

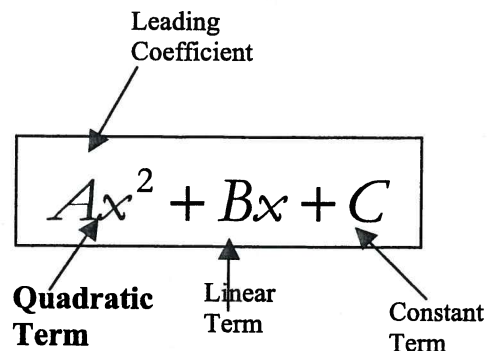
NOTES: FACTORING "HARD" TRINOMIALS

DAY 13

Textbook Chapter 4.4

"Hard" Trinomials:

The leading coefficient is Not 1.



1. Decide your signs for the parentheses.
2. Multiply $A \cdot C$
3. Find 2 #'s that multiply to equal $A \cdot C$ and add to the linear term (B).
4. Rewrite Bx as a sum of the *two factors*. There will be 4 terms.
5. Factor by grouping:

Group the first two terms and the last two terms

Factor the GCF out of each group {the parentheses should match}

Use distributive property to write as two binomials

6. Check your answer - FOIL!!!

Example 1	Example 2
<p>Factor: $2x^2 + 7x + 6$</p> <p>Step 1: $\quad + \quad +$</p> <p>Step 2: $(6)(2) = 12$</p> <p>Step 3: $+3x + 4x$</p> <p>Step 4: $\frac{2x^2 + 3x + 4x + 6}{x \quad 2}$</p> <p>Step 5: $x(2x+3) + 2(2x+3)$</p> <p>Step 6: $(2x+3)(x+2)$</p> <p>Check: $2x^2 + 3x + 4x + 6$ $2x^2 + 7x + 6 \checkmark$</p>	<p>Factor: $12x^2 - 26xy - 10y^2$</p> <p>Factor out GCF: $2(6x^2 - 13xy - 5y^2)$</p> <p>Step 1: $\quad + \quad -$</p> <p>Step 2: $(6)(5) = 30$</p> <p>Step 3: $+2xy - 15xy$</p> <p>Step 4: $2\left(\frac{6x^2 + 2xy - 15xy - 5y^2}{2x \quad -5y}\right)$</p> <p>Step 5: $2[2x(3x+y) - 5y(3x+y)]$</p> <p>Step 6: $2(3x+y)(2x-5y)$</p> <p>Check: $2(6x^2 + 2xy - 15xy - 5y^2)$ $2(6x^2 - 13xy - 5y^2)$ $12x^2 - 26xy - 10y^2 \checkmark$</p>

