Linear Equations and Inequalities Homework Explanations

Linear Equations Homework 1

Question 6 (page 54).

$$\left(\frac{x^4y^3}{x^5y}\right)^3 = \left(\frac{y^2}{x^1}\right)^3 = \frac{y^6}{x^3}.$$

Question 47 (page 54).

$$\begin{aligned}
&3a - 22 = -2a - 7\\
&+2a \qquad\quad +2a\\
&5a - 22 = -7\\
&+22 \qquad\quad +22\\
&5a = 15\\
&\div 5 \quad \div 5\\
&a = 3
\end{aligned}$$

Question 70 (page 54).

$$\frac{x}{2} + \frac{x}{3} = 10$$

We have fractions, so we're going to need to actually do step 1.

Step 1. Find a common multiple of the denominators. 6 is a good common multiple (Note that we just need a common multiple, we don't need to worry about the least common multiple) because 2 and 3 both divide it.

NOTE: Don't forget to multiply divide,and add on both sides. Number one source of errors is forgeting to do so!

$$\frac{x}{2} + \frac{x}{3} = 10$$

$$\times 6 \quad \times 6$$

$$\frac{x}{2} \cdot 6 + \frac{x}{3} \cdot 6 = 10 \cdot 6$$

$$\frac{x}{2} \cdot 6 = 6x/2 = 3x$$
$$\frac{x}{3} \cdot 6 = 6x/3 = 2x$$

$$3x + 2x = 60$$

Step 2. Deal with parenthesis and combine like terms. No paranethesis, but we do have like-terms, i.e. $3x$ and $2x$ (since they're both terms that is a coefficient times the variable)

$$5x = 60$$

We can then go straight to step 4, and divide

$$5x = 60$$
$$\div 5 \quad \div 5$$
$$x = 12$$

When in doubt, check your answer. (step 5)

Question 81 (page 54).

$$4(2 - 3t) + 6t = -6t + 8$$

Step 1: no fractions

Step 2: Get rid of the parenthesis and combine like terms

$$4 \cdot (2 - 3t) = 8 - 12t$$

$$8 - 12t + 6t = -6t + 8$$
$$8 - 6t = -6t + 8$$

Note, we have the same thing on both sides, so we have an identity. We know that because plug in any number for t and it works.

Question 82 (page 54).

$2x - 6 = -2x + 4(x - 2)$

Step 1: no fractions

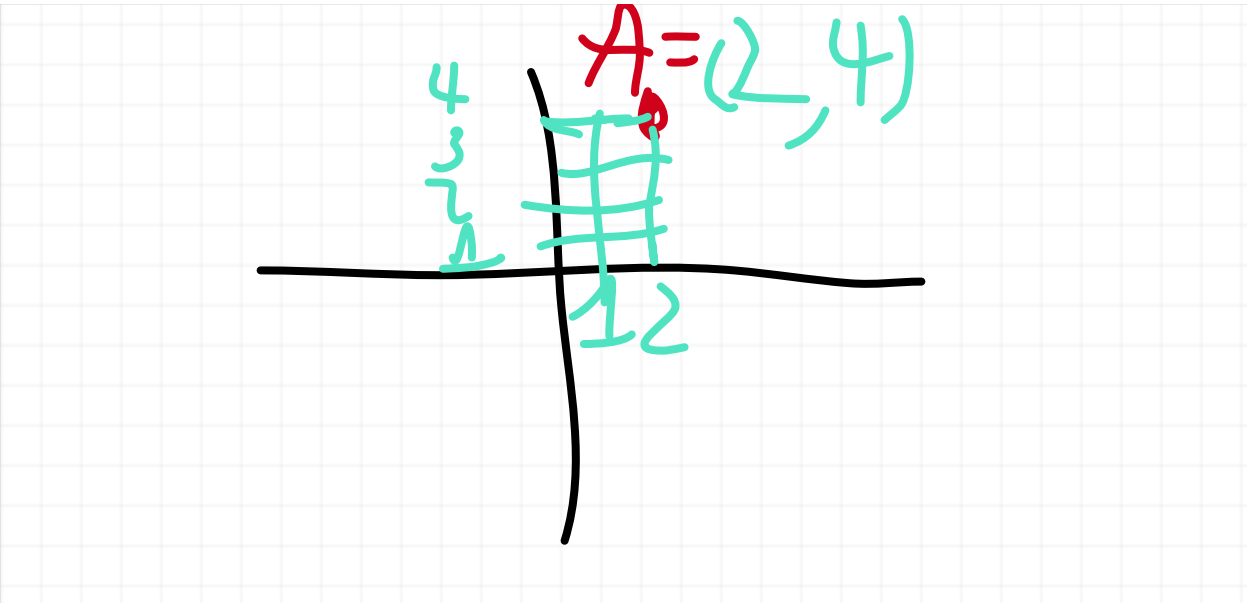
Step 2: We have parenthesis and like-terms

$4 \cdot (x - 2) = 4x - 8$
$2x - 6 = -2x + 4x - 8$
$2x - 6 = 2x - 8$
$-2x \quad\quad - 2x$
$-6 \quad = \quad -8$

We get a CONTRADICTION because $-6 \neq -8$.

Linear Equations Homework 2

Question 27 (page 96).

