

Objective: Students will be able to recognize different types of polynomials and be able to factor polynomials.

Class Size: 20 students, Algebra I

1. **Warm Ups:** Fill in the signs worksheet
I am thinking of 2 numbers
← from Jen Sauriol
← from Jen Sauriol
2. **Introduce Topic:** Matching Activity
Sorting Activity
← one of them from Jen Sauriol
3. **Cover Sheet - Flipper**
4. **Notes:** 2 column Notes
Vocab
Examples with steps

Homework: Worksheets

Game: white board computations
Match up – find mate, no talking, no paper

Assessment: matching up, with out paper

5. **Applications:** word problems

matching assessment, sorting activity, word problems
column notes process, word problems

Common Factors: $5x+5y=5(x+y)$
Trinomials with Coeff of 1: $x^2+x-6=(x+3)(x-2)$
Trinomials with Coeff not 1: $3x^2-14x+8=(3x-2)(x-4)$
Difference of perfect squares: $x^2-y^2=(x-y)(x+y)$
Grouping:

Louise Therrien

Ann Wilde

1. WARM UPS

Work as a class or in groups

1. I'm thinking of two numbers that when I add I get 8 and when I multiply I get 12.
2. I'm thinking of two numbers that when I add I get 10 and when I multiply I get 25.
3. I'm thinking of two numbers that when I add I get 7 and when I multiply I get 10.
4. I'm thinking of two numbers that when I add I get 17 and when I multiply I get 72.
5. I'm thinking of two numbers that when I add I get 15 and when I multiply I get 14.
6. I'm thinking of two numbers that when I add I get 0 and when I multiply I get -9.
7. I'm thinking of two numbers that when I add I get 7 and when I multiply I get -44.
8. I'm thinking of two numbers that when I add I get 2 and when I multiply I get -8.
9. I'm thinking of two numbers that when I add I get -7 and when I multiply I get 12.
10. I'm thinking of two numbers that when I add I get -10 and when I multiply I get 24.

x
x

Fill in the signs of these signed numbers to make these statements true.

$$\begin{array}{r} 7 \\ 3 \\ \hline -4 \end{array}$$

$$\begin{array}{r} 7 \\ 3 \\ \hline +4 \end{array}$$

$$\begin{array}{r} 4 \\ 1 \\ \hline -3 \end{array}$$

$$\begin{array}{r} 4 \\ 1 \\ \hline +3 \end{array}$$

$$\begin{array}{r} 12 \\ 2 \\ \hline -14 \end{array}$$

$$\begin{array}{r} 6 \\ 7 \\ \hline -13 \end{array}$$

$$\begin{array}{r} 12 \\ 2 \\ \hline +10 \end{array}$$

$$\begin{array}{r} 6 \\ 7 \\ \hline -1 \end{array}$$

$$\begin{array}{r} 5 \\ 3 \\ \hline -2 \end{array}$$

$$\begin{array}{r} 5 \\ 3 \\ \hline +8 \end{array}$$

$$\begin{array}{r} 5 \\ 3 \\ \hline +2 \end{array}$$

$$\begin{array}{r} 5 \\ 3 \\ \hline -8 \end{array}$$

$$\begin{array}{r} 17 \\ 5 \\ \hline -12 \end{array}$$

$$\begin{array}{r} 5 \\ 17 \\ \hline +12 \end{array}$$

$$\begin{array}{r} 17 \\ 5 \\ \hline -22 \end{array}$$

$$\begin{array}{r} 5 \\ 17 \\ \hline +22 \end{array}$$

NOTES
and
WORD PROBLEM

①

Difference of Perfect Squares

- ① recognize that this is difference of perfect squares $9x^2 - 4$
 $\underbrace{9x^2}_{3x} - \underbrace{4}_2$
- ② write the two squares in two sets of (), in order $(3x + 2)(3x - 2)$
- ③ put a plus, minus sign in between squares $(3x + 2)(3x - 2)$

②

Common Factors

- ① recognize that this is not perfect squares but it does have common factors $9x^2 - 15x$
- ② Pull out # common to both factors, leave in () what is left after dividing $3(3x^2 - 5x)$
- ③ Pull out common variable, leave in () what is left after dividing $3x(3x - 5)$

