

Solve and Check! Show all work/steps and circle your final answer.

Big Ideas!

- ① Isolate the absolute value.
- ② Determine the case.
- ③ Write and solve 1 equation for case 2. Write and solve 2 equations for case 3.

1. $|a+6|=2$ Case 3

$$\begin{array}{r} a+6 = -2 \text{ or } a+6 = 2 \\ \underline{-6} \quad \underline{-6} \quad \quad \underline{-6} \quad \underline{-6} \\ a = -8 \text{ or } a = -4 \end{array}$$

$a = -8, -4$

2. $|2c+5|=21$ Case 3

$$\begin{array}{r} 2c+5 = -21 \text{ or } 2c+5 = 21 \\ \underline{-5} \quad \underline{-5} \quad \quad \underline{-5} \quad \underline{-5} \\ 2c = -26 \quad \quad \quad 2c = 16 \\ \underline{\quad} \quad \underline{\quad} \quad \quad \underline{\quad} \quad \underline{\quad} \\ c = -13 \text{ or } c = 8 \end{array}$$

$c = -13, 8$

3. $2|x-3|+1=5$

$$\begin{array}{r} \underline{-1} \quad \underline{-1} \\ 2|x-3| = 4 \\ \underline{\quad} \quad \underline{\quad} \\ |x-3| = 2 \quad \text{Case 3} \end{array}$$

$$\begin{array}{r} x-3 = -2 \text{ or } x-3 = 2 \\ \underline{+3} \quad \underline{+3} \quad \quad \underline{+3} \quad \underline{+3} \\ x = 1 \text{ or } x = 5 \end{array}$$

$x = 1, 5$

4. $-3|2q+1|+5=-1$

$$\begin{array}{r} \underline{-5} \quad \underline{-5} \\ -3|2q+1| = -6 \\ \underline{-3} \quad \underline{-3} \\ |2q+1| = 2 \quad \text{Case 3} \end{array}$$

$$\begin{array}{r} 2q+1 = -2 \text{ or } 2q+1 = 2 \\ \underline{-1} \quad \underline{-1} \quad \quad \underline{-1} \quad \underline{-1} \\ 2q = -3 \quad \quad \quad 2q = 1 \\ \underline{\quad} \quad \underline{\quad} \quad \quad \underline{\quad} \quad \underline{\quad} \\ q = -\frac{3}{2} \text{ or } q = \frac{1}{2} \end{array}$$

$q = -\frac{3}{2}, \frac{1}{2}$

5. $\frac{1}{2}|3x-4|+8=15$

$$\begin{array}{r} \underline{-8} \quad \underline{-8} \\ \frac{1}{2}|3x-4| = 7 \quad (2) \\ |3x-4| = 14 \quad \text{Case 3} \end{array}$$

$$\begin{array}{r} 3x-4 = -14 \text{ or } 3x-4 = 14 \\ \underline{+4} \quad \underline{+4} \quad \quad \underline{+4} \quad \underline{+4} \\ 3x = -10 \quad \quad \quad 3x = 18 \\ \underline{\quad} \quad \underline{\quad} \quad \quad \underline{\quad} \quad \underline{\quad} \\ x = -\frac{10}{3} \text{ or } x = 6 \end{array}$$

$x = -\frac{10}{3}, 6$

6. $-4|y+1|-5=11$

$$\begin{array}{r} \underline{+5} \quad \underline{+5} \\ -4|y+1| = 16 \\ \underline{-4} \quad \underline{-4} \\ |y+1| = -4 \quad \text{Case 1} \end{array}$$

No solution

Determine if either of the given points are solutions to the given inequalities. Show work/steps to justify your answers. Write **Solution** or **Not a Solution** for each point.