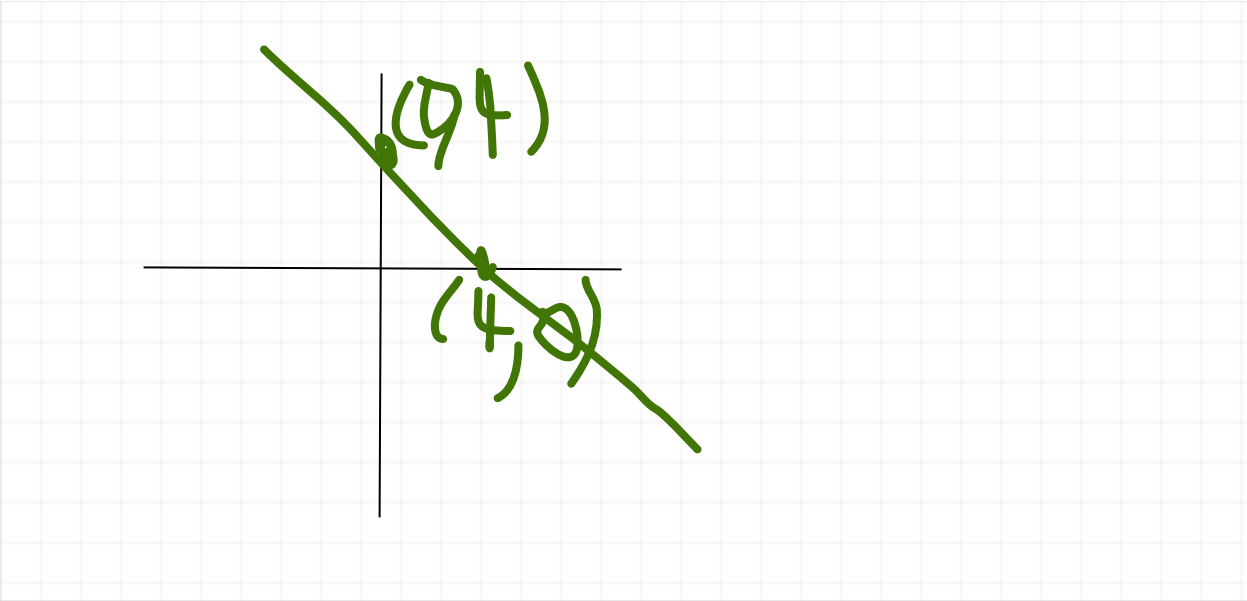


Question 39 (page 96).

Plot some points (we only need 2)
$y = -x + 4$
$y = 0$
$0 = -x + 4$

$+x \quad +x$
$x = 4$

$x = 0$
$y = -(0) + 4 = 4$



Question 57 (page 97).

Want to find the midpoint of PQ
$P = (x_1, y_1) = (0, 0),\ Q = (x_2, y_2) = (6, 8)$
$x_1 = 0,\ x_2 = 6$
$\dfrac{x_1 + x_2}{2} = \dfrac{0 + 6}{2} = 3$
$y_1 = 0,\ y_2 = 8$
$\dfrac{y_1 + y_2}{2} = \dfrac{0 + 8}{2} = \dfrac{8}{2} = 4$

$$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) = (3, 4)$$

Question 73 (page 97).

The table gives the amount y (in dollars) that a student can earn for working x hours.

x	2	4	5	6
y	12	24	30	36

Plot the ordered pairs and estimate the amount for 8 hours

Step 1. Let's rewrite the points on the table in terms of coordinates:
$(2, 12),\ (4,\ 24),\ (5, 30),\ (6, 36)$

Step 2. Connect the dots, and drawing out the line that contains dots

Step 3. Find the point 8 and look at approximately what that point is.

Linear Equations Homework 3

Question 34 (page 106).

$x = y$; find the slope.

How we find the slope of a line is the rate of change between any two points (we can pick our favorite).

One of my favorite points is the origin $(0, 0)$, Let's plug in 1 for x to get another point $(1,\ 1)$. Then use the rate of change formula

$$m = \frac{1-0}{1-0} = 1.$$

Question 38 (page 107).

$$x + y = \frac{2-3y}{3}$$

Three main ways of finding the slope

(i) Find two points of the line, and find their rate of change

$x = 0$

$$y = \frac{2-3y}{3}$$

$\times 3 \quad \times 3$

$3y = 2 - 3y$

$+3y \quad\quad +3y$

$6y = 2$

$$\begin{array}{l} \div 6 \quad \div 6 \\ y = \frac{1}{3} \quad \left(0, \frac{1}{3}\right) \end{array}$$

$y = 0$

$x = \frac{2}{3} \quad \left(\frac{2}{3}, 0\right)$

Plug that into the rate of change formula

$$\frac{\Delta y}{\Delta x} = \frac{0 - \frac{1}{3}}{\frac{2}{3} - 0} = \frac{-\frac{1}{3}}{\frac{2}{3}} = \frac{-1}{2}.$$

(ii). Convert the equation into one of the three formulas

the easiest would be the *slope-intercept* formula, since that entails solving for y

We started with

$$x + y = \frac{2 - 3y}{3}$$

$$\begin{array}{l} x + y = \frac{2 - 3y}{3} \\ \times 3 \qquad \times 3 \\ 3(x + y) = 2 - 3y \\ 3x + 3y = 2 - 3y \\ \quad +3y \qquad +3y \\ 3x + 6y = 2 \\ -3x \qquad -3x \\ \quad 6y = 2 - 3x \\ \quad \div 6 \quad \div 6 \\ \quad y = \frac{1}{3} - \frac{1}{2}x \\ \quad y = \frac{1}{3} + \left(-\frac{1}{2}\right)x \end{array}$$

the slope is $-\frac{1}{2}$.

Question 45 (page 107).

$m_1 = 3, m_2 = -\frac{1}{3}$

parallel or perpendicular or neither?

is it parallel? Are the slopes the same?

Obviously no, so they're not parallel.

perpendicular?

