--- Day 21: Monkey Math ---

The monkeys are back! You're worried they're going to try to steal your
stuff again, but it seems like they're just holding their ground and making
various monkey noises at you.

Eventually, one of the elephants realizes you don't speak monkey and comes
over to interpret. As it turns out, they overheard you talking about trying
to find the grove; they can show you a shortcut if you answer their riddle.

Each monkey is given a job: either to yell a specific number or to yell the
result of a math operation. All of the number-yelling monkeys know their
number from the start; however, the math operation monkeys need to wait for
two other monkeys to yell a number, and those two other monkeys might also
be waiting on other monkeys.

Your job is to work out the number the monkey named root will yell before
the monkeys figure it out themselves.

For example:

```
root: pppw + sjmn
dbpl: 5
cczh: sllz + lgvd
zczc: 2
ptdq: humn - dvpt
dvpt: 3
lfqf: 4
humn: 5
ljgn: 2
sjmn: drzm * dbpl
sllz: 4
pppw: cczh / lfqf
lgvd: ljgn * ptdq
drzm: hmdt - zczc
hmdt: 32
```

Each line contains the name of a monkey, a colon, and then the job of that
monkey:

  - A lone number means the monkey's job is simply to yell that number.
  - A job like aaaa + bbbb means the monkey waits for monkeys aaaa and
    bbbb to yell each of their numbers; the monkey then yells the sum of
    those two numbers.
  - aaaa - bbbb means the monkey yells aaaa's number minus bbbb's number.
  - Job aaaa * bbbb will yell aaaa's number multiplied by bbbb's number.
  - Job aaaa / bbbb will yell aaaa's number divided by bbbb's number.

So, in the above example, monkey drzm has to wait for monkeys hmdt and zczc
to yell their numbers. Fortunately, both hmdt and zczc have jobs that
involve simply yelling a single number, so they do this immediately: 32 and
2. Monkey drzm can then yell its number by finding 32 minus 2: 30.

Then, monkey sjmn has one of its numbers (30, from monkey drzm), and
already has its other number, 5, from dbpl. This allows it to yell its own
number by finding 30 multiplied by 5: 150.

This process continues until root yells a number: 152.

However, your actual situation involves considerably more monkeys. What
number will the monkey named root yell?

Your puzzle answer was 331120084396440.

--- Part Two ---

Due to some kind of monkey-elephant-human mistranslation, you seem to have
misunderstood a few key details about the riddle.

First, you got the wrong job for the monkey named root; specifically, you
got the wrong math operation. The correct operation for monkey root should
be =, which means that it still listens for two numbers (from the same two
monkeys as before), but now checks that the two numbers match.

Second, you got the wrong monkey for the job starting with humn:. It isn't
a monkey - it's you. Actually, you got the job wrong, too: you need to
figure out what number you need to yell so that root's equality check
passes. (The number that appears after humn: in your input is now
irrelevant.)

In the above example, the number you need to yell to pass root's equality
test is 301. (This causes root to get the same number, 150, from both of
its monkeys.)

What number do you yell to pass root's equality test?

Your puzzle answer was 3378273370680.

Both parts of this puzzle are complete! They provide two gold stars: **

At this point, you should return to your Advent calendar and try another puzzle.

If you still want to see it, you can get your puzzle input.

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