

# Hot X: Algebra Exposed

## Solution Guide for Chapter 1

Here are the solutions for the “Doing the Math” exercises in *Hot X: Algebra Exposed!*

### DTM from p.8

2. Let's start by simplifying this thing a bit. We know that  $\frac{a}{a}$  equals 1, (as long as  $a \neq 0$ ), and that an exponent of 1 is the same as not having an exponent. Also, in that first fraction we can cancel a factor of 2 from the top and bottom, so we can write our expression as:  $\frac{2}{3b} - 1 + 1$ , which we can then write as simply  $\frac{2}{3b}$ . And that matches A!

Answer: **A**

3. We can't start by simplifying because it's already simplified. So, is there an expression in the right hand column that can be simplified to look like  $b - a$ ? Hm, we know a negative sign needs to be involved somehow, and it's not C, because (for most values of  $a$  and  $b$ ) we know that  $a - b \neq b - a$ . The only other item on the right with a negative sign is D, so let's try that one. We know that an exponent of 1 is like not having an exponent, and let's multiply that  $-1$  and  $a$  together, so we get:  $-a + b$ . And we know from the commutative property of addition that this equals  $b + (-a)$ , in other words,  $b - a$ . And we have a match! Answer: **D**

4. Let's simplify this. We can drop the big brackets, because they're not actually serving any purpose; they're not separating anything from anything else, you know what I mean?

So we have  $\frac{a}{1} + (-1b)$ . Next, let's multiply the  $-1$  and the  $b$  together, and we also know that if the denominator of a fraction is just 1, we can drop that denominator. So we can rewrite this as:  $a - b$ . and that matches C! Answer: **C**

5. Let's take the hint and first distribute the outside negative sign. Then we get:  $-1 + a + b + 1$ . Notice that the  $-1$  and 1 cancel each other out, and we are left with:  $a + b$ . Hm, the only expression in the right hand column we haven't used yet is B; let's see what happens when we simplify it. We know that an exponent of 1 is like not having an exponent, so B becomes:  $1(a + b)$ . Then distributing the 1 (which then disappears) we get:  $a + b$ . Since the original problem and B both simplify to the same answer, they are equal! Answer: **B**

### **DTM from p.12–13**

2. If we label the smallest of the two integers  $n$  (always a good idea), then the next consecutive integer could be expressed as  $n + 1$ . If their sum is  $-11$ , written in the language of math, that sentence looks like:

$$n + (n + 1) = -11$$

And now we solve for  $n$ . Dropping the parentheses (they're not really doing anything), and combining like terms, we get:  $2n + 1 = -11$ . With me so far?

Subtracting 1 from both sides we get  $2n = -12$ , and then dividing both sides by 2, we get  $n = -6$ .

Does this work? Well, the next consecutive integer after  $-6$  is  $-5$ , right? And their sum is:  $-6 + (-5) = -11$ . Yep!

Answer:

Part a:  $n + (n + 1) = -11$

Part b:  **$-6$  &  $-5$**

3. Now we're being asked for three consecutive integers. If we label the smallest one  $n$ , then the next two would be  $n + 1$  and  $n + 2$ . If their sum is 42, this means:

$$n + (n + 1) + (n + 2) = 42$$

Dropping parentheses (since they're not doing anything) and combining like terms, we get:  $3n + 3 = 42$ . Then, subtracting 3 from both sides we get  $3n = 39$ , and dividing both sides by 3, we get  $n = 13$ .

Does this work? We said that  $n$  was the smallest integer, so our three consecutive integers are 13, 14, and 15. Add 'em up and you'll see that, yep, they equal 42!

Answer:

Part a:  $n + (n + 1) + (n + 2) = 42$

Part b: **13, 14 & 15**

4. Now we're asked to find 3 consecutive odd integers. If we call the smallest integer  $n$ , and if it is odd, then the next odd integer could be expressed as  $n + 2$ . And the next odd integer after that would be  $n + 4$ . (See the box at the bottom of p.11 if you want to review why this is.) If their sum is  $-3$ , that would mean:

$$n + (n + 2) + (n + 4) = -3$$

Dropping parentheses and combining like terms, we get:  $3n + 6 = -3$ . Subtracting 6 from both sides, we get:  $3n = -9$ , and dividing both sides by 3, we get:  $n = -3$ .

If that is the smallest of the 3 odd integers, then the next one would be  $-1$ , and the next consecutive odd integer after that would be  $1$ . (Tricky, huh!)

Does it work? Adding 'em up, we get:  $-3 + (-1) + 1 = -4 + 1 = -3$ . Yep!

Answer:

Part a:  $n + (n + 2) + (n + 4) = -3$

Part b: **-3, 1 & 1**