NOTES: SOLVING BY FACTORING

<p>1. $6x^2 - 11x - 2 = 0$</p> $\begin{array}{r} 6x^2 + 1x - 12x - 2 = 0 \\ \underline{x \qquad -2} \end{array}$ <p>$x(6x+1) - 2(6x+1) = 0$</p> $(6x+1)(x-2) = 0$ $\begin{array}{r} 6x+1=0 \\ \underline{-1 \ -1} \\ 6x = -1 \\ \frac{6x}{6} = \frac{-1}{6} \\ x = -\frac{1}{6} \end{array}$ $\begin{array}{r} x-2=0 \\ \underline{+2 \ +2} \\ x = 2 \end{array}$ <p>$x = -\frac{1}{6}, 2$</p>	<p>2. $4x^2 + 20x + 25 = 0$</p> $\sqrt{(2x+5)^2} = \sqrt{0}$ $\begin{array}{r} 2x+5=0 \\ \underline{-5 \ -5} \\ 2x = -5 \\ \frac{2x}{2} = \frac{-5}{2} \end{array}$ <p>$x = -\frac{5}{2}$</p>
<p>3. $18x^2 + 12x + 2 = 0$</p> $\frac{18x^2 + 12x + 2}{2} = \frac{0}{2}$ $9x^2 + 6x + 1 = 0$ $\sqrt{(3x+1)^2} = \sqrt{0}$ $\begin{array}{r} 3x+1=0 \\ \underline{-1 \ -1} \\ 3x = -1 \\ \frac{3x}{3} = \frac{-1}{3} \end{array}$ <p>$x = -\frac{1}{3}$</p>	<p>4. $36x^2 - 12x + 1 = 0$</p> $\sqrt{(6x-1)^2} = \sqrt{0}$ $\begin{array}{r} 6x-1=0 \\ \underline{+1 \ +1} \\ 6x = 1 \\ \frac{6x}{6} = \frac{1}{6} \end{array}$ <p>$x = \frac{1}{6}$</p>
<p>5. $4x^2 - 25x = 2x - 35$</p> $\begin{array}{r} 4x^2 - 25x = 2x - 35 \\ \underline{-2x \ -2x} \end{array}$ $4x^2 - 27x = -35$ $\begin{array}{r} 4x^2 - 27x = -35 \\ \underline{+35 \ +35} \end{array}$ $4x^2 - 27x + 35 = 0$ $\begin{array}{r} 4x^2 - 7x - 20x + 35 = 0 \\ \underline{x \qquad -5x} \end{array}$ $x(4x-7) - 5x(4x-7) = 0$ $(4x-7)(x-5) = 0$ $4x-7=0 \quad x-5=0$ <p>$x = \frac{7}{4} \quad x = 5$</p>	<p>6. $4x^2 - 26x + 42 = 0$</p> $\frac{4x^2 - 26x + 42}{2} = \frac{0}{2}$ $2x^2 - 13x + 21 = 0$ $\begin{array}{r} 2x^2 - 6x - 7x + 21 = 0 \\ \underline{2x \qquad -7} \end{array}$ $2x(x-3) - 7(x-3) = 0$ $(x-3)(2x-7) = 0$ $x-3=0 \quad 2x-7=0$ $x=3 \quad x = \frac{7}{2}$ <p>$x = 3, \frac{7}{2}$</p>

PRACTICE: FACTORING

DAY 13

Factor the trinomial, if possible. If it cannot be factored, write "prime."

<p>1. $3t^2 + 16t + 5$</p> $\frac{3t^2 + 1t + 15t + 5}{t \quad 5}$ $t(3t+1) + 5(3t+1)$ $\boxed{(3t+1)(t+5)}$ <p style="text-align: right;"> $\frac{15}{+1+15}$ $3 \quad 15$ </p>	<p>2. $6x^2 - 9x - 6$</p> $\frac{3(2x^2 - 3x - 2)}{3}$ $3\left(\frac{2x^2 + 1x - 4x - 2}{x \quad -2}\right)$ $3[x(2x+1) - 2(2x+1)]$ $\boxed{3(2x+1)(x-2)}$ <p style="text-align: right;"> $\frac{4}{+1-4}$ $2 \quad 2$ </p>
<p>3. $3x^2 - 17x - 6$</p> $\frac{3x^2 + 1x - 18x - 6}{x \quad -6}$ $x(3x+1) - 6(3x+1)$ $\boxed{(3x+1)(x-6)}$ <p style="text-align: right;"> $\frac{18}{+1-18}$ $2 \quad 9$ $3 \quad 6$ </p>	<p>4. $64x^2 - 9$</p> $\boxed{(8x-3)(8x+3)}$
<p>5. $\frac{18x^2 + 12x}{6x}$</p> $\boxed{6x(3x+2)}$	<p>6. $\frac{4a^2 - 26ab - 42b^2}{2}$</p> $2(2a^2 - 13ab - 21b^2)$ $2\left(\frac{2a^2 - 6ab - 7ab - 21b^2}{2a \quad -7b}\right)$ $2[2a(a-3b) - 7b(a+3b)]$ <p style="text-align: center;"> Prime </p> <p style="text-align: right;"> $\frac{42}{1 \quad 42}$ $2 \quad 21$ $3 \quad 14$ $-6 \quad -7$ </p>
<p>7. $\frac{8x^2 + 54x + 70}{2}$</p> $2(4x^2 + 27x + 35)$ $2\left(\frac{4x^2 + 7x + 20x + 35}{x \quad 5}\right)$ $2[x(4x+7) + 5(4x+7)]$ $\boxed{2(4x+7)(x+5)}$ <p style="text-align: right;"> $\frac{140}{1 \quad 140}$ $2 \quad 70$ $4 \quad 35$ $5 \quad 28$ $+7+20$ </p>	<p>8. $\frac{12x^2 - 22x - 20}{2}$</p> $2(6x^2 - 11x - 10)$ $2\left(\frac{6x^2 + 4x - 15x - 10}{2x \quad -5}\right)$ $2[2x(3x+2) - 5(3x+2)] + 4 - 15$ $\boxed{2(3x+2)(2x-5)}$ <p style="text-align: right;"> $\frac{60}{1 \quad 60}$ $2 \quad 30$ $3 \quad 20$ $5 \quad 12$ </p>

