5.1 Preparing for Factoring

Tips:

- If two numbers multiply to a positive, they are either <u>both positive or</u> 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 <u>all</u> 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
   Both positive
   List of <u>all</u> pairs that multiply to 6:

   $1 \cdot 6$ $1+6$
   $2 \cdot 3$ $2+3$

   Which ones add to 5? ___2, 3___

2. Multiply to: 24   Add to: -14
   positive   negative
   List of <u>all</u> pairs that multiply to 24:

   $^-1 \cdot {}^-24$ $^-1 + {}^-24$
   $^-2 \cdot {}^-12$ ⟨$^-2 + {}^-12$⟩
   $^-3 \cdot {}^-8$ $^-3 + {}^-8$
   $^-4 \cdot {}^-6$ $^-4 + {}^-6$

   Which ones add to -14? $^-2, {}^-12$

negative   positive

3. Multiply to: -6   Add to: 5

List of all pairs that multiply to -6:

1 negative 1 positive
bigger number is positive

$-1 \cdot 6$ $-1 + 6 = 5$
$1 \cdot -6$ $1 + -6 = -5$
$-2 \cdot 3$ $-2 + 3 = 1$
$2 \cdot -3$ $2 + -3 = -1$

Which ones add to 5? __-1, 6__

negative   negative

4. Multiply to: -36   Add to -9

List of all pairs that multiply to -36:

1. -36 $1 + -36 = -35$
2. -18 $2 + -18 = -16$
3. -12 $3 + -12 = -9$
4. -9 $4 + -9 = -5$
6. -6 $6 + -6 = 0$

Which ones add to -9? __3, -12__

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

Product (× to)	Sum (+ to)	Numbers
10	7	2,5 2+5
-24	2	-4·6 -4+6=2
8	9	1·8 1+8=9 1,8
-25	0	-1·25 -5·5 -5+5=0
8	6	4·2 4+2=6 4,2
-12	1	-3·4 -3+4=1
-11	-10	-1·11 -1+11= 1·-11 1+-11
72	18	6·12=72 6+12=18 6,12

Product (× to)	Sum (+ to)	Numbers
4	5	1·4 1+4=5 1,4
-60	-7	1·60 2·-30 4·15 5·-12 3·-20 6·-10
-66	5	-1·66 -2·33 -3·22 6·-11
15	-8	-1·15 -3·5 -3 + -5
-8	2	-1·8 -2·4 -1+8 -2+4
-16	-6	2 + -8 2·-8
33	-14	-1·33 -3·-11 -3+-11
-15	2	-3 + 5 -3·5

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

mult   add

12	-13	$-1, -12$	30	-13	$-3, -10$
-2	-1	$-2 + 1 = -1$ $-2 \cdot 1$	5	-6	$-1, -5$
-80	2	$-8, 10$	-6	-1	$-3, 2$
-40	-6	$-10 \cdot 4 = -40$ $-10 + 4 = -6$	20	9	$5, 4$
-44	7	$-4, 11$	121	-22	$-11, -11$
63	16	$7, 9$	20	-12	$-10, -2$
90	-19	$-9, -10$	-9	-8	$-9, 1$