
CH 1 – CONSTANTS

□ INTRODUCTION

Worried about this algebra class?? You'll find out really soon that your algebra classroom is filled with people just as worried as you are.



Many are worried that it's been a whole summer (or a whole decade!) since their last math class. Others are terrified by the very word "algebra." A bunch of others simply don't like math, whether they're good at it or lousy at it. This means that we're all pretty much in the same boat (well, not all of us – I think algebra is cool!).



Keep an open mind and give me a chance to teach you the subject. That means that you attend class, pay attention, ask and answer questions, and spend a good amount of time at home (or in the Math Lab) practicing your algebra skills.

We begin our algebra journey by exercising our brains. The homework in this chapter should be done by just guessing and experimenting; that is, by trial and error.

□ FINDING A PAIR OF NUMBERS

To work the homework in this section, we need only the following four math terms:

The **sum** of two numbers is the result of adding them.

The **difference** of two numbers is the result of subtracting them.

The **product** of two numbers is the result of multiplying them.

The **quotient** of two numbers is the result of dividing them.

EXAMPLE 1: Find two numbers with a sum of 11 and a difference of 5.

Solution: What? How can we have an algebra problem with unknown values on the first page of an algebra book? Here's how: We don't care about algebra yet. Let's just use our knowledge of the words *sum* and *difference* and a little trial and error (guessing!).

Well, 10 and 1 have a sum of 11, so that's a possibility:

$$10 + 1 = 11 \quad \checkmark$$

$$10 - 1 = 9, \text{ not } 5, \text{ like the problem requires.}$$

We didn't get the right two numbers, so let's try 7 and 4:

$$7 + 4 = 11 \quad \checkmark$$

$$7 - 4 = 3, \text{ but the difference is supposed to be } 5.$$

Consider 8 and 3:

$$8 + 3 = 11 \quad \checkmark$$

$$8 - 3 = 5, \text{ as required by the problem!}$$

In short, the numbers 8 and 3 have a sum of 11 and a difference of 5. Both conditions of the problem have been met, and so our final answer is the pair of numbers

8 & 3



DONE!

"Only education is capable of saving our societies from possible collapse, whether violent, or gradual."

– *Jean Piaget*

Homework

1. Find two numbers with a product of 20 and a sum of 12.
2. Find two numbers with a sum of 2 and a difference of 0.
3. Find two numbers with a product of 12 and a difference of 4.
4. Find two numbers with a product of 7 and a sum of 8.
5. Find two numbers with a difference of 9 and a sum of 11.
6. Find two numbers with a product of 42 and a sum of 13.
7. Find two numbers with a difference of 7 and a product of 18.
8. Find two numbers with a product of 16 and a difference of 6.
9. Find two numbers with a difference of 2 and a product of 48.
10. Find two numbers with a sum of 8 and a difference of 0.
11. Find two numbers with a difference of 14 and a quotient of 8.
12. Find two numbers with a product of 16 and a sum of 8.
13. Find two numbers with a sum of 19 and a product of 90.
14. Find two numbers with a difference of 4 and a sum of 10.
15. Find two numbers with a quotient of 2 and a product of 50.
16. Find two numbers with a sum of 11 and a difference of 7.
17. Find two numbers with a difference of 9 and a quotient of 2.
18. Find two numbers with a sum of 3 and a difference of 1.
19. Find two numbers with a product of 12 and a sum of 7.
20. Find two numbers with a quotient of 4 and a difference of 27.



I'M THINKING OF A NUMBER

I'm thinking of a number. If I add 10 to the number, the result is 45. What number was I thinking of?

In the second section of this chapter, our goal is to solve problems like the one above using just our common sense. We simply want to “reason” it out using just a little bit of logic. Can you find the number? The number I was thinking of was **35**. Next, we need some more terminology.

To **double** a number means to multiply it by **2**.

To **triple** a number means to multiply it by **3**.

To **quadruple** a number means to multiply it by **4**.

To **quintuple** a number means to multiply it by **5**.

There's no process that I intend to teach you at this point in the course, so on to the homework. One hint: If you see a phrase like “subtract 7 from 20,” it means $20 - 7 = 13$.

Homework

21. Solve each of the following “*I'm thinking of a number*” problems using whatever reasoning you like:
- If I multiply the number by 2, the result is 24.
 - If I subtract 7 from the number, the result is 20.
 - If I divide the number by 5, the result is 10.
 - If I add 19 to the number, the result is 100.
 - If I multiply the number by 3, the result is 24.
 - If I subtract 17 from the number, the result is 20.