③

Factor by Grouping

① recognize 4 terms may factor by grouping (but may not)

$$x^3 - 2x^2 - 3x + 6$$

② group by 2's, pull out common factor

$$\underbrace{x^3 - 2x^2}_{x^2} \quad \underbrace{-3x + 6}_{-3}$$

③ factor out common ()

$$x^2(x-2) - 3(x-2)$$

$$(x^2 - 3)(x - 2)$$

④ Factor Trinomial w/ leading coefficient 1

① recognize trinomial, leading coeff is 1

$$x^2 + x - 6$$

② find factors of last term, that add up to coeff. of middle

$$\begin{matrix} 1, & 2, \\ 6 & 3 \end{matrix}$$

③ find pair and signs that work

$$3, -2$$

④ Write as factors

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

⑤ Factor Trinomial w/ leading coefficient not 1

① recognize trinomial, leading coeff not 1

$$3x^2 - 14x + 8$$

② multiply first coeff x last
find factors that add to middle term and signs

$$\begin{matrix} 24 & 1, & -2, & 3, & 4, \\ & 24 & -12, & 8, & 6 \end{matrix}$$

③ re write original equation with middle term broken into two

$$\begin{aligned} & 3x^2 - 12x - 2x + 8 \\ & 3x(x-4) - 2(x-4) \\ & (3x-2)(x-4) \end{aligned}$$

Word Problem

1. TIC-TAC-TOE

You are making a tic-tac-toe board. Each square will have sides of x inches.

The board will have a border with a width of 1 inch. Draw a diagram and label the dimensions. Write a polynomial expression for the area of the board.

2. ROOM DIMENSIONS

A room's length is 3' less than twice its width. The area of the room is 135 square feet. What are the room's dimensions?

FOOTBALL GAME

and

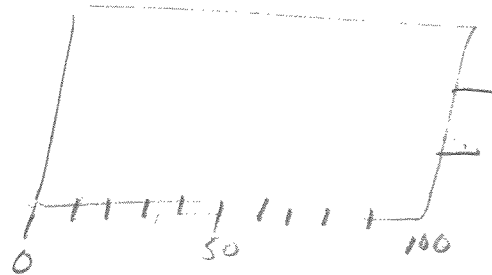
MATCHING & SORTING

ACTIVITY

$(x^2 - 3)(x - 2)$	$(x - 8)(x + 6)$	$(3x + 2)(3x - 2)$
$3x(3x - 5)$	$(x - 3)(x - 4)$	$(2x - 5)(x + 3)$
$7x(x^3 - 7)$	$(2x - 5)(4x - 5)$	$(x - 7)(x + 7)$
$(2x - 3)(x + 4)$	$(x - 5)(x + 5)$	$(x + 2y)(x + 2)$
$(y - 4)(x + 6)$	$5x(x^2 + 5)$	$(x - 6)(x - 2)$

Football Game

questions {
 10 yd
 20 yd
 30 yd
 50 yd



- if answer question correctly you advance # yds.
- if answer incorrect, and team does not correct then you go back # yds.
- Keep score of # of touch downs. (6 pts)
- team field goal question after each question
 general knowledge question (1 pt)

Factor:

10 yd	$(3x - x)$	$(x^2 - 64)$	$(x^2 + 2x)$	$(25 - y^2)$
20 yd	$(x^2 + 8x + 12)$	$(9x^2 - 36y^2)$	$(6x^3 + 21x^5)$	$(x^2 - x + 6)$
30 yd	$(6x^3 + 2x^2 - 4x)$	$(10x^2 + 17x + 6)$	$(14y^2 - 15y + 4)$	$(8y^2 + 2y - 3)$
50 yd	$(6y^2 - 11y - 10)$	$(4x^2 - 26x - 42)$	$(x^3 + 3x^2 - 4x - 12)$	$(x^3 - 2x^2 - 9x + 11)$

team

How do you know if it is difference of perfect square?
 How do you factor a trinomial w/ leading coefficient = 1?
 Show (expression) on index card, ask what type?

lots of these

$$x^2 + x - 20$$

$$(x + 5)(x - 4)$$

$$x^2 - 8x - 20$$

$$(x - 10)(x + 2)$$

$$x^2 + x - 6$$

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

$$x^2 + 5x + 6$$

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

$$x^2 - 6x + 9$$

$$(x - 3)(x - 3)$$

$$x^2 + 8x - 9$$

$$(x - 1)(x + 9)$$

$$x^2 - 7x - 30$$

$$(x - 10)(x + 3)$$

$$x^2 - 22x - 75$$

$$(x - 25)(x + 3)$$

$$x^2 + x - 56$$

$$(x - 7)(x + 8)$$

$$x^2 - x - 42$$

$$(x - 7)(x + 6)$$

$$3x^2 + 31x + 36$$

$$(3x + 4)(x + 9)$$

$$x^2 - 16$$

$$(x + 4)(x - 4)$$

$$(5x + 3)(x - 7)$$

$$5x^2 - 32x - 21$$

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

$$5x^2 - 9x - 2$$

$$(3x + 1)(2x - 4)$$

$$6x^2 - 10x - 4$$

ASSESSMENT

Quadratic Functions – Factoring Polynomials- Grouping - Trinomials **B**

Factor the following Polynomials. Show all work. Circle answer.