$m_2 = -\frac{1}{m_1}$

$m_2 = -\frac{1}{3}$

$-\frac{1}{m_1} = -\frac{1}{3} = m_2$

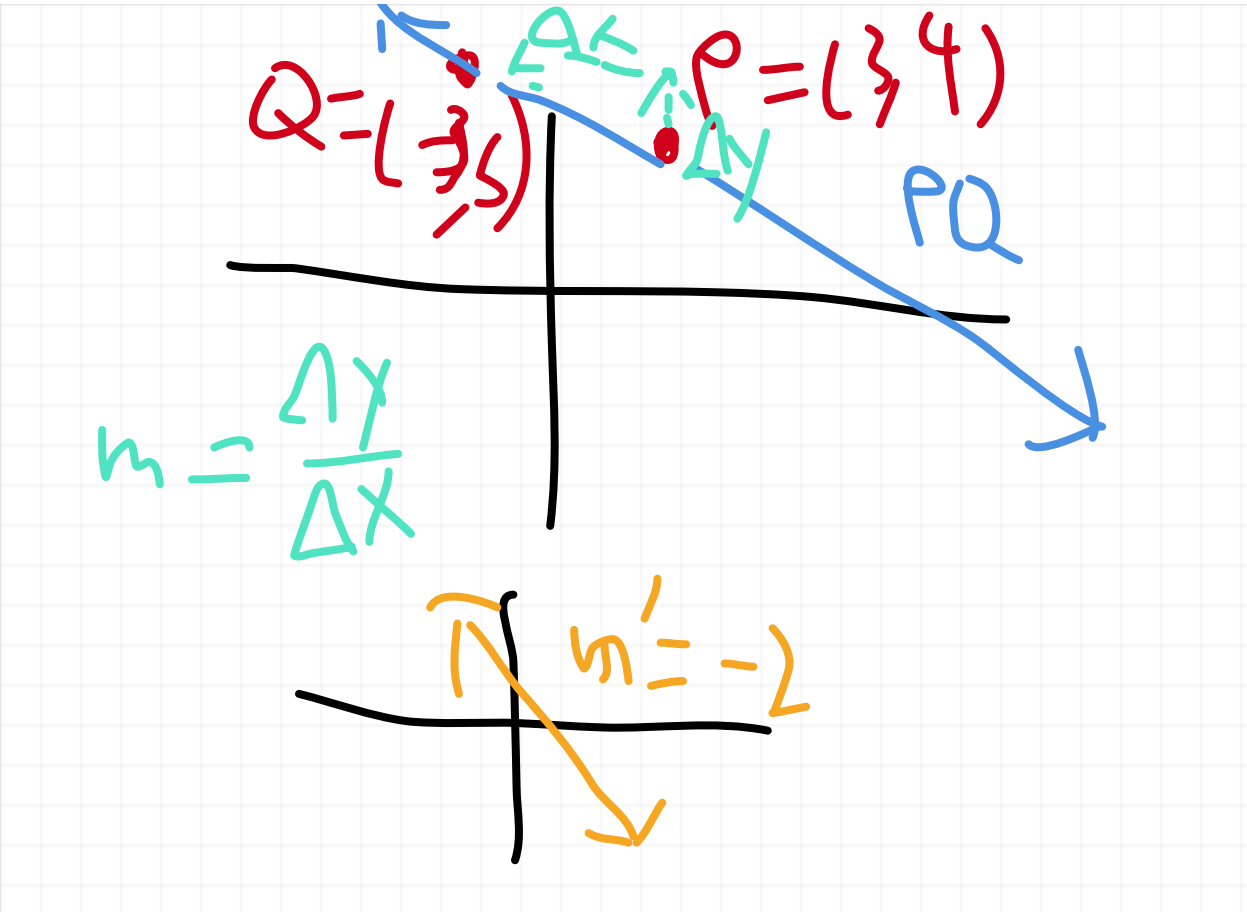
The lines are perpendicular.

Question 54 (page 107). To find if PQ is parallel or perpendicular (or neither) to a line with slope -2, we want to see if the slope of PQ meets the slope conditions of parallel or perpendicular lines.

Parallel lines: $m_1 = m_2$

Perpendicular lines: $m_2 = -\frac{1}{m_1}$

$P(3,4),\ Q(-3,5)$



m = slope of $PQ = \dfrac{\Delta y}{\Delta x} = \dfrac{5-4}{-3-3} = \dfrac{1}{-6} = -\dfrac{1}{6}$

Letting m' be the slope of the other line, let's check to see if

$m = m'$ or $m = -\dfrac{1}{m'}$

$m = m'$? No $-2 \neq -\dfrac{1}{6}$, not parallel.

$m = -\dfrac{1}{m'}$? No

$-\dfrac{1}{m'} = -\dfrac{1}{-2} = \dfrac{1}{2} \neq -\dfrac{1}{6} = m$

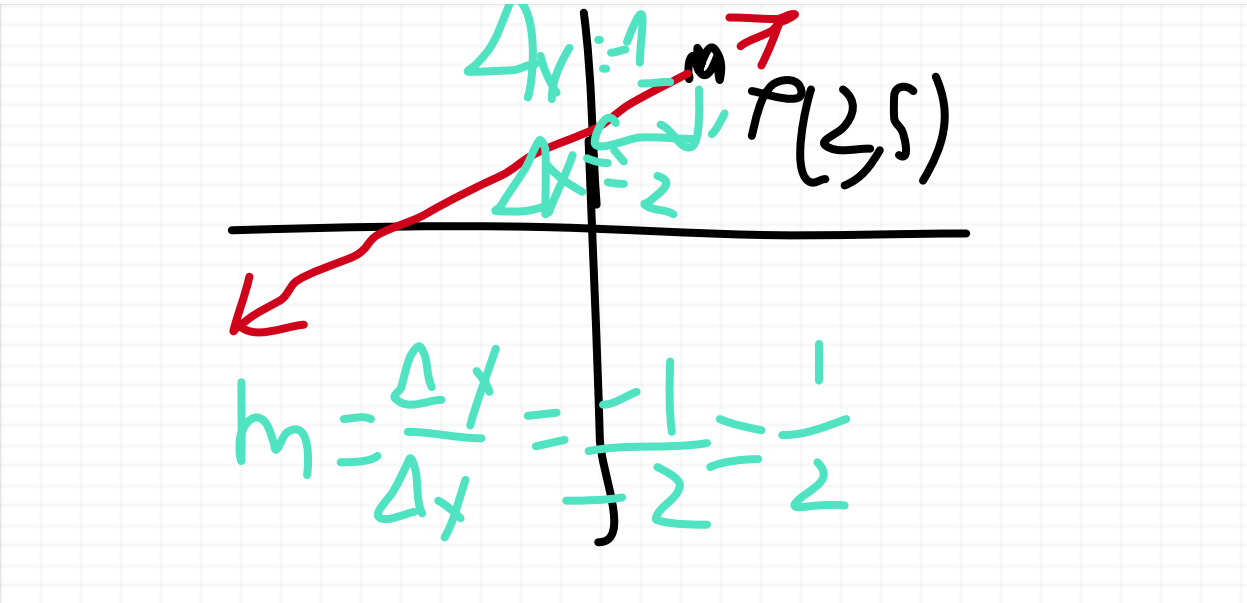
The answer is that it's neither.