- g. If I divide the number by 6, the result is 12.
- h. If I add 29 to the number, the result is 50.
- i. If I multiply the number by 20, the result is 300.
- j. If I subtract 27 from the number, the result is 40.
- k. If I divide the number by 9, the result is 8.
- l. If I add 199 to the number, the result is 200.
- m. If I double the number, the result is 34.
- n. If I triple the number, the result is 72.
- o. If I quadruple the number, the result is 300.
- p. If I quintuple the number, the result is 95.



22. I'm thinking of a number . . .

- a. If I triple the number and then add 4, the result is 34.
- b. If I multiply the number by 7, and then subtract 8, the result is 20.
- c. If I add 3 to the number, and then double that result, the final result is 16.
- d. If I subtract 2 from the number, and then triple that result, the final result is 99.
- e. If I quintuple the number and then add 7, the result is 57.
- f. If I quadruple the number, and then subtract 8, the result is 40.
- g. If I add 13 to the number, and then double that result, the final result is 100.
- h. If I subtract 20 from the number, and then triple that result, the final result is 51.
- i. If I add 11 to the number, and then quadruple that result, the final result is 200.
- j. If I subtract 22 from the number, and then quintuple that result, the final result is 75.

Review Problems

23. Find two numbers with a difference of 0 and a product of 9.
24. Find two numbers with a product of 16 and a quotient of 4.
25. Find two numbers with a sum of 7 and a product of 10.
26. Find two numbers with a quotient of 3 and a difference of 14.
27. Find two numbers with a quotient of 4 and a product of 4.
28. Find two numbers with a quotient of 5 and a sum of 36.
29. Find two numbers with a quotient of 4 and a sum of 10.



30. I'm thinking of a number. If 3 is added to the number, and then that result is doubled, the final answer is 14. What is the number?
31. I'm thinking of a number. If 4 is subtracted from the number, and then that result is multiplied by 6, the final answer is 18. What is the number?

“The only real mistake is the one from which we learn nothing.”

– John Powell

32. I'm thinking of a number. If 2 is added to the number, and then that result is divided by 4, the final answer is 3. What is the number?
33. I'm thinking of a number. If I double the number, and then add 8, the final result will be 10. What is the number?
34. I'm thinking of a number. If I divide the number by 3, and then add 5, the final result will be 10. What is the number?

35. I'm thinking of a number. If 3 is subtracted from the number, and then that result is divided by 7, the final answer is 2. What is the number?
36. I'm thinking of a number. If I divide the number by 7, and then subtract 5, the final result will be 3. What is the number?
37. I'm thinking of a number. If the number is tripled, and then 9 is subtracted, the final result will be 15. What is the number?

Solutions

- | | | | | |
|--------------------------------------|------------------------|-------------------------|-------------------------|------------------------|
| 1. 2 & 10 | 2. 1 & 1 | 3. 2 & 6 | 4. 7 & 1 | |
| 5. 1 & 10 | 6. 6 & 7 | 7. 9 & 2 | 8. 8 & 2 | |
| 9. 8 & 6 | 10. 4 & 4 | 11. 16 & 2 | 12. 4 & 4 | |
| 13. 10 & 9 | 14. 3 & 7 | 15. 10 & 5 | 16. 2 & 9 | |
| 17. 18 & 9 | 18. 1 & 2 | 19. 4 & 3 | 20. 36 & 9 | |
| 21. a. 12
f. 37
k. 72
p. 19 | b. 27
g. 72
l. 1 | c. 50
h. 21
m. 17 | d. 81
i. 15
n. 24 | e. 8
j. 67
o. 75 |
| 22. a. 10
f. 12 | b. 4
g. 37 | c. 5
h. 37 | d. 35
i. 39 | e. 10
j. 37 |
| 23. 3 & 3 | 24. 8 & 2 | 25. 2 & 5 | 26. 21 & 7 | |
| 27. 4 & 1 | 28. 30 & 6 | 29. 8 & 2 | | |
| 30. 4 | 31. 7 | 32. 10 | 33. 1 | |

8

34. 15

35. 17

36. 56

37. 8

□ *TO ∞ AND BEYOND*

A. Find two numbers whose sum is 45 and whose product is 500.

B. Find two numbers whose difference is $\frac{1}{4}$ and whose product is $\frac{1}{8}$.

□ *FREQUENTLY ASKED QUESTIONS*

□ *IN A NUTSHELL*

□ *PROGRAMMING*

“Live as if you were
to die tomorrow.
Learn as if you were
to live forever.”

Mahatma Gandhi

