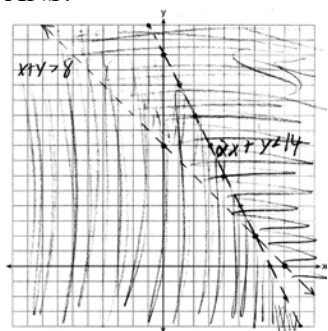
REF: 081735ai

22 ANS:

$y \geq 2x - 3$.   Oscar is wrong. $(2) + 2(1) < 4$ is not true.

REF: 011534ai

23 ANS:

(6,2) is not a solution as its falls on the edge of each inequality.
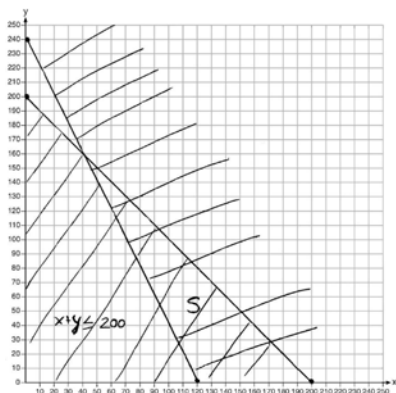
REF: 061634ai

24 ANS:

$x + y \le 200$ Marta is incorrect because $12.5(30) + 6.25(80) < 1500$

$12.5x + 6.25y \ge 1500$ $375 + 500 < 1500$

$875 < 1500$

REF: 011637ai