Question 64 (page 106).

$x = 0$
No slope.

Linear Equations Homework 4

Question 17 (page 119).



So we have $m = 1/2$ and $(x_1, y_1) = (2, 5)$, so using point slope form, we plug in these values to get

$y - y_1 = m(x - x_1)$
$y - 5 = 1/2(x - 2)$

Simplify to general form $ax + by = c$

$y - 5 = 1/2x - 1$
$+5 \qquad\qquad +5$
$y \quad = 1/2x + 4$
$-1/2x \quad -1/2x$

$-\frac{1}{2}x + y = 4$

Linear Equations Homework 5

Question 34 (page 159).

$2x = 5y - 11$
$3x = 2y$

$2x = 5y - 11$
$-5y \quad -5y$
$2x - 5y = -11$

slope: $-\frac{2}{-5} = \frac{2}{5}$ y-intercept: $\left(0, \frac{11}{5}\right)$

$3x = 2y$
$-2y \quad -2y$
$3x - 2y = 0$

slope: $-\frac{3}{-2} = \frac{3}{2}$ y-intercept: $(0, 0)$

NOTE: Make sure to draw the line very well (using graph paper)

Linear Equations Homework 6

27.

$2x + 3y = 8$
$3x - 2y = -1$

$2x + 3y = 8$
$\times 2 \quad \times 2$
$4x + 6y = 16$

$3x - 2y = -1$
$\times 3 \quad \times 3$
$9x - 6y = -3$

$$
\begin{aligned}
4x + 6y &= 16 \\
+(9x - 6y) &\quad +(-3) \\
13x &= 13 \\
\div 13 &\quad \div 13 \\
x &= 1
\end{aligned}
$$

$$
\begin{aligned}
2(1) + 3y &= 8 \\
2 + 3y &= 8 \\
-2 &\quad -2 \\
3y &= 6 \\
\div 3 &\quad \div 3 \\
y &= 2
\end{aligned}
$$

$(x, y) = (1, 2)$

Question 47 (page 172).

$$
\begin{aligned}
\frac{1}{x} + \frac{1}{y} &= \frac{5}{6} \\
\frac{1}{x} - \frac{1}{y} &= \frac{1}{6}
\end{aligned}
$$

You're expected to solve for $x' = \frac{1}{x}$ and $y' = \frac{1}{y}$

$$
\begin{aligned}
x' + y' &= \frac{5}{6} \\
x' - y' &= \frac{1}{6}
\end{aligned}
$$

Let's use the addition method

$$
\begin{aligned}
x' + y' &= \frac{5}{6} \\
+(x' - y') &\quad + \frac{1}{6} \\
2x' &= \frac{6}{6} = 1 \\
\div 2 &\quad \div 2
\end{aligned}
$$

$$x' = \frac{1}{2}.$$

$$\begin{aligned}
\frac{1}{2} + y' &= \frac{5}{6} \\
\times 6 \quad &\quad \times 6 \\
3 + 6y' &= 5 \\
-3 \quad &\quad -3 \\
6y' &= 2 \\
\div 6 \quad &\quad \div 6 \\
y' &= \frac{1}{3}.
\end{aligned}$$

$$x = \frac{1}{x'} = 2,$$
$$y = \frac{1}{y'} = 3.$$

Linear Equations Homework 7

Question 16 (page 192).

$$\begin{bmatrix} -1 & 3 & 2 \\ 1 & -2 & 3 \end{bmatrix}$$

$$\begin{bmatrix} -1 & 3 & 2 \\ & 1 & 5 \end{bmatrix}$$

How did we get from -2 to 1 and also from 2 to 5? It's clear that we didn't multiply row 2 by some constant because row 2 of the second matrix is not a factor of the first. So we know that we have the row operation

row $2 + t \cdot$ row 1

$$\begin{bmatrix} -1 & 3 & 2 \\ 1 & -2 & 3 \end{bmatrix}$$

row $2 + t \cdot$ row 2

$$\begin{bmatrix} -1 & 3 & 2 \\ & 1 & 5 \end{bmatrix}$$

and we want to solve for t. So we solve the following equality

$$\begin{aligned} 1 &= -2 + t \cdot 3 \\ +2 & \quad +2 \\ 3 &= t \cdot 3 \\ \div 3 & \quad \div 3 \\ 1 &= t \end{aligned}$$

So $t = 1$ and the row operation is row $2 +$ row 1, so we added row 2 by row 1 (let's check and the determine the blank)

$$\begin{bmatrix} -1 & 3 & 2 \\ 1 & -2 & 3 \end{bmatrix}$$

row $2 +$ row 1

$$\begin{bmatrix} -1 & 3 & 2 \\ 0 & 1 & 5 \end{bmatrix},$$

so the $2, 1$ entry is 0.

Question 18 (page 192).

$$\begin{bmatrix} 2 & 1 & -3 \\ 2 & 6 & 1 \end{bmatrix}$$

$$\begin{bmatrix} 6 & 3 & - \\ 2 & 6 & 1 \end{bmatrix}$$

$$\begin{aligned} 6 &= t2 \\ \div 2 & \quad \div 2 \\ 3 &= t \end{aligned}$$

$$\begin{aligned} (6,3) &= t(2,1)? \\ (6,3) &= 3(2,1)? \\ (6,3) &= (3 \cdot 2, 3 \cdot 1) = 3 \cdot (2,1) \end{aligned}$$

$$\begin{bmatrix} 2 & 1 & -3 \\ 2 & 6 & 1 \end{bmatrix}$$

$3 \times$ row 1

$$\begin{bmatrix} 6 & 3 & -3 \cdot 3 \\ 2 & 6 & 1 \end{bmatrix},$$
$$\begin{bmatrix} 6 & 3 & -9 \\ 2 & 6 & 1 \end{bmatrix}$$

Question 20 (page 192).

