

## Assignment #15: Formula Solving

In some equations, we use letters not only for the variables, but also for some of the constants and coefficients. You have seen this before in cases like the equation relating the area and radius of a circle:

$A = \pi r^2$ . Such an equation is sometimes called a **formula**.

Example:

$$Ax+B=Cx+D$$

$$Ax-Cx = D-B$$

$$x(A-C) = D-B$$

$$\frac{x(A-C)}{(A-C)} = \frac{(D-B)}{(A-C)}$$

$$x = \frac{(D-B)}{(A-C)}$$

We want to solve this formula for x

So we get the terms with x on one side, using subtraction or addition

Then we factor out x (reverse distribution)

Then we divide by the coefficient (A-C) to get x

### Problems

Solve for the lower-case letter. Reduce your answers if possible. You may assume that no variables cause a denominator to be zero.

1. a.  $Ac=17Z$

b.  $9x=T$

c.  $RTy=3H$

2. a.  $Dx=0$

b.  $6c=6H$

c.  $7x=14RF$

3. a.  $-3=9KHx$

b.  $-9QD\pi=-9x$

c.  $K=B-Bc$

4. A bee flies 18 mph faster than a moth. A bee can cover the same distance in three hours as a moth can in 9 hours. How fast is a moth?

5. Bface and Rface, two cousins with not much in common, run directly away from each other for 6 hours and end up 96 miles apart. The source of the argument that caused this sudden separation was the fact that Bface runs 12 mph faster than Rface. How fast is Rface?
6. A train going 4 mph is 8 miles from a bridge 4 miles in length. I have been daydreaming while watching phosphorescent mold on the bridge, and now I must get off the bridge to escape being hit by the train! Being an algebra student, I quickly calculate that I can exactly escape (i.e. with no time to spare) by running to either end of the bridge. Where on the bridge am I?
7. The supplement of an angle is  $44^\circ$  less than twice its complement. Find this (negative) angle.
8. Twiddles can make a widget in 4 hours. He works for three hours, then quits. Quin arrives and finishes the widget in 30 minutes. How long would Quin have taken to make the entire widget by himself?

(L): The Weather Channel announced a 70% chance of rain on Saturday and a 40% chance of rain on Sunday. "Well, you can forget the barbecue!" said the announcer. "We now know that there's a 110% chance of rain sometime this weekend. That's Seattle for you!" What is wrong with the announcer's calculation, and what is the real probability of rain sometime this weekend?