Hey, Math 1

Earlier this year, I nominated Mrs. Kiker, the PLTW teacher, to be a "Teacher To Watch." If you have seen the sign in the front, you know that she won! It's a big honor.

I was asked last minute yesterday if I wanted to attend the awards lunch to support Mrs. Kiker since I nominated her for the award, and I chose to attend.

I apologize for the last minute absence, but supporting my friend, colleague, and mentor is very important to me.

Thank you for your understanding!

Best,

Ms. Barger

Plan for the day

- You are going to learn how to factor trinomials in the form ax^2+bx+c
- You will take yourself through today's notes slides and follow all instructions
- We will talk about it tomorrow during class, so if you are confused, I need for you to give it your best effort

Tutoring

Since I am absent today, there was obviously no tutoring.

I have a faculty meeting before school on Wednesday.

I will be absent again on Thursday (remember Mrs. Mitchell will sub and you will have a Hidden Figures reading day)

I can offer tutoring on Friday morning before school

Announcements

Polynomials Tests were returned to you yesterday. Find them in your email. Test corrections are due next Monday.

Exponents Test 2… we are still waiting...

Factoring Test is on Monday

HF Chapters 13-16 will be due on Monday, but remember you can always work ahead!

Unit Map - Factoring

~~Friday - Factoring by Grouping~~
~~Monday - Factoring Trinomials x^2+bx+c~~
Tuesday - Factoring Trinomials ax^2+bx+c
Wednesday - Factoring Special Cases
Thursday - Hidden Figures Reading Day with Mrs. Mitchell to substitute
Friday - Factoring Review
Monday - Factoring Test

Check Thursday's Homework ANSWERS (selected questions on the worksheet)

Warm-Up

Factor the following polynomials on a whiteboard or paper:

$2x^2+18$

$h^2+12h+11$

$u^2-1u-42$

$3t^3-15t^2+t-5$

u^3-u^2-7u+7

Warm-Up Answers

Factor the following polynomials:

$2x^2+18$ $\rightarrow$ $x(x^2+9)$

$h^2+12h+11$ $\rightarrow$ $(h+11)(h+1)$

$u^2-1u-42$ $\rightarrow$ $(u-7)(u+6)$

$3t^3-15t^2+t-5$ $\rightarrow$ $(t-5)(3t^2+1)$

u^3-u^2-7u+7 $\rightarrow$ $(u^2-7)(u-1)$

Factoring Trinomials in the form ax^2+bx+c

3/5/2019

Please take notes on the following slides...

Watch Ms. Barger

Click [HERE](#) to watch Ms. Barger do an example problem (I'm a bit awkward on camera… sorry!)

Khan Academy Video

Click [HERE](#) to watch an introductory video from Khan Academy!

Factoring Trinomials in the form ax^2+bx+c

Consider the trinomial $6x^2 + 23x + 7$. To factor it, think of $23x$ as $2x + 21x$.

$$6x^2 + 23x + 7 = 6x^2 + 2x + 21x + 7 \qquad \text{Rewrite } 23x \text{ as } 2x + 21x.$$
$$= 2x(3x + 1) + 7(3x + 1) \qquad \text{Factor out the GCF of each pair of terms.}$$
$$= (2x + 7)(3x + 1) \qquad \text{Distributive Property}$$

How do you know to rewrite $23x$ as $2x + 21x$? Notice that multiplying 2 and 21 gives 42, which is the product of the x^2-coefficient 6 and the constant term 7. This example suggests that, to factor a trinomial of the form $ax^2 + bx + c$, you should look for factors of the product ac that have a sum of b.

What is the factored form of $5x^2 + 11x + 2$?

Step 1 Find factors of ac that have sum b.
Since $ac = 10$ and $b = 11$, find positive factors of 10 that have sum 11.

Step 2 To factor the trinomial, use the factors you found to rewrite bx.

$$5x^2 + 11x + 2 = 5x^2 + 1x + 10x + 2$$
$$= x(5x + 1) + 2(5x + 1)$$
$$= (x + 2)(5x + 1)$$

Factors of 10	1, 10	2, 5
Sum of Factors	11 ✔	7

Rewrite bx: $11x = 1x + 10x$.

Factor out the GCF of each pair of terms.

Distributive Property

Complete all three practice problems

Practice:

a. $6x^2 + 13x + 5$

b. $2x^2 + 13x + 6$

c. $3d^2 + 23d + 14$

Click [HERE](#) to view the answers

What is the factored form of $3x^2 + 4x - 15$.

Step 1 Find factors of ac that have sum b. Since $ac = -45$ and $b = 4$, find factors of -45 that have sum 4.

