

Preparing for Factoring

Tips:

- If two numbers multiply to a positive, they are either both positive or both negative.
 - If they multiply to a positive and add to a positive: both numbers are positive.
 - If they multiply to a positive and add to a negative: both numbers are negative.
- If two numbers multiply to a negative, one is positive and one is negative.
 - If they multiply to a negative and add to a positive: the bigger number is positive and the smaller number is negative.
 - If they multiply to a negative and add to a negative: the bigger number is negative and the smaller number is positive.

In problems 1-4, list all pairs of numbers with the given product (multiplication answer), then identify the pair with the given sum (addition answer).

1. Multiply to: 6 Add to: 5

List of all pairs that multiply to 6:

$$1 \cdot 6 \rightarrow 1 + 6 = 7$$

$$\cancel{1} \cdot \cancel{-6} \rightarrow -1 + -6 = -7$$

$$\boxed{2 \cdot 3 \rightarrow 2 + 3 = 5}$$

$$-2 \cdot -3 \rightarrow -2 + -3 = -5$$

Which ones add to 5? 2, 3

2. Multiply to: 24 Add to: -14

List of all pairs that multiply to 24:

$$1 \cdot 24 \rightarrow 1 + 24 = 25 \quad -3 \cdot -8 \rightarrow -3 + -8 = -11$$

$$-24 \cdot 1 \rightarrow -1 + -24 = -25 \quad 4 \cdot 6 \rightarrow 4 + 6 = 10$$

$$\boxed{-2 \cdot 12 \rightarrow 2 + 12 = 14} \quad -4 \cdot -6 \rightarrow -4 + -6 = -10$$

$$\boxed{-12 \cdot -2 \rightarrow -2 + -12 = -14}$$

$$3 \cdot 8 \rightarrow 3 + 8 = 11$$

Which ones add to -14? -2, -12

3. Multiply to: -6 Add to: 5

List of all pairs that multiply to -6:

$$\boxed{-1 \cdot 6 \rightarrow -1 + 6 = 5}$$

$$-6 \cdot 1 \rightarrow -6 + 1 = -5$$

$$-2 \cdot 3 \rightarrow -2 + 3 = 1$$

$$-3 \cdot 2 \rightarrow -3 + 2 = -1$$

Which ones add to 5? -1, 6

4. Multiply to: -36 Add to: -9

List of all pairs that multiply to -36:

$$-1 \cdot 36 \rightarrow -1 + 36 = 35 \quad -6 \cdot 6 \rightarrow -6 + 6 = 0$$

$$-36 \cdot 1 \rightarrow -36 + 1 = -35$$

$$-2 \cdot 18 \rightarrow -2 + 18 = 16$$

$$-18 \cdot 2 \rightarrow -18 + 2 = -16$$

$$-3 \cdot 12 \rightarrow -3 + 12 = 9$$

$$\boxed{-12 \cdot 3 \rightarrow -12 + 3 = -9}$$

$$-4 \cdot 9 \rightarrow -4 + 9 = 5$$

$$-9 \cdot 4 \rightarrow -9 + 4 = -5$$

Which ones add to -9? -12, 3

Find two numbers with the given product (multiplication answer) and sum (addition answer).

Product (\times to)	Sum ($+$ to)	Numbers
10	7	2, 5
-24	2	6, -4
8	9	8, 1
-25	0	-5, 5
8	6	2, 4
-12	1	4, -3
-11	-10	-11, 1
72	18	12, 6
12	-13	-12, -1
-2	-1	-2, 1
-80	2	-8, 10
-40	-6	-10, 4
-44	7	11, -4
63	16	9, 7
90	-19	-9, -10

Product (\times to)	Sum ($+$ to)	Numbers
4	5	4, 1
-60	-7	-12, 5
-66	5	11, -6
15	-8	-3, -5
-8	2	4, -2
-16	-6	-8, 2
33	-14	-11, -3
-15	2	5, -3
30	-13	-10, -3
5	-6	-1, -5
-6	-1	-3, 2
20	9	4, 5
121	-22	-11, -11
20	-12	-10, -2
-9	-8	-9, 1