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

2) $2x(y+b) - (y+b)$

3) $xy - 5y - 2x + 10$

4) $8v^2 - 12vy + 14v - 21y$

5) $4x^2 + 3xy - 12y - 16x$

6) $3st + t^2 - 2t - 6s$

7) $x^2 + 3x - 40$

8) $x^2 - x - 72$

9) $2x^2 + 7x + 3$

10) $3x^2 + 2x - 21$

11) $3p^2 - 16p + 5$

12) $8x^2 + 33x + 4$

13) $7p^2 + 19p + 10$

14) $6b^2 - 19b + 15$

15) $4z^2 + 5z - 6$

16) $3b^2 - 16b + 16$

17) $6x^2 + 10x + 4$

18) $12a^3 + 14a^2 - 48a$

Find the inverse function.

Factoring Trinomial with Leading Coefficient not equal to 1

NO Graphing Calculator! Show all work. Circle answer.

1) $3x^2 + 8x - 16$

2) $2x^2 + 13x + 15$

3) $2x^2 - 3x - 5$

4) $3x^2 - 8x + 4$

5) $2x^2 + x - 10$

6) $6x^2 + 11x - 10$

7) $7x^2 - 19x + 10$

8) $2x^2 + 13x - 7$

9) $5x^2 - 22x + 8$

10) $2x^2 + 19x - 10$

HOMework

Common Factors

Ex 1. $6x^3 - 4x = 2x(3x^2 - 2)$

Ex 2. $2x(x - 2) + 3(x - 2) = (2x + 3)(x - 2)$

1) $5a + 5$

2) $16 - 8a^2$

3) $3a^2 + 5a^5$

4) $14y^2 + 11y$

5) $3x^4 - 9x$

6) $8a^8 - 4a^5$

7) $x^2y^2 - xy$

8) $3x^2y^4 - 6xy$

9) $3x^3 + 6x^2 + 9x$

10) $3y^3 - 9y^2 + 24y$

11) $x^3y - 3x^2y^2 + 7xy^3$

12) $5x^3 + 10x^2 - 25x$

13) $4b^5 + 6b^3 - 12b$

14) $8x^2y^2 - 4x^2y + x^2$

Grouping

Ex 1.
$$\begin{aligned}x^3 - 2x^2 - 3x + 6 &= (x^3 - 2x^2) + (-3x + 6) \\ &= x^2(x - 2) - 3(x - 2) \\ &= (x^2 - 3)(x - 2)\end{aligned}$$

15) $x(b + 4) + 3(b + 4)$

16) $y(a + z) + 7(a + z)$

17) $x^2 + 2x + 2xy + 4y$

18) $t^2 + 4t - st - 4s$

Trinomials with leading coefficient of 1

Ex 1. $x^2 - 7x + 12 = (x - 3)(x - 4)$

1) $x^2 + 3x + 2$

3) $a^2 + a - 2$

5) $b^2 + 7b - 8$

7) $x^2 + 20x + 100$

9) $y^2 - 14y - 51$

11) $x^2 - 4x - 21$

13) $x^2 - 4x - 96$

Ex 2. $x^2 - 2x - 48 = (x - 8)(x + 6)$

2) $a^2 + a - 12$

4) $x^2 - 2x - 35$

6) $x^2 - 12x - 160$

8) $x^2 - 11x - 42$

10) $x^2 + 9x - 70$

12) $x^2 - 20x + 75$

14) $a^2 - 7a - 44$

Factor Completely

Ex 1. $2x^3 + 8x^2 - 64x = 2x(x^2 + 4x - 32)$
 $= 2x(x + 8)(x - 4)$

15) $2x^2 + 6x + 4$

17) $ab^2 + 2ab - 15a$

19) $3x^2 + 3x - 36$

16) $3x^2 + 15x + 18$

18) $xy^2 + 8xy + 15x$

20) $-2a^3 - 6a^2 - 4a$

Trinomials with leading coefficient not 1

Ex 1. $2x^2 + x - 15 = (2x - 5)(x + 3)$

Ex 2. $3t^2 + 16t + 5 = (3t + 1)(t + 5)$

1) $2x^2 + 3x + 1$

2) $2a^2 - 3a + 1$

3) $3x^2 - 4x + 1$

4) $3b^2 - 13b + 4$

5) $2b^2 - 11b + 5$

6) $3y^2 + 7y + 2$

7) $6t^2 - 11t + 4$

8) $2t^2 + 5t - 12$

9) $7x^2 - 50x + 7$

10) $11a^2 - 54a - 5$

11) $12t^2 + 28t - 5$

12) $9x^2 + 12x + 4$

13) $8x^2 + 2x - 15$

14) $8x^2 - 30x + 25$

Difference of Two Squares

Ex 1. $9x^2 - 4 = (3x + 2)(3x - 2)$

Ex 2. $a^2 - b^2 = (a + b)(a - b)$

15) $x^2 - 25$

16) $y^2 - 49$

17) $4x^2 - 1$

18) $81x^2 - 4$

19) $16x^2 - 121$

20) $49y^2 - 36$