Solutions

Page 206 #s 1, 3, 5, 7acegi, 8ad,
10ac, 11ace, 12bdf

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1. Explain the difference between the graph of $y = 4$ and the graph of $y > 4$.

The graph of $y = 4$ is a LINE.

The graph of $y > 4$ is a REGION.

3. Consider the graph of the inequality shown on the right.

   a) What points are described by the graph?

   b) Write an algebraic representation of the inequality.

   c) Does the point $(-8, 6)$ satisfy the inequality?

   d) Does the point $(6, -5)$ satisfy the inequality?

   e) Does the point $(-4, -4)$ satisfy the inequality?
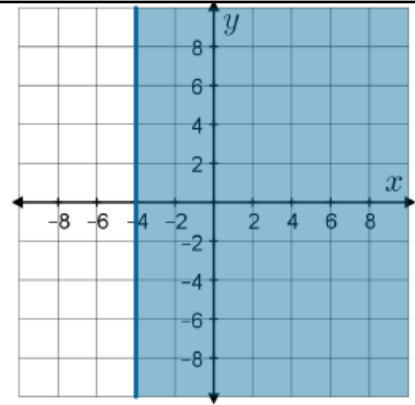
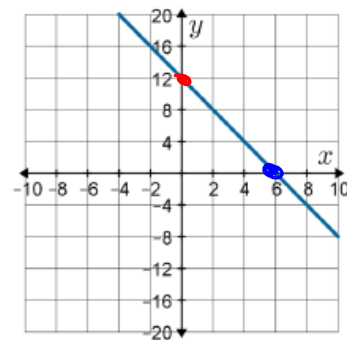a) Points that have an x-value of -4 or bigger.

b) $x \geq -4$

                                        Solid line, include that value of x

c) No (x is too small)

d) Yes (x is bigger than -4)

e) Yes (The point is on the line $x = -4$)

5. State the x-intercept and the y-intercept for the line shown in the graph on the right.

x-intercept is $(6, 0)$

y-intercept is $(0, 12)$

7. Determine the x-intercept and the y-intercept for each of the following lines (if they exist).

a) $x + y = 7$ c) $y + 5x = -20$ e) $y = 6x$

y-intercept when $x = 0$, x-intercept when $y = 0$

a)
$$0 + y = 7$$
$$y = 7$$
$$x + 0 = 7$$
$$x = 7$$
$$\Rightarrow (7, 0)$$
and
$$(0, 7)$$

c)
$$y + 5(0) = -20$$
$$y = -20$$
$$0 + 5x = -20$$
$$\frac{5x}{5} = \frac{-20}{5}$$
$$x = -4$$
$$\Rightarrow (-4, 0)$$
and
$$(0, -20)$$

e)
$$y = 6(0)$$
$$y = 0$$
$$\frac{0}{6} = \frac{6x}{6}$$
$$0 = x$$
$$\Rightarrow (0, 0)$$
and
$$(0, 0)$$

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7. Determine the x-intercept and the y-intercept for each of the following lines (if they exist).

g) $3x - 4y = 24$ i) $y = \dfrac{2}{3}x - 4$

g)
$$3(0) - 4y = 24$$
$$\frac{-4y}{-4} = \frac{24}{-4}$$
$$y = -6$$
$$3x - 4(0) = 24$$
$$\frac{3x}{3} = \frac{24}{3}$$
$$x = 8$$
$$\Rightarrow (8, 0)$$
and
$$(0, -6)$$

i)
$$y = \frac{2}{3}(0) - 4$$
$$y = -4$$
$$0 = \frac{2}{3}x - 4$$
$$0 + 4 = \frac{2}{3}x - 4 + 4$$
$$\frac{4}{2/3} = \frac{\frac{2}{3}x}{2/3}$$
$$6 = x \Rightarrow (6, 0)$$
and
$$(0, -4)$$

3

8. Use *x*- and *y*-intercepts to sketch the graph of each of the following.
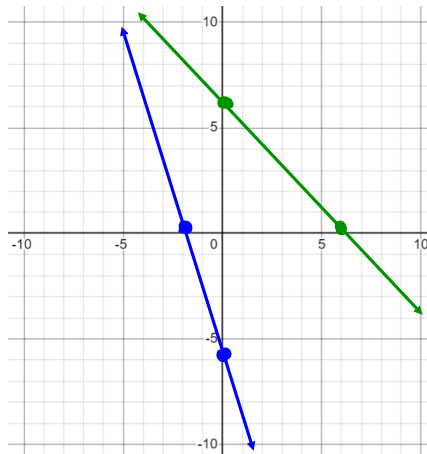
a) $x + y = 6$

$0 + y = 6$

$y = 6$

$x + 0 = 6$

$x = 6$

$\Rightarrow (6, 0)$
and
$(0, 6)$

d) $-3x - y = 6$

$-3(0) - y = 6$

$-y = 6$

$\dfrac{-y}{-1} = \dfrac{6}{-1}$

$y = -6$

$-3x - 0 = 6$

$-3x = 6$

$\dfrac{-3x}{-3} = \dfrac{6}{-3}$

$x = -2$

$\Rightarrow (-2, 0)$ and $(0, -6)$

10. Use *x*- and *y*-intercepts to sketch the graph of each of the following.

a) $x + y > 4$

$0 + y = 4$

$y = 4$

$x + 0 = 4$

$x = 4$

$(4, 0)$
and
$(0, 4)$

Plot as open circles as they are NOT included.

