Factoring Practice

Saturday, January 28, 2023 9:52 PM

Practice the basics of factoring here:
https://www.mangahigh.com/en/games/wrecksfactor

Factoring Review & ...

Review of Algebra and Factoring

Common Factoring

Determine the greatest common factor by checking what the largest term divisible by all terms is (numbers and variables).

Ex. $2x^2 - 6x \rightarrow \boxed{2x(x-3)}$

Complete the following for practice:

a) $3x^3 - 9x^2$

b) $-8x^3 + 2x^2 - 22x$

Binomial Factoring with a Difference of Squares

When the 2 terms of the binomial are perfect squares and there is a subtraction between them, you can use this method for factoring. Form must be $\left(a^2 - b^2\right)$.

Ex. $x^2 - 9 \rightarrow \boxed{(x+3)(x-3)}$ $\quad$ $4x^2 - 25y^2 \rightarrow \boxed{(2x+5y)(2x-5y)}$

Here, you put the square root of x and the square root of 9 in each bracket with different signs between them: this is the difference of squares factoring.

NOTE: $x^2 + 9$ is a sum of squares and cannot be factored.

Complete the following:

a) $a^2 - 16$ $\quad$ b) $144 - 9y^2$ $\quad$ c) $36x^2 - 49$

Trinomial Factoring

A trinomial is in the form $ax^2 + bx + c$. There are different methods for trinomial factoring, including decomposition, guess and check and the box method. I will show you guess and check and decomposition. (I usually do decomposition factoring in class.)

When a trinomial has a leading coefficient of 1, factoring it is fairly simple:

$$x^2 - 4x - 5 \;\Rightarrow b = -4,\; c = -5$$

We find two numbers that multiply to the *c* value, -5, and add to the *b* value, -4. For this question, the numbers are -5 *and* $+1$. We place these two numbers into the brackets as shown below: $x^2 - 4x - 5 = (x-5)(x+1)$

Multiplying these factors together, we get the original trinomial. This is how we check that our factoring is correct.

When the leading coefficient is not 1, we use one of the following methods:

Decomposition

$3x^2 - 19x - 14$

A = 3, C = -14 ➔ AC = -42

Two numbers that multiply to -42 but add to -19

These numbers are: -21 and +2

Replace the middle (b) term with these two factors written with an *x*

$3x^2 - 21x + 2x - 14$

Split it in half and factor each half

$3x^2 - 21x \,|\, +2x - 14$

$3x(x-7) + 2(x-7)$

Place each term in front of the brackets in its own bracket and write the other common binomial in one bracket.

$(3x+2)(x-7)$

Done!

Box Method

$3x^2 - 19x - 14$

A = 3, C = -14 ➔ AC = -42

Two numbers that multiply to -42 but add to -19
These numbers are: -21 and +2

Place the first and last term in the box in the first and last spot

$3x^2$	
	-14

Place the two factors with *x* in the second and third box

$3x^2$	$-21x$
$2x$	-14

Common factor each row and each column and collect the factors in two brackets for final factored form.

$3x^2$	$-21x$	$3x$
$2x$	-14	2
x	-7	

$(3x+2)(x-7)$

Complete the following using a method of your choice:

a) $6x^2 - 5x - 4$

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

c) $2x^2 + x - 1$

d) $2x^2 - 3x - 2$

To solve, you make each binomial bracket equal zero and solve for x.

Solving the example from above:

$(3x+2)(x-7)$

$3x+2=0 \qquad x-7=0$

$3x=-2 \qquad \boxed{x=7}$

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

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Factoring Trinomials (a = 1)

Date_____ Period____

Factor each completely.

1) $b^2 + 8b + 7$

2) $n^2 - 11n + 10$

3) $m^2 + m - 90$

4) $n^2 + 4n - 12$

5) $n^2 - 10n + 9$

6) $b^2 + 16b + 64$

7) $m^2 + 2m - 24$

8) $x^2 - 4x + 24$

9) $k^2 - 13k + 40$

10) $a^2 + 11a + 18$

11) $n^2 - n - 56$

12) $n^2 - 5n + 6$

13) $b^2 - 6b + 8$

14) $n^2 + 6n + 8$

15) $2n^2 + 6n - 108$

16) $5n^2 + 10n + 20$

17) $2k^2 + 22k + 60$

18) $a^2 - a - 90$

19) $p^2 + 11p + 10$

20) $5v^2 - 30v + 40$

21) $2p^2 + 2p - 4$

22) $4v^2 - 4v - 8$

23) $x^2 - 15x + 50$

24) $v^2 - 7v + 10$

25) $p^2 + 3p - 18$

26) $6v^2 + 66v + 60$

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Factoring Trinomials (a = 1)

Date_____ Period____

Factor each completely.