$x + y = 3$
$x - y = -1$

First we write the equation in matrix form

$$\left(\begin{array}{cc|c} 1 & 1 & 3 \\ 1 & -1 & -1 \end{array}\right)$$

Next, we do reduced row operations to solve for x and y. First, observe that we already have the desired 1 coefficient in the $1,1$ entry, so we can go straight to cancelling out row 2 with row 1 as follows:

$$\left(\begin{array}{cc|c} 1 & 1 & 3 \\ 1 & -1 & -1 \end{array}\right)$$

row 2 – row 1

$$\left(\begin{array}{cc|c} 1 & 1 & 3 \\ 1-1 & -1-1 & -1-3 \end{array}\right),$$
$$\left(\begin{array}{cc|c} 1 & 1 & 3 \\ 0 & -2 & -4 \end{array}\right)$$

Next, we want to get the $2,2$ entry to be 1. We do that by multiplying row 2 by $-1/2$ as follows:

$$\left(\begin{array}{cc|c} 1 & 1 & 3 \\ 0 & -2 & -4 \end{array}\right)$$

row $2 \div -2$

$$\left(\begin{array}{cc|c} 1 & 1 & 3 \\ 0 & 1 & 2 \end{array}\right)$$

Finally, we want to cancel the 1 on the $1,2$ entry, because then the 1 in the $1,1$ entry (i.e. the x variable is by itself)

$$\left(\begin{array}{cc|c} 1 & 1 & 3 \\ 0 & 1 & 2 \end{array}\right)$$

row 1 – row 2

$$\left(\begin{array}{cc|c} 1 & 0 & 1 \\ 0 & 1 & 2 \end{array}\right),$$

so we now have the equation

$x = 1$
$y = 2,$

and our solution is $(x, y) = (1, 2)$.

Question 29 (page 192).

$2x + y + 3z = 3$
$-2x - y + z = 5$
$4x - 2y + 2z = 2$

In matrix form, we have

$$\left(\begin{array}{ccc|c} 2 & 1 & 3 & 3 \\ -2 & -1 & 1 & 5 \\ 4 & -2 & 2 & 2 \end{array}\right)$$

$$2x + y + 3z = 3$$
$$-2x - y + z = 5$$
$$4x - 2y + 2z = 2$$

row $1 \div 2$ multiply by 1/2 on both sides on the first equation

$$\left(\begin{array}{ccc|c} 1 & 1/2 & 3/2 & 3/2 \\ -2 & -1 & 1 & 5 \\ 4 & -2 & 2 & 2 \end{array}\right) \qquad x + 1/2y + 3/2z = 3/2$$

$$-2x - y + z = 5$$
$$4x - 2y + 2z = 2$$

row $2 + 2 \cdot$ row 1

$$\begin{array}{rl} -2x - y + z & = 5 \\ +2(x + 1/2y + 3/2z) & +\,2(3/2) \end{array}$$

$$\left(\begin{array}{ccc|c} 1 & 1/2 & 3/2 & 3/2 \\ 0 & 0 & 4 & 8 \\ 4 & -2 & 2 & 2 \end{array}\right)$$

row $3 - 4 \cdot$ row 1

$$\left(\begin{array}{ccc|c} 1 & 1/2 & 3/2 & 3/2 \\ 0 & 0 & 4 & 8 \\ 0 & -4 & -4 & -4 \end{array}\right)$$

row $2 \leftrightarrow$ row 3

$$\left(\begin{array}{ccc|c} 1 & 1/2 & 3/2 & 3/2 \\ 0 & -4 & -4 & -4 \\ 0 & 0 & 4 & 8 \end{array}\right)$$

row $2 \div -4$

$$\left(\begin{array}{ccc|c} 1 & 1/2 & 3/2 & 3/2 \\ 0 & 1 & 1 & 1 \\ 0 & 0 & 4 & 8 \end{array}\right)$$

row $3 \div 4$

$$\left(\begin{array}{ccc|c} 1 & 1/2 & 3/2 & 3/2 \\ 0 & 1 & 1 & 1 \\ 0 & 0 & 1 & 2 \end{array}\right)$$

row $1 - \dfrac{1}{2} \cdot$ row 2

$$\left(\begin{array}{ccc|c} 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 1 \\ 0 & 0 & 1 & 2 \end{array}\right)$$

row 2 – row 3

$$\left(\begin{array}{ccc|c} 1 & 0 & 1 & 1 \\ 0 & 1 & 0 & -1 \\ 0 & 0 & 1 & 2 \end{array}\right)$$

row 1 – row 3

$$\left(\begin{array}{ccc|c} 1 & 0 & 0 & -1 \\ 0 & 1 & 0 & -1 \\ 0 & 0 & 1 & 2 \end{array}\right)$$

$x = -1$
$y = -1$
$z = 2$

Question 32 (page 192).

$2x + 3y - z = -8$
$x - y - z = -2$
$-4x + 3y + z = 6.$

In matrix form, we have

$$\left(\begin{array}{ccc|c} 2 & 3 & -1 & -8 \\ 1 & -1 & -1 & -2 \\ -4 & 3 & 1 & 6 \end{array}\right)$$

row $1 \leftrightarrow$ row 2

$$\left(\begin{array}{ccc|c} 1 & -1 & -1 & -2 \\ 2 & 3 & -1 & -8 \\ -4 & 3 & 1 & 6 \end{array}\right)$$

row $2 - 2 \cdot$ row 1

$$\left(\begin{array}{ccc|c} 1 & -1 & -1 & -2 \\ 2-2 & 3-2(-1) & -1-2(-1) & -8-2(-2) \\ -4 & 3 & 1 & 6 \end{array}\right)$$

$$\left(\begin{array}{ccc|c} 1 & -1 & -1 & -2 \\ 0 & 5 & 1 & -4 \\ -4 & 3 & 1 & 6 \end{array}\right)$$

row $3 + 4 \cdot$ row 1

$$\left(\begin{array}{ccc|c} 1 & -1 & -1 & -2 \\ 0 & 5 & 1 & -4 \\ 0 & -1 & -3 & -2 \end{array}\right)$$

row $2 \leftrightarrow$ row 3

$$\left(\begin{array}{ccc|c} 1 & -1 & -1 & -2 \\ 0 & -1 & -3 & -2 \\ 0 & 5 & 1 & -4 \end{array}\right)$$

