

Intro to College Math: Chapter 6.2
Factoring Trinomials

1. Factor the following trinomial. $r^2 - 11r + 30$

$r^2 - 11r + 30$
 $(r - 5)(r - 6)$

30
 1 \ 30
 2 \ 15
 3 \ 10
 5 \ 6

$5 + 6 = 11$
 $-5 + 6 = 1$
 $5 - 6 = -1$
 $-5 - 6 = -11$

* To factor

- ① make 2 sets of () ().
- ② write down the variable in each one
- ③ write down the last number to the side, and list all the sets of numbers that multiply to get the last number.
- ④ Decide which pair can add or subtract to get the middle number
- ⑤ Write those numbers in your () () and decide what the signs should be.

2. Factor the following trinomial. $y^2 - 2y - 8$

$y^2 - 2y - 8$
 $(y + 2)(y - 4)$

8
 1 \ 8
 2 \ 4

$2 + 4 = 6$
 $-2 + 4 = 2$
 $2 - 4 = -2$
 $-2 - 4 = -6$

To factor..

- * Make 2 sets of () ().
- * Write down the variable in each one.
- (here it is a y)
- * Write down the last number to the side, and then list all the sets of numbers that multiply together to get that number.
- * Decide which pair can add or subtract to get the middle number.
- * Write those numbers in your parenthesis and then decide what the signs should be.

3. Factor the following trinomial. $y^2 + 7y + 12$

$y^2 + 7y + 12$
 $(y + 3)(y + 4)$

12
 / \
 1 · 12
 2 · 6
 3 · 4

$3 + 4 = 7$
 $-3 + 4 = 1$
 $3 - 4 = -1$
 $-3 - 4 = -7$

To factor:.

- * Make 2 sets of () ().
- * Write down the variable in each one.
(here it is a y)
- * Write down the last number to the side, and then list all the sets of numbers that multiply together to get that number.
- * Decide which pair can add or subtract to get the middle number.
- * Write those numbers in your parenthesis and then decide what the signs should be.

4. Factor the following trinomial. $a^2 + 4a - 12$

$a^2 + 4a - 12$
 $(a - 2)(a + 6)$

12
 / \
 1 · 12
 2 · 6
 3 · 4

$2 + 6 = 8$
 $-2 + 6 = 4$
 $2 - 6 = -4$
 $-2 - 6 = -8$

To factor:.

- * Make 2 sets of () ().
- * Write down the variable in each one.
(here it is a y)
- * Write down the last number to the side, and then list all the sets of numbers that multiply together to get that number.
- * Decide which pair can add or subtract to get the middle number.
- * Write those numbers in your parenthesis and then decide what the signs should be.

5. Factor the following trinomial. $10y^2 + 80y + 150$

$$10y^2 + 80y + 150$$

Divide each term by the number you factored out.

$$\frac{10y^2}{10} + \frac{80y}{10} + \frac{150}{10}$$

$$10(y^2 + 8y + 15)$$

$$10(y+3)(y+5)$$

15
 $\begin{array}{r} 1 \backslash \\ 1 \cdot 15 \\ 3 \cdot 5 \end{array}$
 $3+5=8$
 $-3+5=2$
 $3-5=-2$
 $-3-5=-8$

To factor:

- * Factor out what all the terms have in common first.
- * Then make a set of () and write down what's left over inside them.
- * Then make 2 sets of () ().
- * Write down the variable in each one. (here it is a y)
- * Write down the last number to the side, and then list all the sets of numbers that multiply together to get that number.
- * Decide which pair can add or subtract to get the middle number.
- * Write those numbers in your parenthesis and then decide what the signs should be.

6. Factor the following trinomial. $3y^2 - 9y - 84$

$$3y^2 - 9y - 84$$

Divide each term by the common factor you wrote down

$$\frac{3y^2}{3} - \frac{9y}{3} - \frac{84}{3}$$

$$3(y^2 - 3y - 28)$$

$$3(y+4)(y-7)$$

28
 $\begin{array}{r} 1 \backslash \\ 1 \cdot 28 \\ 2 \cdot 14 \\ 4 \cdot 7 \end{array}$
 $4+7=11$
 $-4+7=3$
 $4-7=-3$
 $-4-7=-11$

To factor:

- * Factor out what all the terms have in common first.
- * Then make a set of () and write down what's left over inside them.
- * Then make 2 sets of () ().
- * Write down the variable in each one. (here it is a y)
- * Write down the last number to the side, and then list all the sets of numbers that multiply together to get that number.
- * Decide which pair can add or subtract to get the middle number.
- * Write those numbers in your parenthesis and then decide what the signs should be.