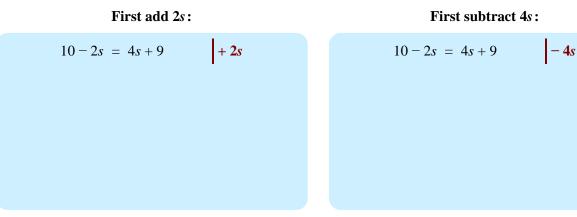
A Variable on Both Sides

Example 1. Solve 2x + 8 = -5x.

Notice that the unknown appears on both sides of the equation. This is not a problem; we can still use the principle of doing the same operation to both sides in order to isolate the unknown on one side. In this case, we can either subtract 2x from both sides or add 5x to both sides. See both options below.

First subtract 2x:		First add 5x:			Check:
2x + 8 = -5x	-2x		2x + 8 = -5x	+ 5 <i>x</i>	$2 \cdot (-8/7) + 8 \stackrel{?}{=} -5 \cdot (-8/7)$
8 = -7x	(Switch sides.)		7x + 8 = 0	- 8	$-16/7 + 8 \stackrel{?}{=} 40/7$
-7x = 8	÷-7		7x = -8	÷ 7	-2 2/7 + 8 2 5 5/7
x = -8/7			x = -8/7		5 5/7 = 5 5/7

1. Solve the equation in two ways, as instructed.



2. Solve. Check your solutions (as always!).

a.	3x + 2 = 2x - 7	b.	9y – 2	=	7 <i>y</i> + 5



3. A common student error is to add or subtract "across the sides," instead of carefully adding or subtracting the same quantity to/from both sides.

Here is an example of it: the student added 7w and 2w, and wrote 9w on the next line. Correct the error and solve the equation.

7w + 8 = 2w - 59w + 8 = -5

4. Solve. Check your solutions (as always!).

a. $-2y-6 = 20+6y$	b. $8x - 12 = -1 - 3x$	c. $6z-5 = 9-2z$

- 5. Fred is contemplating two different job offers. In one, he gets paid \$19.50 per hour plus he will receive a bonus based on the sales he brings in, which he estimates to be about \$150 per week. In another job, he will earn \$21 per hour (no bonuses).
 - **a.** Write an expression for the weekly earnings in each job, for *m* hours of work.

Job 1:

Job 2:

b. In which job would he earn more, if he worked 20 hours per week?

c. For what amount of work hours would both jobs provide him the same wages?