$-1 \times$ row 2

$$\left(\begin{array}{ccc|c} 1 & -1 & -1 & -2 \\ 0 & 1 & 3 & 2 \\ 0 & 5 & 1 & -4 \end{array}\right)$$

row $1 +$ row 2

$$\left(\begin{array}{ccc|c} 1 & 0 & 2 & 0 \\ 0 & 1 & 3 & 2 \\ 0 & 5 & 1 & -4 \end{array}\right)$$

row $3 - 5 \cdot$ row 2

$$\left(\begin{array}{ccc|c} 1 & 0 & 2 & 0 \\ 0 & 1 & 3 & 2 \\ 0 & 0 & -14 & -14 \end{array}\right)$$

row $3 \div -14$

$$\left(\begin{array}{ccc|c} 1 & 0 & 2 & 0 \\ 0 & 1 & 3 & 2 \\ 0 & 0 & 1 & 1 \end{array}\right)$$

row $1 - 2 \cdot$ row 3

$$\left(\begin{array}{ccc|c} 1 & 0 & 0 & -2 \\ 0 & 1 & 3 & 2 \\ 0 & 0 & 1 & 1 \end{array}\right)$$

row $2 - 3 \cdot$ row 3

$$\left(\begin{array}{ccc|c} 1 & 0 & 0 & -2 \\ 0 & 1 & 0 & -1 \\ 0 & 0 & 1 & 1 \end{array}\right)$$

We get the reduced equation of
$x = -2$
$y = -1$
$z = 1$
so we have the unique solution of $(x, y, z) = (-2, -1, 1)$.

Question 33 (page 192)

$x + y = 3$
$3x - y = 1$
$2x + y = 4$

First we want to set up this equation as a matrix.

$$\left(\begin{array}{cc|c} 1 & 1 & 3 \\ 3 & -1 & 1 \\ 2 & 1 & 4 \end{array}\right)$$

row $2 - 3 \cdot$ row 1

$$\left(\begin{array}{cc|c} 1 & 1 & 3 \\ 0 & -4 & -8 \\ 2 & 1 & 4 \end{array}\right)$$

row $3 - 2 \cdot$ row 1

$$\left(\begin{array}{cc|c} 1 & 1 & 3 \\ 0 & -4 & -8 \\ 0 & -1 & -2 \end{array}\right)$$

row $2 \div -4$

$$\left(\begin{array}{cc|c} 1 & 1 & 3 \\ 0 & 1 & 2 \\ 0 & -1 & -2 \end{array}\right)$$

row $1 -$ row 2

$$\left(\begin{array}{cc|c} 1 & 0 & 1 \\ 0 & 1 & 2 \\ 0 & -1 & -2 \end{array}\right)$$

row $3 +$ row 2

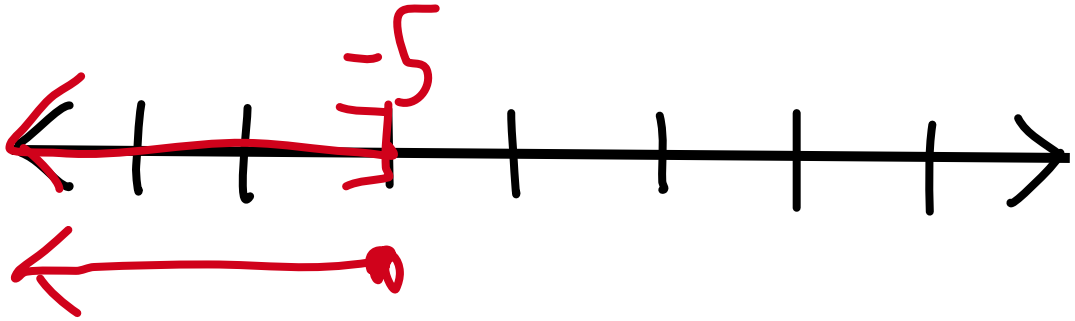
$$\left(\begin{array}{cc|c} 1 & 0 & 1 \\ 0 & 1 & 2 \\ 0 & 0 & 0 \end{array}\right).$$

Inequalities Homework 1

Question 24 (page 218). Find the solution and graph

$$\begin{array}{rl} -2x+6 & \geq 16 \\ -6 & -6 \\ -2x & \geq 10 \\ \div -2 & \div -2 \quad (-2 < 0 \text{ dividing by a negative switches the inequality sign}) \\ x & \leq -5 \end{array}$$

The solution is the interval $(-\infty, 5]$, so note that 5 is included, so to draw the solution, we make sure to draw it with either a closed point (a fully drawn point) or a SQUARE bracket



Question 28 (page 218). $-3 \leq 3x < 12$

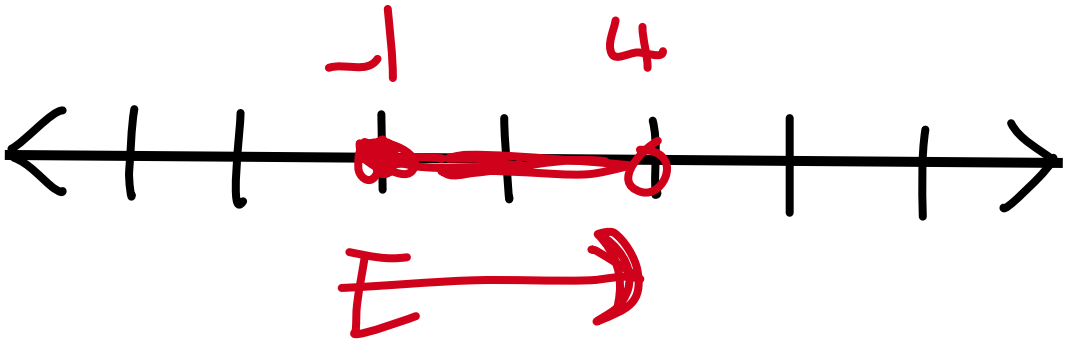
We do algebra for each of the inequalities individually, so we solve it for $-3 \leq 3x$ and $3x < 12$ (and we could hypothetically do it simultaneously, but in general, doing it separate will work most generally)

