Algebra 1 8.7

Factor trinomials with a leading coefficient

Solve quadratic equations by factoring

coefficient
leading coefficient
x-factor
factor by grouping
prime polynomial
zero product property
whiteboards

$2x^2 + \_ \cdot \_ = \_$

Example 2 Factor $ax^2 - bx + c$

60

Factor $3x^2 - 17x + 20$.

$-17x = -5x + -12x$

60

1 60
2 50
3 20
4 15
5 12
6 10

$(3x^2 - 5x) + (-12x + 20)$

$-4 \qquad -4$

$x(3x-5) - 4(3x-5)$

$(3x-5)(x-4)$

GuidedPractice

2A. $2n^2 - n - 1$

$\frac{-2}{1-2}$ $-1n = n + -2n$

$(2n^2 + n) + (-2n - 1)$

$n \quad n \quad -1 \quad -1$

$n(2n+1) - 1(2n+1)$

$(2n+1)(n-1)$

$(n-1)(2n+1)$

300

2B. $10y^2 - 35y + 30$

$5(2y^2 - 7y + 6)$

$(2y^2 + -3y) + -4y + 6$

$y(2y-3) - 2(2y-3)$

$5(y-2)(2y-3)$

Is there a GCF?

12

$1 \quad 12$

$2 \quad 6$

$-3 \quad -4$

$(2y^2 + -3y) + -4y + 6$

$y(2y-3) + 2(-2y+3)$

Some things are just not factorable: but you have to try everything first...

Example 3 Determine Whether a Polynomial is Prime

Factor $4x^2 - 3x + 5$, if possible. If the polynomial cannot be factored using integers, write *prime*.

~~GCF~~
x ~~factor~~
factor by grouping

prime

20
1 20
2 10
4 5

GuidedPractice

Factor each polynomial, if possible. If the polynomial cannot be factored usin integers, write *prime*.

3A. $4r^2 - 1r + 7$

28
1 28
2 14
4 7

prim

3B. $2x^2 + 3x - 5$

-10
1 10
-2 +5

$(2x^2 - 2x + 5x - 5)$
$2x$ 5 5

$2x(x-1) + 5(x-1)$

$(2x+5)(x-1)$

How is this problem different?

6. $3x^2 + 17x + 20 = 0$

$3x^2 + 5x + 12x + 20 = 0$

$x(3x + 5) + 4(3x + 5)$

60

1	60
2	30
3	20
4	15
5	12
6	10

$x = -4$

$x = -\frac{5}{3}$

$(x + 4)(3x + 5) = 0$

$x + 4 = 0$

$-4 \quad -4$

$3x + 5 = 0$

$-5 \quad -5$

$\frac{3x}{3} = \frac{-5}{3}$

Solve

5. $2x^2 + 9x + 9 = 0$

$2x^2+3x+6x+9=0$

$x(2x+3)+3(2x+3)$

$(x+3)(2x+3)=0$

$x+3=0$ $\quad 2x+3=0$

$-3\ \ -3 \quad -3\ \ -3$

$x=-3$ $\quad 2x=-3$

$\frac{2x}{2}=\frac{-3}{2}$

18

1 18

2 9

3 6

$x=-3$

$x=\frac{-3}{2}$

Factor

( )( )

Solve

( )( ) = 0

x= x=