PRACTICE: SOLVING QUADRATIC EQUATIONS

DAY 13

9. $x^2 + 8x + 15 = 0$

$$(x+3)(x+5) = 0$$

$$\begin{array}{r} x+3=0 \\ -3 \quad -3 \\ \hline x = -3 \end{array} \quad \begin{array}{r} x+5=0 \\ -5 \quad -5 \\ \hline x = -5 \end{array}$$

$$x = -3, -5$$

10. $a^2 + 7a = 18$

$$\frac{-18 \quad -18}{}$$

$$a^2 + 7a - 18 = 0$$

$$(a-2)(a+9) = 0$$

$$\begin{array}{r} a-2=0 \\ +2 \quad +2 \\ \hline a = 2 \end{array} \quad \begin{array}{r} a+9=0 \\ -9 \quad -9 \\ \hline a = -9 \end{array}$$

$$\frac{18}{1 \quad 18} \\ -2 \quad +9 \\ \hline 3 \quad 8$$

$$a = 2, -9$$

11. $2x^2 + 18x + 5 = 0$

PRIME

$$\frac{10}{1 \quad 10} \\ 2 \quad 5$$

12. $5x^2 + 20x = 0$

$$5x$$

$$5x(x+4) = 0$$

$$\begin{array}{r} 5x=0 \\ 5 \quad 5 \\ \hline x = 0 \end{array} \quad \begin{array}{r} x+4=0 \\ -4 \quad -4 \\ \hline x = -4 \end{array}$$

$$x = 0, -4$$

13. $6b^2 - 11b = 2$

$$\frac{-2 \quad -2}{}$$

$$6b^2 - 11b - 2 = 0$$

$$\begin{array}{r} 6b^2 + 1b - 12b - 2 = 0 \\ b \quad -2 \\ \hline 3 \quad 4 \end{array} \quad \begin{array}{r} 12 \\ +1 \quad -12 \\ 2 \quad 6 \\ \hline 3 \quad 4 \end{array}$$

$$b(6b+1) - 2(6b+1) = 0$$

$$(6b+1)(b-2) = 0$$

$$\begin{array}{r} 6b+1=0 \\ b = -1/6 \end{array} \quad \begin{array}{r} b-2=0 \\ b = 2 \end{array}$$

$$b = -1/6, 2$$

14. $3c^2 - 37c + 44 = 0$

$$\frac{3c^2 - 4c - 33c + 44 = 0}{c \quad -11}$$

$$c(3c-4) - 11(3c-4) = 0$$

$$(3c-4)(c-11) = 0$$

$$\begin{array}{r} 3c-4=0 \\ c = 4/3 \end{array} \quad \begin{array}{r} c-11=0 \\ c = 11 \end{array}$$

$$c = 4/3, 11$$

$$\frac{132}{1 \quad 132} \\ 2 \quad 66 \\ 3 \quad 44 \\ -4 \quad -33$$