$-3 \leq 3x$
$\div 3 \quad \div 3 \ (3 > 0)$
$-1 \leq x$

next we do $3x < 12$

$3x < 12$
$\div 3 \quad \div 3$
$x < 4$

So the solution is both of those inequalities put together $-1 \leq x < 4$, which gives us the half-open interval $[-1, 4)$ (also can be viewed as the intersection of $[-1, \infty)$ and $(-\infty, 4)$)

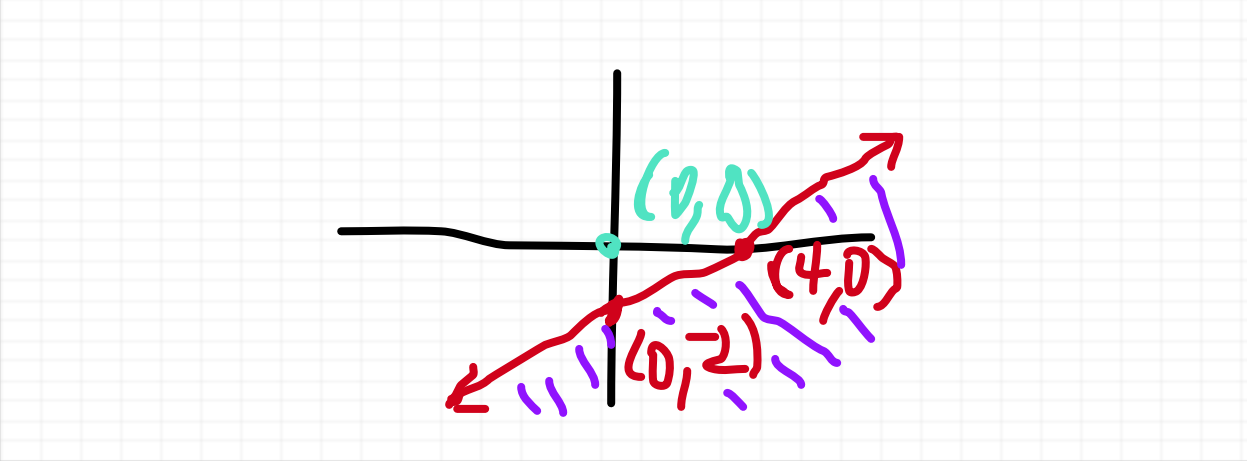


Inequalities Homework 2

Question 25 (page 239). $x - 2y \geq 4$

We find that the line $x - 2y = 4$ has x-intercept $(4, 0)$ and y-intercept $(0, -2)$. We plug in the origin $(0, 0)$ into the inequality $x - 2y \geq 4$ and get

$(0) - 2(0) = 0 \not\geq 4.$



Inequalities Homework 3

Question 11 (page 246)

$3x + 2y > 6$
$x + 3y \leq 2$

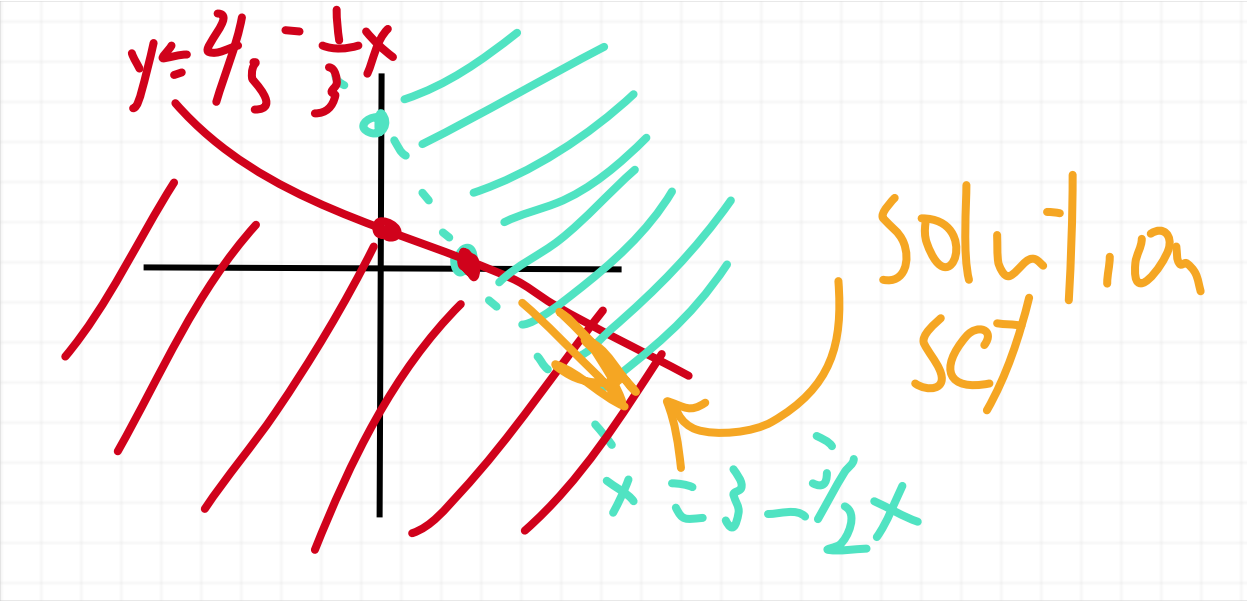
$3x + 2y > 6$
$-3x \qquad -3x$
$2y > 6 - 3x$
$\div 2 \quad \div 2 \ (2 > 0)$
$y > 3 - \frac{3}{2}x$

$x + 3y \leq 2$
$-x \qquad -x$
$3y \leq 2 - x$
$\div 3 \quad \div 3 \quad (3 > 0)$
$y \leq \frac{2}{3} - \frac{1}{3}x$

We then have

$y > 3 - \frac{3}{2}x$
$y \leq \frac{2}{3} - \frac{1}{3}x.$

We graph



Question 12 (page 246).