7. $y \leq -\frac{2}{3}x + 5$ $(-3, 4)$ Solution $(0, -1)$ Solution

$$4 \leq \left(-\frac{2}{3}\right)(-3) + 5$$

$$4 \leq 2 + 5$$

$$4 \leq 7$$

True

$$-1 \leq \left(-\frac{2}{3}\right)(0) + 5$$

$$-1 \leq 5$$

True

8. $y > 3x - 9$ $(0, -9)$ Not a Solution $(2, -4)$ Not a Solution

$$-9 > 3(0) - 9$$

$$-9 > -9$$

False

$$-4 > 3(2) - 9$$

$$-4 > 6 - 9$$

$$-4 > -3$$

False

9. $3x - 2y < -8$ $(-4, -3)$ Not a Solution $(3, 10)$ Solution

$$3(-4) - 2(-3) < -8$$

$$-12 + 6 < -8$$

$$-6 < -8$$

False

$$3(3) - 2(10) < -8$$

$$9 - 20 < -8$$

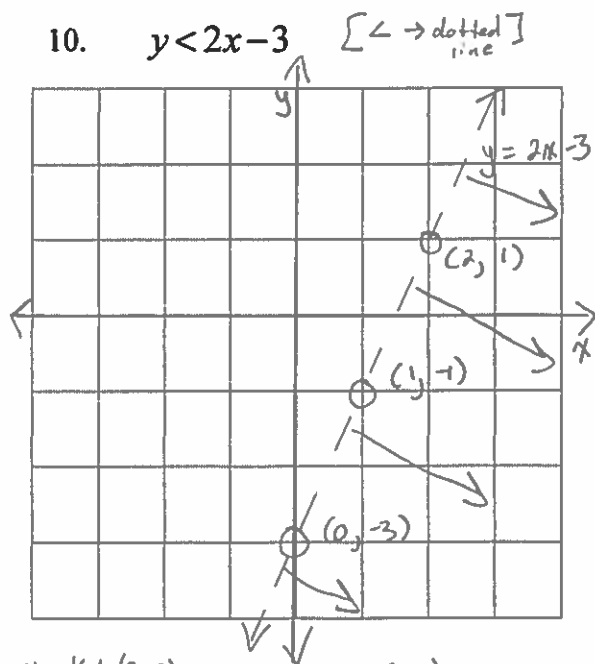
$$-11 < -8$$

True

Graph each inequality. Completely label your graph and include at least two points on the boundary line.

Big Ideas!

- ① Graph the boundary line. ($>$ or $<$) dotted (\geq or \leq) solid
- ② Determine the half plane by checking points.



Check: $(0, 0)$ $(2, 0)$

$$0 < 2(0) - 3$$

$$0 < -3$$

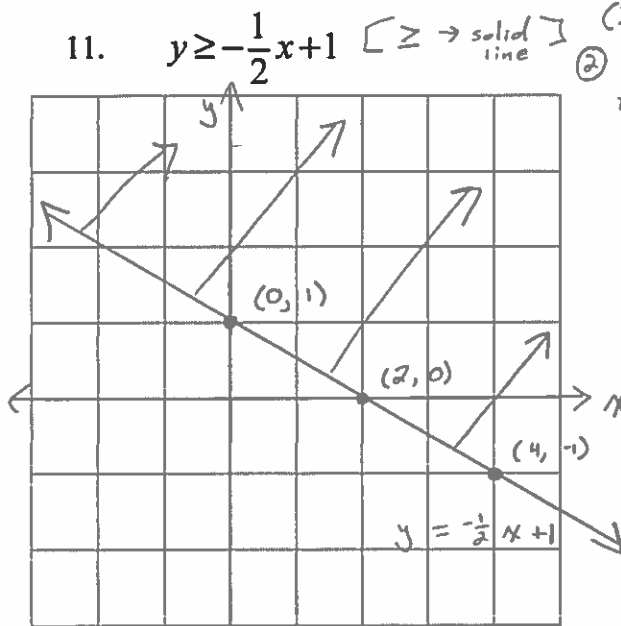
False

$$0 < 2(2) - 3$$

$$0 < 4 - 3$$

$$0 < 1$$

True, shade below!



Check: $(0, 0)$ $(3, 0)$

$$0 \geq -\frac{1}{2}(0) + 1$$

$$0 \geq 0 + 1$$

$$0 \geq 1$$

False

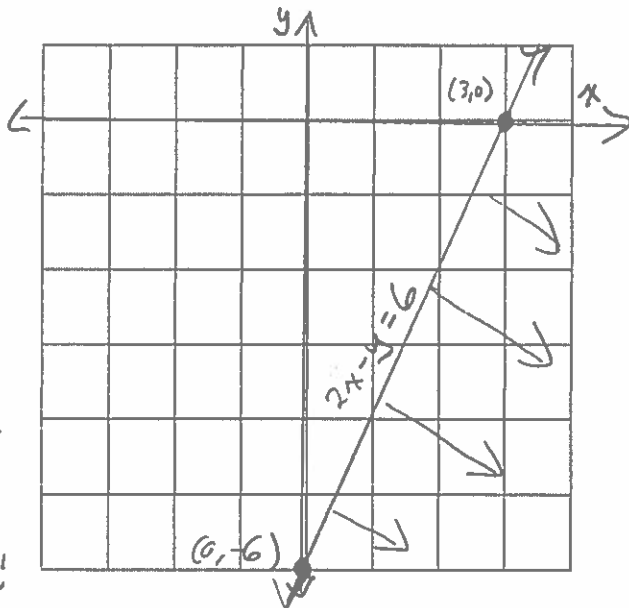
$$0 \geq -\frac{1}{2}(3) + 1$$

$$0 \geq -\frac{3}{2} + 1$$

$$0 \geq -\frac{1}{2}$$

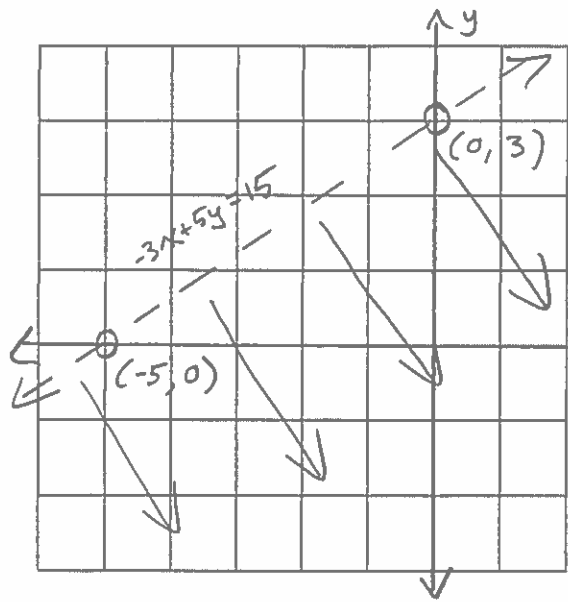
True, include above!

