MATH DOESN'T SUCK

Solution Guide – Chapter 2

Greatest Common Factor

Doing the Math from p. 17

2) 70 and 14

First, list all the factors for each number, and <u>underline</u> the ones they have in common:

70 – <u>2</u>, 5, <u>7</u>, 10, <u>14</u>, 35, 70
14 – <u>2</u>, <u>7</u>, <u>14</u>

The biggest (greatest) factor they have in common is 14.

Answer: the GCF of 70 and 14 is 14.

3) 100 and 30

First, list all the factors for each number, and <u>underline</u> the ones they have in common:

100 – <u>2</u>, 4, <u>5</u>, <u>10</u>, 20, 25, 50, 100
30 – <u>2</u>, 3, <u>5</u>, 6, <u>10</u>, 15, 30

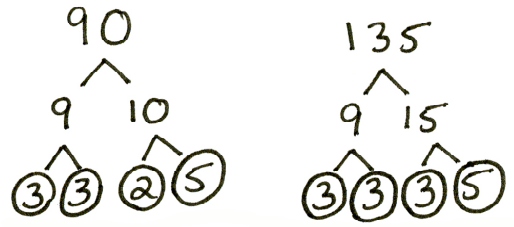
The biggest (greatest) factor they have in common is 10.

Answer: the GCF of 100 and 30 is 10.

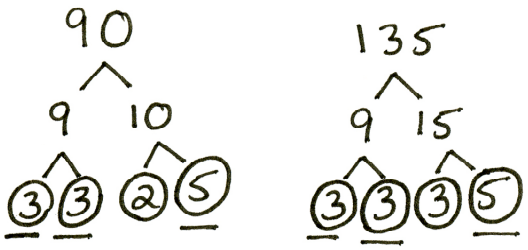
Doing the Math from p. 19-20

2) 90 and 135

Start by doing a factor tree for each and circling the prime numbers.
$90 = 9 \times 10$, and then the 9 and 10 are easy to factor. For 135, notice that $1 + 3 + 5 = 9$, so it's divisible by 9. Divide and find out that: $135 = 9 \times 15$.



Now underline the <u>common</u> primes:

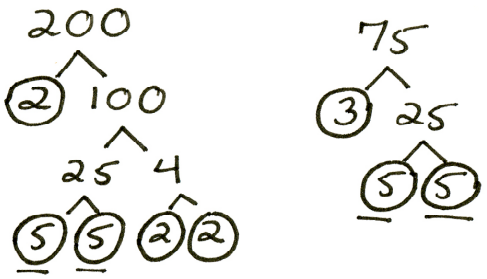


They each have <u>two 3's</u> and <u>one 5</u>. Multiply the monkeys (primes) they have in common, and that's $3 \times 3 \times 5 = 45$.

Answer: The GCF of 90 and 135 = 45.

3) 200 and 75

Start by doing a factor tree for each and circling the prime numbers.
$200 = 2 \times 100$, and $75 = 3 \times 25$, so here's one way the factor trees could look (though they'll always have the same prime factors, no matter how the trees are started.)



They both have two 5's, so multiply the common monkeys (primes) and get: $5 \times 5 = 25$.
Answer: The GCF of 200 and 75 is 25.

Doing the Math from p. 23

2) 80 and 104

Start by noticing that they are both even, so let's use 2:

$$\begin{array}{r|rr} 2 & 80 & 104 \\ \hline & 40 & 52 \end{array}$$

Again, 40 and 52 are both even, so let's use 2 again:

$$\begin{array}{r|rr} 2 & 80 & 104 \\ \hline 2 & 40 & 52 \\ \hline & 20 & 26 \end{array}$$

Yet again, 20 and 26 are even, so let's use 2 again:

$$\begin{array}{r|rr} 2 & 80 & 104 \\ \hline 2 & 40 & 52 \\ \hline 2 & 20 & 26 \\ \hline & 10 & 13 \end{array}$$

And finally, since 13 is prime and doesn't divide into 10, we've found all the common factors we could. Multiply the numbers on the SIDE of the cake to get: $2 \times 2 \times 2 = 8$.

Answer: The GCF of 80 and 108 is 8.

3) 48 and 51

At first glance, they're not both even, so we can't use 2. If we add up their digits, we see that 4 + 8 = 12, which is divisible by 3, and also 5 + 1 = 6 which is divisible by 3. So they both have 3 as a factor! Then we can divide 3 into 48 and 51 each and do:

$$\begin{array}{r|rr} 3 & 48 & 51 \\ \hline & 16 & 17 \end{array}$$

And now we consider 16 and 17… nope, they don't have any common factors (16 and17 are relatively prime). So we've reached the end of the cake!

Multiply the numbers on the side of the cake, and, well, we only have one number, so:

Answer: the GCF of 48 and 51 is 3.

4) 54, 180, and 90

So, what's the greatest factor they all have in common? Let's find their GCF.

Okay, first notice that all three are divisible by 9; (just add up their digits to see: 5 + 4 = 9, 1 + 8 + 0 = 9, and 9 + 0 = 9). Now that we know they all have 9 as a factor, we can divide 9 into each of them and start the cake layers:

$$\begin{array}{r|rrr} 9 & 54 & 180 & 90 \\ \hline & 6 & 20 & 10 \end{array}$$

Now consider 6, 20, and 10. Well, they're all even, so let's use 2!

$$\begin{array}{r|rrr} 9 & 54 & 180 & 90 \\ \hline 2 & 6 & 20 & 10 \\ \hline & 3 & 10 & 5 \end{array}$$

We're left with 3, 10, and 5. Even though 10 and 5 share a common factor (5), we need factors that are shared by *all* of them, and there aren't any. Since 3 is prime, and it doesn't divide into 10 or 5, so we're done. Multiply the numbers on the side of the cake, and we get $9 \times 2 = 18$.

Answer: The GCF of 54, 180, and 90 is 18.