Factors of −45	1, −45	−1, 45	3, −15	−3, 15	5, −9	−5, 9
Sum of Factors	−44	44	−12	12	−4	4 ✔

Step 2 To factor the trinomial, use the factors you found to rewrite bx.

$$3x^2 + 4x - 15 = 3x^2 - 5x + 9x - 15 \qquad \text{Rewrite } bx: 4x = -5x + 9x.$$

$$= x(3x - 5) + 3(3x - 5) \qquad \text{Factor out the GCF of each pair of terms.}$$

$$= (3x - 5)(x + 3) \qquad \text{Distributive Property}$$

Complete all three practice problems

Practice:

   a. $10x^2 + 31x - 14$
   b. $5z^2 + 19z - 4$
   c. $2k^2 - 13k - 24$

Click <u>HERE</u> to view the answers

The area of a rectangle is $2x^2 - 13x - 7$. What are the possible dimensions of the rectangle? Use factoring

Step 1 Find factors of ac that have sum b. Since $ac = -14$ and $b = -13$, find factors of -14 that have sum -13.

Factors of −14	1, −14	−1, 14	2, −7	−2, 7
Sum of Factors	−13 ✔	13	−5	5

Step 2 To factor the trinomial, use the factors you found to rewrite bx.

$$2x^2 - 13x - 7 = 2x^2 + x - 14x - 7 \qquad \text{Rewrite } bx: -13x = x - 14x.$$
$$= x(2x + 1) - 7(2x + 1) \qquad \text{Factor out the GCF of each pair of terms.}$$
$$= (2x + 1)(x - 7) \qquad \text{Distributive Property}$$

The possible dimensions of the rectangle are $2x + 1$ and $x - 7$.

Remember...

To factor a polynomial completely,
1. factor out the GCF of the polynomial's terms.
2. factor the remaining polynomial until it is written as the product of polynomials that cannot be factored further

$18x^2 - 33x + 12$

$$18x^2 - 33x + 12 = 3(6x^2 - 11x + 4)$$

Factors of 24	-1, -24	-2, -12	-3, -8	-4, -6
Sum of Factors	-25	-14	-11 ✔	-10

$3(6x^2 - 3x - 8x + 4)$
$3[3x(2x - 1) - 4(2x - 1)]$
$3(3x - 4)(2x - 1)$

Complete all three practice problems

Practice:

   a. $12p^2 + 20p - 8$ b. $v^2 + 34v - 30$ c. $6s^2 + 57s + 72$

Click HERE to view the answers

Optional IXL practice if you are still struggling

If you are still struggling, HERE is some additional practice from IXL!

Complete the factoring mixed review in its entirety

Factoring Mixed Review

Directions: Factor each of the following completely. Remember to use GCF, T chart, X-Factor, grouping, or a mix of all three!

1. $x^2 + 12x + 35$

2. $x^2 - 9x + 18$

3. $x^2 + 5x$

4. $y^2 - 13y + 42$

5. $7d^2 - 20d - 3$

6. $x^2 + 6x - 40$

7. $x^2 + x - 132$

8. $a^2 - 10ab - 24b^2$

9. $6y^2 - 6y - 540$

Homework

Page 509 #20, 21, 34-46 even, 49, 51 (see next slide)

Polynomials Test Corrections due Monday

Hidden Figures Chapter 13-16 due Monday

*** *If you finish the notes and the homework, work on test corrections or Hidden Figures. You have more than enough math work to keep you going through the period and you should not do work for other classes or play games.*

20. Interior Design The area of a rectangular kitchen tile is $8x^2 + 30x + 7$. What are the possible dimensions of the tile? Use factoring.
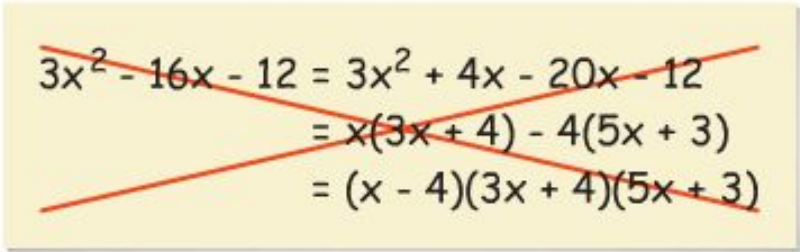
21. Crafts The area of a rectangular knitted blanket is $15x^2 - 14x - 8$. What are the possible dimensions of the blanket? Use factoring.

34. Error Analysis Describe and correct the error made in factoring the expression at the right.

$$3x^2 - 16x - 12 = 3x^2 + 4x - 20x - 12$$
$$= x(3x + 4) - 4(5x + 3)$$
$$= (x - 4)(3x + 4)(5x + 3)$$

35. Think About a Plan A triangle has area $9x^2 - 9x - 10$. The base of the triangle is $3x - 5$. What is the height of the triangle?

- What is the formula for the area of a triangle?
- How does factoring the given trinomial help you solve the problem?

36. Carpentry The top of a rectangular table has an area of $18x^2 + 69x + 60$. The width of the table is $3x + 4$. What is the length of the table?

48. $56x^3 + 43x^2 + 5x$ **49.** $49p^2 + 63pq - 36q^2$ **50.** $108g^2h - 162gh + 54h$

51. The graph of the function $y = x^2 + 5x + 6$ is shown at the right.
   a. What are the x-intercepts?
   b. Factor $x^2 + 5x + 6$.
   c. **Reasoning** Describe the relationship between the binomial factors you found in part (b) and the x-intercepts.