12. $2x - y \geq 6$



check
 $(0, 0)$
 $2(0) - 0 \geq 6$
 $0 \geq 6$
 False
 $(4, 0)$
 $2(4) - 0 \geq 6$
 $8 \geq 6$
 True,
 shade
 below!

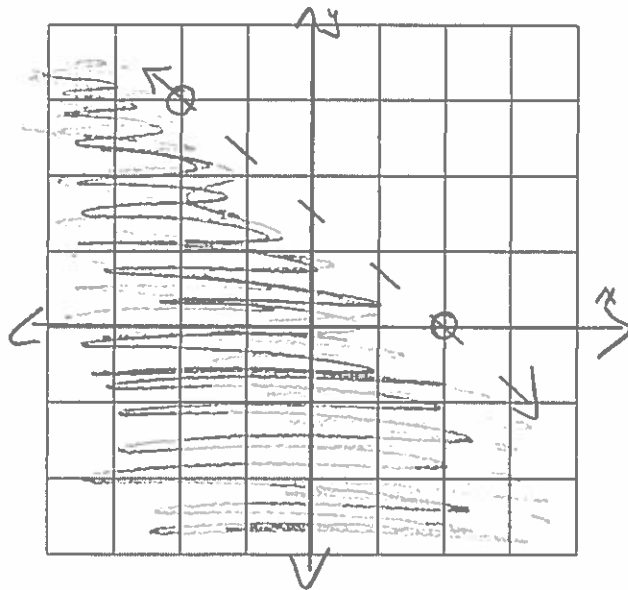
13. $-3x + 5y < 15$



check
 $(0, 0)$
 $-3(0) + 5(0) < 15$
 $0 < 15$
 True, shade
 $(0, 4)$ below.
 $-3(0) + 5(4) < 15$
 $20 < 15$
 False

Write an inequality for the given graphs.

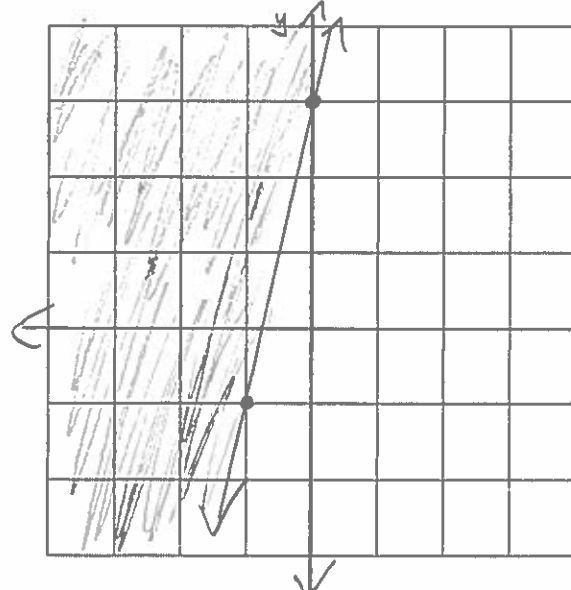
14. $y < -\frac{3}{4}x + \frac{3}{2}$



① $(-2, 3)$ $(2, 0)$ $m = \frac{\Delta y}{\Delta x} = \frac{-3}{4}$ $y = mx + b$
 $0 = -\frac{3}{4}(2) + b$
 $0 = -\frac{3}{2} + b$
 $b = \frac{3}{2}$
 Boundary Line $\rightarrow y = -\frac{3}{4}x + \frac{3}{2}$

② Dotted $\rightarrow < \text{ or } >$
 Use $(0, 0)$ $0 < -\frac{3}{4}(0) + \frac{3}{2}$
 $0 < \frac{3}{2}$
 Inequality: $y < -\frac{3}{4}x + \frac{3}{2}$

15. $y \geq 4x + 3$



① $(-1, -1)$ $(0, 3)$ $m = \frac{\Delta y}{\Delta x} = \frac{4}{1} = 4$
 $b = 3$
 Boundary Line $\rightarrow y = 4x + 3$

② Solid $\rightarrow \geq \text{ or } \leq$
 Use $(-1, 1)$ $1 \geq 4(-1) + 3$
 $1 \geq -4 + 3$
 $1 \geq -1$
 Inequality: $y \geq 4x + 3$

Big Ideas!

- ① Find the equation of the boundary line
- ② Determine the inequality.
 {solid $\rightarrow \geq \text{ or } \leq$;
 dotted $\rightarrow > \text{ or } <$;
 Use a point in the shaded half plane.