Math 120 Quiz #1
Sept. 13, 2010

Problem 1

Solve the following equations:

Problem 1.a

$$5y = 2((y+3) - 3(y-2))$$

Solution

$$\begin{aligned} 5y &= 2((y+3) - 3(y-2)) \\ 5y &= 2(y+3-3y+6) \\ 5y &= 2(-2y+9) \\ 5y &= -4y+18 \\ 9y &= 18 \\ y &= 2 \end{aligned}$$

Problem 1.b

$$x^2 - 2x - 1 = 0$$

Solution

You could have completed the square here, or you could have used the quadratic formula. You could not, however, use factoring to solve this problem, unless you are some kind of genius.

$$\begin{aligned} a &= 1 \\ b &= -2 \\ c &= -1 \end{aligned}$$

Recall that the quadratic formula is

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

and thus the solutions are

$$x = \frac{2 \pm \sqrt{(-2)^2 - 4(1)(-1)}}{2(1)}$$
$$x = \frac{2 \pm \sqrt{4+4}}{2}$$
$$x = 1 \pm \sqrt{2}$$

I didn't ask you to simplify it, so one you plugged it in the quadratic formula you were good to go.

Problem 2

Perform the indicated operations and then simplify the resulting expression as much as possible. Recall that adding fractions requires a common denominator.

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

Solution

As indicated, you need a common denominator to perform the subtraction. The common denominator of $(x+1)(x-2)$ is easy to find here since the denominators have already been factored. We need to multiply the left term to make the denominators equal, and recall that we need to multiply the top and the bottom by the same value:

$$\frac{(x+1)1}{(x+1)(x-2)} - \frac{3}{(x+1)(x-2)}.$$

Now we can perform the subtraction

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

and simplify as much as possible,

$$\frac{x-2}{(x+1)(x-2)}.$$

At this point we see a common factor of $x-2$ on the top and the bottom. Canceling this out we get

$$\frac{1}{x+1}$$

which is the answer.