$x + y < 2$

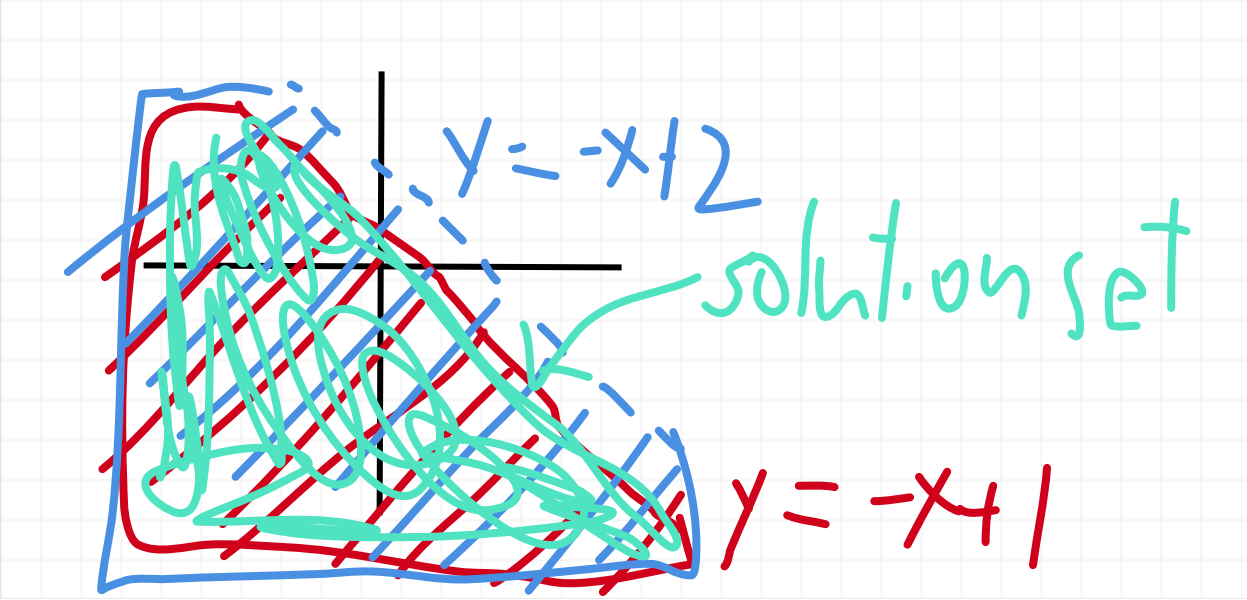
$x + y \leq 1$

In slope-intercept form, the system of inequalities are

$y < -x + 2$

$y \leq -x + 1$

We get the region

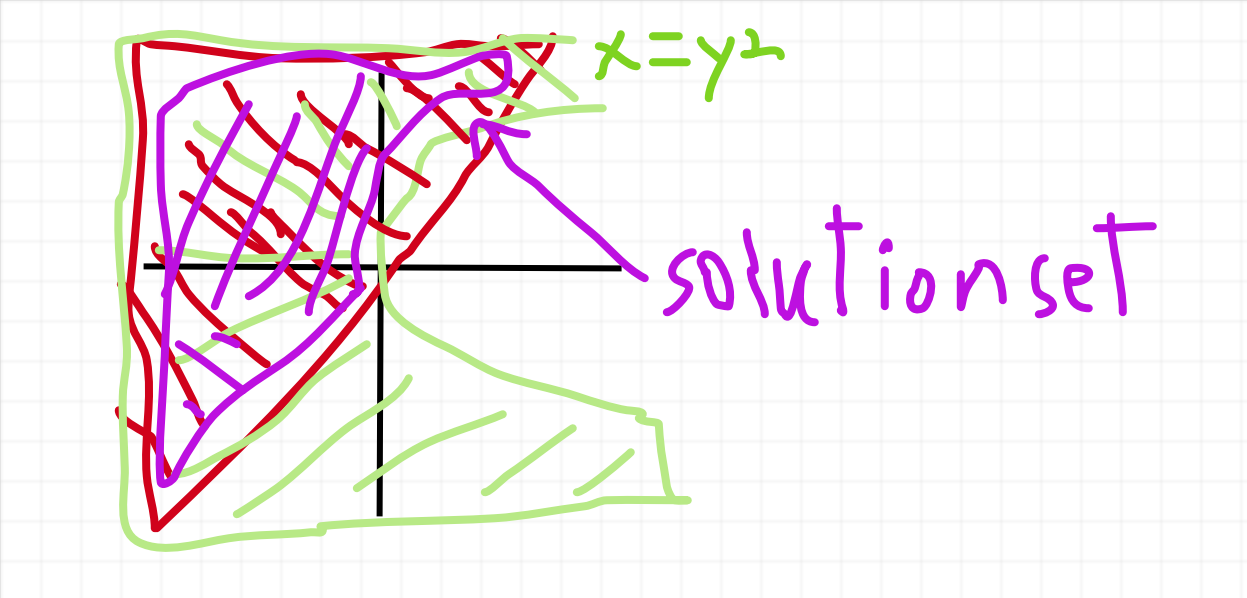


Question 16 (page 246): it involves a parabola, which is not linear.

$x \leq y^2$

$y \geq x$

Note that graphically, we have a parabola above



Question 20 (page 246).

$2x + y \leq 2$

$y \geq x$

$x \geq 0$

The first line in slope-intercept form is

$y \leq -2x + 2$

And so we draw the lines and get