Homework 1 **MATH-1150-ES32&ES36** **2013 April 1&2**

1.1 To begin with, I multiply both sides by 12 (a common denominator); after that, it's pretty straightforward.

$$\begin{aligned}\frac{2x}{3}-\frac{x}{2}&=\frac{5}{12};\\ 8x-6x&=5;\\ 2x&=5;\\ x&=\frac{5}{2}.\end{aligned}$$

If you like, the solution set for x is $\{5/2\}$.

1.4 I isolate the square root, square both sides, and check for extraneous solutions.

$$\begin{aligned}\sqrt{2x-5}+2&=4;\\ \sqrt{2x-5}&=2;\\ 2x-5&=4,\ 2\geq 0;\\ 2x&=9,\ \text{True};\\ x&=\frac{9}{2}.\end{aligned}$$

If you like, the solution set for x is $\{9/2\}$.

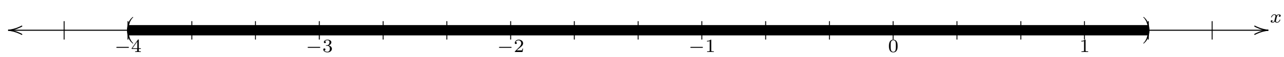
1.9 A number must be close to zero if its absolute value is to be small. This gives me a compound inequality with three sides, and I must do the same operations to all of tem.

$$\begin{aligned}|3x-4|&<8;\\ -8<3x+4&<8;\\ -12<3x&<4;\\ -4<x&<\frac{4}{3}.\end{aligned}$$

In interval notation, the solution set for x is

$$\left(-4,\frac{4}{3}\right).$$

Here is a graph:



1.12 I'll use the quadratic formula, with $a=4$, $b=-4$, and $c=5$. Then

$$x=\frac{-(-4)\pm\sqrt{(-4)^2-4(4)(5)}}{2(4)}=\frac{4\pm\sqrt{-64}}{8}=\frac{4\pm 8\mathrm{i}}{8}=\frac{1}{2}\pm\mathrm{i}.$$

If you like, the solution set for x is $\{1/2+\mathrm{i},1/2-\mathrm{i}\}$.