c) $y + 5x \le -10$

$y + 5(0) = -10$

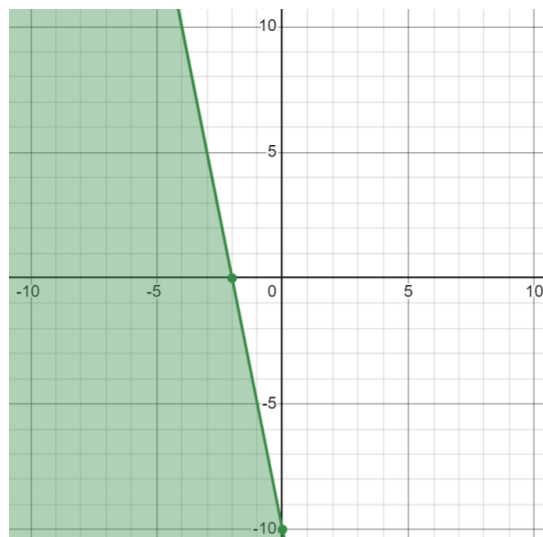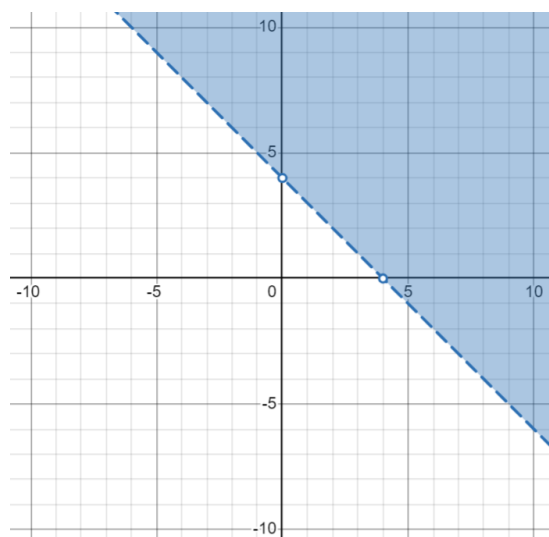$y = -10$

$0 + 5x = -10$

$\dfrac{5x}{5} = \dfrac{-10}{5}$
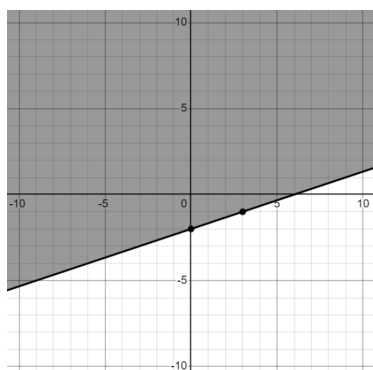
$x = -2$

$(-2, 0)$
and
$(0, -10)$

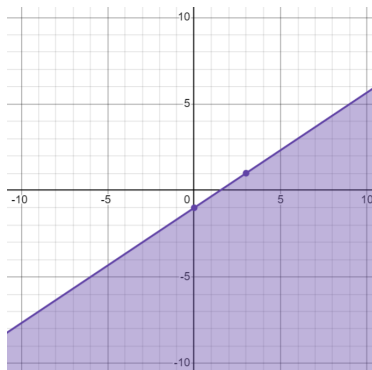Plot as dots as they ARE included.

11. For each line, use the slope and y-intercept to sketch the graph.
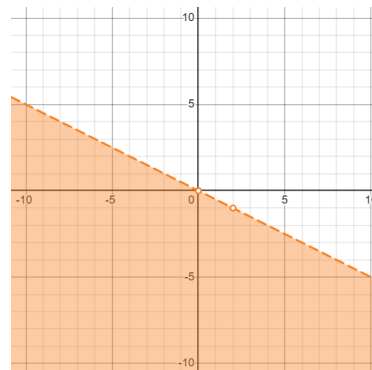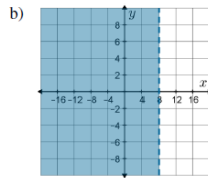
a) $y \geq \dfrac{1}{3}x - 2$ c) $y \leq \dfrac{2}{3}x - 1$ e) $y < -\dfrac{1}{2}x$
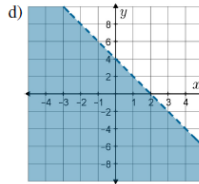
12. Determine an algebraic representation for each of the following graphs.
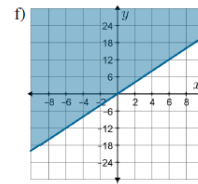
b)

d)

f)

Vertical line
Dotted line
$\Rightarrow$ not equal
to
$\Rightarrow x < 8$

Slope $= -2$
y-int $= 4$
Equation is
$y = -2x + 4$
Dotted line so
not equal to

Point $(0,0)$ is in the region

LS	RS
0	$-2(0) + 4$
0	< 4

$\Rightarrow y < -2x + 4$

Slope $= 2$
y-int $= 0$
Equation is
$y = 2x$
Line so is
equal to

Point $(0,6)$
is in the region

LS	RS
6	$2(0)$
6	> 0

$\Rightarrow y \geq 6x$