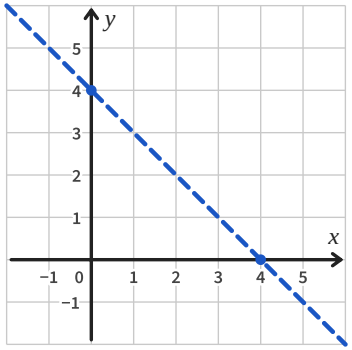
Inequalities and regions: lines like x + 2y = 8

ANSWERS

1

Draw the boundary line of $x + y < 4$.

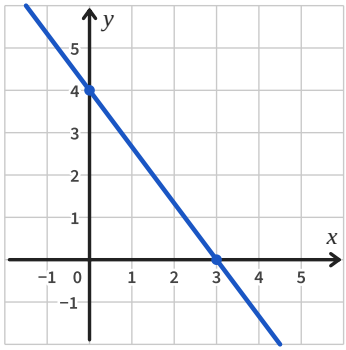


x = 0: y = 4, so (0, 4)

y = 0: x = 4, so (4, 0)

2

Draw the boundary line of $4x + 3y \geq 12$.

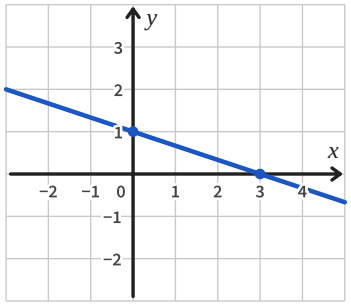


x = 0: 3y = 12, y = 4, so (0, 4)

y = 0: 4x = 12, x = 3, so (3, 0)

3

Draw the boundary line of $x + 3y \leq 3$.

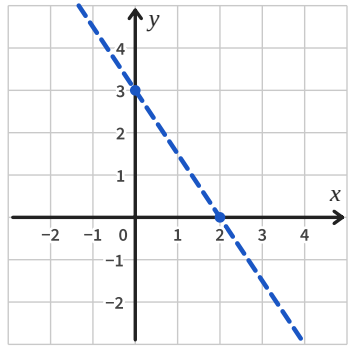


(0, 1)

(3, 0)

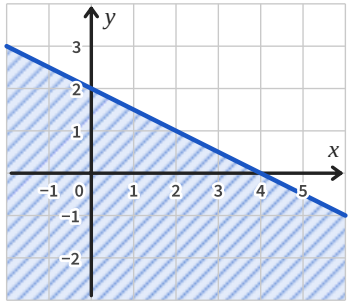
4

Draw the boundary line of $3x + 2y > 6$.



5

Show $x + 2y \leq 4$ on the grid.

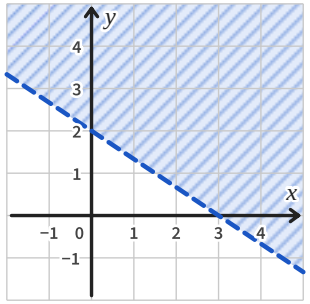


(0, 2) and (4, 0), solid

(0, 0): 0 ≤ 4. True: that side

6

Show $2x + 3y > 6$ on the grid.

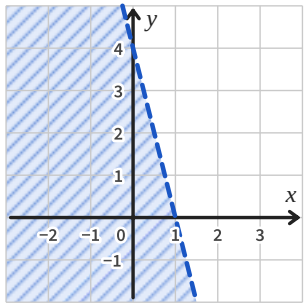


(0, 2) and (3, 0), dashed

(0, 0): 0 > 6. False: the other side

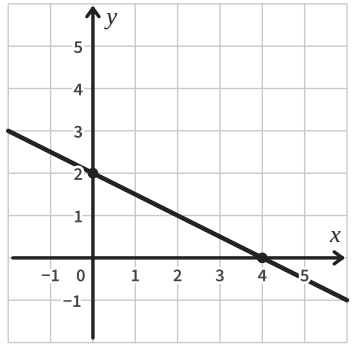
7

Show $4x + y < 4$ on the grid.



8

Zoe draws the line $2x + y = 4$ through (0, 2) and (4, 0). Explain her mistake.



x = 0: y = 4, so (0, 4), not (0, 2)

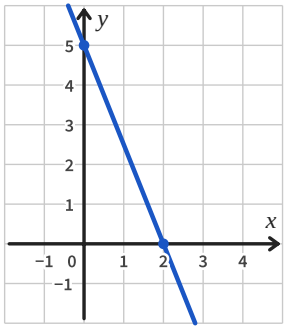
y = 0: 2x = 4, x = 2, so (2, 0)

Inequalities and regions: lines like x + 2y = 8 *further practice*

ANSWERS

9

Draw the boundary line of $5x + 2y \leq 10$.

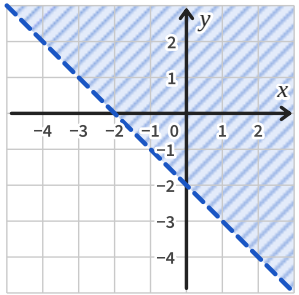


(0, 5) and (2, 0)

Answer solid

10

Show $x + y > -2$ on the grid.



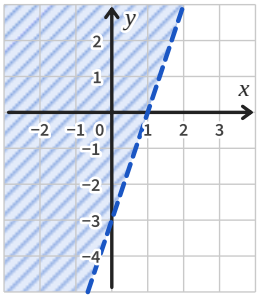
(0, −2) and (−2, 0), dashed

(0, 0): 0 > −2. True.

Answer the side with (0, 0)

11

Show $3x - y < 3$ on the grid.



x = 0: −y = 3, y = −3

(0, 0): 0 < 3. True.

Answer the side with (0, 0)

12

Where does the line $4x + 5y = 20$ cross each axis?

x = 0: 5y = 20, y = 4

y = 0: 4x = 20, x = 5

Answer (0, 4) and (5, 0)

13

Which of these points are in the region $2x + y < 6$: (1, 1), (2, 2), (3, 0), (0, 3)?

(2, 2) and (3, 0): 6 < 6 is false

they are on the dashed line

Answer (1, 1) and (0, 3)

14

The line $ax + by = 12$ crosses the axes at (0, 3) and (4, 0). Find a and b.

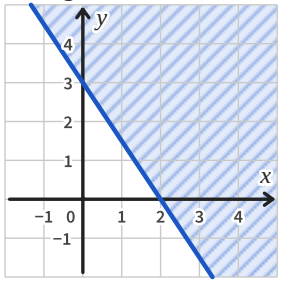
(4, 0): 4a = 12, a = 3

(0, 3): 3b = 12, b = 4

Answer a = 3, b = 4

15

Ama tests the point (2, 0) to show $3x + 2y \geq 6$. Why can she not use it? Shade the region.



3 × 2 + 2 × 0 = 6: (2, 0) is on the line

(0, 0): 0 ≥ 6. False.

Answer the other side from (0, 0)

16

The line $2x + 3y = 9$ crosses the x axis at 4.5. Find two points on it with whole number coordinates.

x = 0: 3y = 9, y = 3

x = 3: 6 + 3y = 9, y = 1

Answer (0, 3) and (3, 1)