MATH DOESN'T SUCK

Solution Guide – Chapter 1

Prime Numbers and Prime Factorization

Doing the Math from p. 8

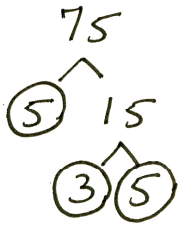
2) 15

Well, you probably know this one from your multiplication facts, and since 3 and 5 are both prime numbers, we're done!

Answer: 15 = 3 × 5

3) 75

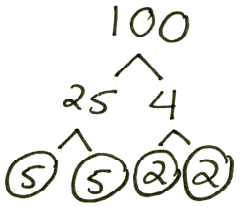
Since it ends in a 5, then you know it's divisible by 5 (see the divisibility tricks on p.9 of the book). When you divide 5 into 75, you get 15, which you know is 3 times 5. Since 3 and 5 are prime numbers, we're done!



Answer: 75 = 3 × 5 × 5

4) 100

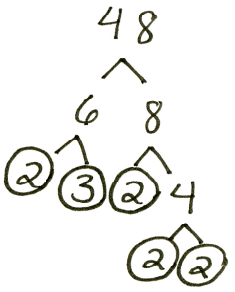
Since 100 is even, you know that 2 divides into it. But you probably also know that 25 goes into 100, 4 times. So that's a good place to start, and then it's easy to factor 25 and 4. Since 2 and 5 are both prime numbers, that's how we know we're done!



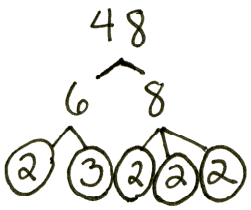
Answer: 100 = 2 × 2 × 5 × 5

5) 48

You probably recognize from your multiplication facts that 48 = 6 × 8, and then it's easy to factor 6 and 8. Then we keep adding lower branches until we have only *prime* numbers left. Since 2 and 3 are both prime, that's how we know we're done. By the way, you can either factor 8 into 2 and 4, and then factor the 4 into 2's:



Or you can go ahead and factor the 8 into three 2's:



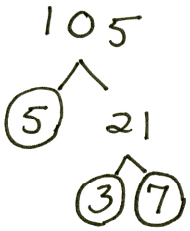
They both mean the same thing, and will give the same final answer!

Answer: 48 = 2 × 2 × 2 × 2 × 3

Doing the Math from p. 10

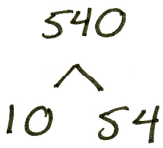
2) 105

This ends in a 5, so we know that 5 is a factor. Try dividing 5 into 105, and you'll see that $105 = 5 \times 21$. And from our times tables, we know that $21 = 3 \times 7$. Done!

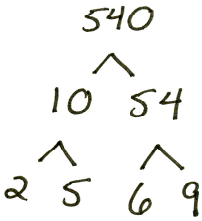


3) 540

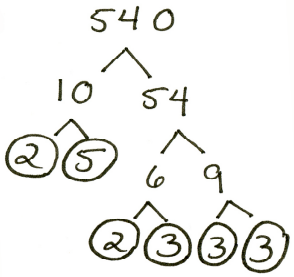
This ends in a 0, so we know that 10 is a factor.



Then 10 splits into its two factors, 2 and 5, and 54 as we know from our times tables, is the product of 6 and 9:

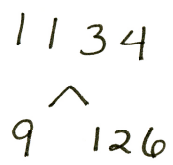


Can we keep splitting up these factors? Since 2 and 5 are prime, that tree branch is done. However, 6 is the product of 2 and 3, and 9 is the product of 3 and 3, and each of those is prime:

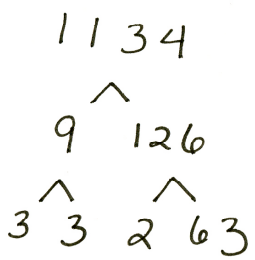


Remember, don't stop until all the numbers at the bottom of the branches are prime! (note: there are often many ways to start the factoring of a number: you also could have started this one by noticing that 5 + 4 + 0 = 9, which is divisible by 9, so a factor of 540 is 9, and the top two branches could have been 9 and 60, instead of 10 and 54!)

4) 1134 – Notice that 1 + 1 + 3 + 4 = 9, so we know that 1134 must be divisible by 9. Divide 9 into 1134 and you'll find that 1134 = 9 × 126.



We know that 9 "splits" into 3 and 3, but what about 126? Well, it's even, so let's divide into it by 2 and find that: 126 = 2 × 63**.**



And now we know from our times tables that 63 = 9 × 7. We have to factor 9 into 3 and 3 to make sure the lowest branches are all prime, and that's it!