

5.4 Finding the Numbers

The next kind of factoring we will do requires thinking of two numbers with a certain sum and a certain product.

Example 5: Which two numbers have a sum of 8 and a product of 12? In other words, what pair of numbers would answer both equations?

$$\underline{\quad} + \underline{\quad} = 8 \quad \text{and} \quad \underline{\quad} \times \underline{\quad} = 12$$

You may think $4 + 4 = 8$, but 4×4 does not equal 12.

Or you may think $7 + 1 = 8$, but 7×1 does not equal 12.

$6 + 2 = 8$ and $6 \times 2 = 12$, so 6 and 2 are the pair of numbers that will work in both equations.

For each problem below, find one pair of numbers that will solve both equations.

1. $\underline{\quad} + \underline{\quad} = 13$ and $\underline{\quad} \times \underline{\quad} = 40$
2. $\underline{\quad} + \underline{\quad} = 11$ and $\underline{\quad} \times \underline{\quad} = 24$
3. $\underline{\quad} + \underline{\quad} = 12$ and $\underline{\quad} \times \underline{\quad} = 27$
4. $\underline{\quad} + \underline{\quad} = 9$ and $\underline{\quad} \times \underline{\quad} = 20$
5. $\underline{\quad} + \underline{\quad} = 8$ and $\underline{\quad} \times \underline{\quad} = 12$
6. $\underline{\quad} + \underline{\quad} = 11$ and $\underline{\quad} \times \underline{\quad} = 28$
7. $\underline{\quad} + \underline{\quad} = 9$ and $\underline{\quad} \times \underline{\quad} = 18$
8. $\underline{\quad} + \underline{\quad} = 13$ and $\underline{\quad} \times \underline{\quad} = 42$
9. $\underline{\quad} + \underline{\quad} = 12$ and $\underline{\quad} \times \underline{\quad} = 32$
10. $\underline{\quad} + \underline{\quad} = 16$ and $\underline{\quad} \times \underline{\quad} = 64$
11. $\underline{\quad} + \underline{\quad} = 15$ and $\underline{\quad} \times \underline{\quad} = 54$
12. $\underline{\quad} + \underline{\quad} = 11$ and $\underline{\quad} \times \underline{\quad} = 30$
13. $\underline{\quad} + \underline{\quad} = 14$ and $\underline{\quad} \times \underline{\quad} = 40$
14. $\underline{\quad} + \underline{\quad} = 17$ and $\underline{\quad} \times \underline{\quad} = 66$
15. $\underline{\quad} + \underline{\quad} = 10$ and $\underline{\quad} \times \underline{\quad} = 24$
16. $\underline{\quad} + \underline{\quad} = 10$ and $\underline{\quad} \times \underline{\quad} = 16$
17. $\underline{\quad} + \underline{\quad} = 15$ and $\underline{\quad} \times \underline{\quad} = 44$
18. $\underline{\quad} + \underline{\quad} = 13$ and $\underline{\quad} \times \underline{\quad} = 36$
19. $\underline{\quad} + \underline{\quad} = 15$ and $\underline{\quad} \times \underline{\quad} = 26$
20. $\underline{\quad} + \underline{\quad} = 10$ and $\underline{\quad} \times \underline{\quad} = 21$

5.5 More Finding the Numbers

Since you have mastered positive numbers, take up the challenge of finding pairs of negative or pairs where one number is negative and one is positive.

Which two numbers have a sum of -3 and a product of -40 ? In other words, what pair of numbers would answer both equations?

$$\underline{\quad} + \underline{\quad} = -3 \quad \text{and} \quad \underline{\quad} \times \underline{\quad} = -40$$

It is faster to look at the factors of 40 first. 8 and 5 and 10 and 4 are possibilities. 8 and 5 have a difference of 3, and in fact, $5 + (-8) = -3$ and $5 \times (-8) = -40$. This pair of numbers, 5 and -8 , will satisfy both equations.

For each problem below, find one pair of numbers that will solve both equations.

40	$\underline{\quad} + \underline{\quad} = 3$	and	$\underline{\quad} \times \underline{\quad} = -40$
24	$\underline{\quad} + \underline{\quad} = -1$	and	$\underline{\quad} \times \underline{\quad} = -6$
27	$\underline{\quad} + \underline{\quad} = -5$	and	$\underline{\quad} \times \underline{\quad} = -14$
20	$\underline{\quad} + \underline{\quad} = 0$	and	$\underline{\quad} \times \underline{\quad} = -9$
12	$\underline{\quad} + \underline{\quad} = -3$	and	$\underline{\quad} \times \underline{\quad} = -54$
28	$\underline{\quad} + \underline{\quad} = 2$	and	$\underline{\quad} \times \underline{\quad} = -15$
18	$\underline{\quad} + \underline{\quad} = -1$	and	$\underline{\quad} \times \underline{\quad} = -12$
42	$\underline{\quad} + \underline{\quad} = -3$	and	$\underline{\quad} \times \underline{\quad} = -10$
32	$\underline{\quad} + \underline{\quad} = 5$	and	$\underline{\quad} \times \underline{\quad} = -14$
64	$\underline{\quad} + \underline{\quad} = 9$	and	$\underline{\quad} \times \underline{\quad} = 8$
54	$\underline{\quad} + \underline{\quad} = 6$	and	$\underline{\quad} \times \underline{\quad} = 5$
30	$\underline{\quad} + \underline{\quad} = 6$	and	$\underline{\quad} \times \underline{\quad} = -16$
10	$\underline{\quad} + \underline{\quad} = -1$	and	$\underline{\quad} \times \underline{\quad} = -2$
16	$\underline{\quad} + \underline{\quad} = 1$	and	$\underline{\quad} \times \underline{\quad} = -20$
4	$\underline{\quad} + \underline{\quad} = 8$	and	$\underline{\quad} \times \underline{\quad} = 12$
5	$\underline{\quad} + \underline{\quad} = 6$	and	$\underline{\quad} \times \underline{\quad} = -16$
1	$\underline{\quad} + \underline{\quad} = 7$	and	$\underline{\quad} \times \underline{\quad} = -18$
18	$\underline{\quad} + \underline{\quad} = -3$	and	$\underline{\quad} \times \underline{\quad} = -4$
19	$\underline{\quad} + \underline{\quad} = 4$	and	$\underline{\quad} \times \underline{\quad} = -32$
20	$\underline{\quad} + \underline{\quad} = 6$	and	$\underline{\quad} \times \underline{\quad} = 8$