1) $b^2 + 8b + 7$

$(b + 7)(b + 1)$

2) $n^2 - 11n + 10$

$(n - 10)(n - 1)$

3) $m^2 + m - 90$

$(m - 9)(m + 10)$

4) $n^2 + 4n - 12$

$(n - 2)(n + 6)$

5) $n^2 - 10n + 9$

$(n - 1)(n - 9)$

6) $b^2 + 16b + 64$

$(b + 8)^2$

7) $m^2 + 2m - 24$

$(m + 6)(m - 4)$

8) $x^2 - 4x + 24$

Not factorable

9) $k^2 - 13k + 40$

$(k - 5)(k - 8)$

10) $a^2 + 11a + 18$

$(a + 2)(a + 9)$

11) $n^2 - n - 56$

$(n + 7)(n - 8)$

12) $n^2 - 5n + 6$

$(n - 2)(n - 3)$

13) $b^2 - 6b + 8$

$(b - 4)(b - 2)$

14) $n^2 + 6n + 8$

$(n + 2)(n + 4)$

15) $2n^2 + 6n - 108$

$2(n + 9)(n - 6)$

16) $5n^2 + 10n + 20$

$5(n^2 + 2n + 4)$

17) $2k^2 + 22k + 60$

$2(k + 5)(k + 6)$

18) $a^2 - a - 90$

$(a - 10)(a + 9)$

19) $p^2 + 11p + 10$

$(p + 10)(p + 1)$

20) $5v^2 - 30v + 40$

$5(v - 2)(v - 4)$

21) $2p^2 + 2p - 4$

$2(p - 1)(p + 2)$

22) $4v^2 - 4v - 8$

$4(v + 1)(v - 2)$

23) $x^2 - 15x + 50$

$(x - 10)(x - 5)$

24) $v^2 - 7v + 10$

$(v - 5)(v - 2)$

25) $p^2 + 3p - 18$

$(p - 3)(p + 6)$

26) $6v^2 + 66v + 60$

$6(v + 10)(v + 1)$

Kuta Software - Infinite Algebra 1 Name_____

Factoring Trinomials (a > 1)

Date_____ Period____

Factor each completely.

1) $3p^2 - 2p - 5$

2) $2n^2 + 3n - 9$

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

4) $5n^2 + 19n + 12$

5) $2v^2 + 11v + 5$

6) $2n^2 + 5n + 2$

7) $7a^2 + 53a + 28$

8) $9k^2 + 66k + 21$

9) $15n^2 - 27n - 6$

10) $5x^2 - 18x + 9$

11) $4n^2 - 15n - 25$

12) $4x^2 - 35x + 49$

13) $4n^2 - 17n + 4$

14) $6x^2 + 7x - 49$

15) $6x^2 + 37x + 6$

16) $-6a^2 - 25a - 25$

17) $6n^2 + 5n - 6$

18) $16b^2 + 60b - 100$

Name_____

Factoring Trinomials (a > 1)

Date_____ Period____

Factor each completely.

1) $3p^2 - 2p - 5$

$(3p - 5)(p + 1)$

2) $2n^2 + 3n - 9$

$(2n - 3)(n + 3)$

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

$(3n - 2)(n - 2)$

4) $5n^2 + 19n + 12$

$(5n + 4)(n + 3)$

5) $2v^2 + 11v + 5$

$(2v + 1)(v + 5)$

6) $2n^2 + 5n + 2$

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

7) $7a^2 + 53a + 28$

$(7a + 4)(a + 7)$

8) $9k^2 + 66k + 21$

$3(3k + 1)(k + 7)$

9) $15n^2 - 27n - 6$

$3(5n + 1)(n - 2)$

10) $5x^2 - 18x + 9$

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

11) $4n^2 - 15n - 25$

$(n - 5)(4n + 5)$

12) $4x^2 - 35x + 49$

$(x - 7)(4x - 7)$

13) $4n^2 - 17n + 4$

$(n - 4)(4n - 1)$

14) $6x^2 + 7x - 49$

$(3x - 7)(2x + 7)$

15) $6x^2 + 37x + 6$

$(x + 6)(6x + 1)$

16) $-6a^2 - 25a - 25$

$-(2a + 5)(3a + 5)$

17) $6n^2 + 5n - 6$

$(2n + 3)(3n - 2)$

18) $16b^2 + 60b - 100$

$4(b + 5)(4b - 5)$