


DECOMPOSITION

(Factor by grouping)

If there is a numerical coefficient in front of x^2 , then we use a method for factoring called *DECOMPOSITION*.


$$4x^2 + 5x - 6$$

Hard Trinomials

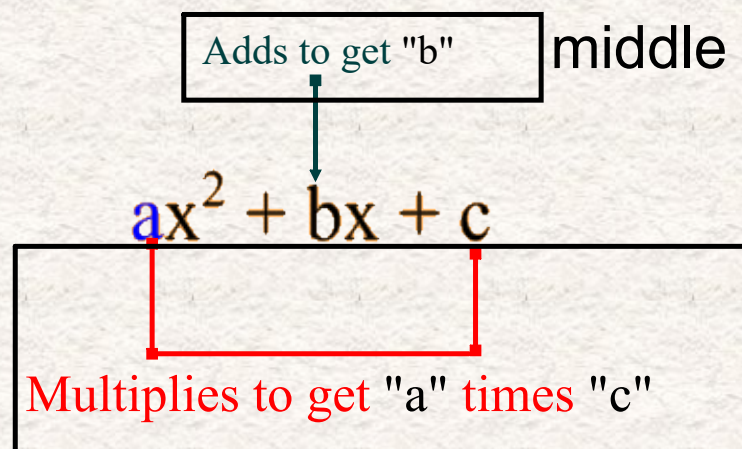
- has three terms with the form...

$$ax^2 + bx + c$$

- a hard trinomial has an "a" value not equal to 1.
- we use a method of decomposition to factor them.

DECOMPOSITION METHOD

- here's how it goes... "What two numbers?"



- once you find the two numbers, use them to break the MIDDLE TERM into two pieces (decomposition).
- then, factor by grouping.

NRF 10 Ch 3 Lesson 3 of e learning Factor hard trinomials by decomposition.notebook

<https://www.khanacademy.org/math/algebra/x2f8bb11595b61c86:quadratics-multiplying-factoring/x2f8bb11595b61c86:factor-quadratics-grouping/v/factoring-trinomials-by-grouping-4>

Multiply

$4x^2 + 5x - 6$

signs are diff

$- + - = \blacksquare$

$- \times - = \blacksquare$

sign on largest

Multiply (1st x last) Add


-24	$+5$
-1×24	
-2×12	
-3×8	
-4×6	

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

gcf

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

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



Always check the following when you are asked to factor:

- 1) G.C.F (# and Letters) {if not....}
- 2) Simple Trinomial
- 3) Hard Trinomial ...

Factor Completely!

1. $2x^2 + 5x + 3$

↓ same

$$\begin{array}{r} x \\ +6 \\ \hline \end{array} \quad \begin{array}{r} + \\ +5 \\ \hline \end{array}$$

$+1x^2$
 $+2x^2$

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

$$\underline{2x(x+1)} \quad \underline{+3(x+1)}$$

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

I think I need to use decomposition!

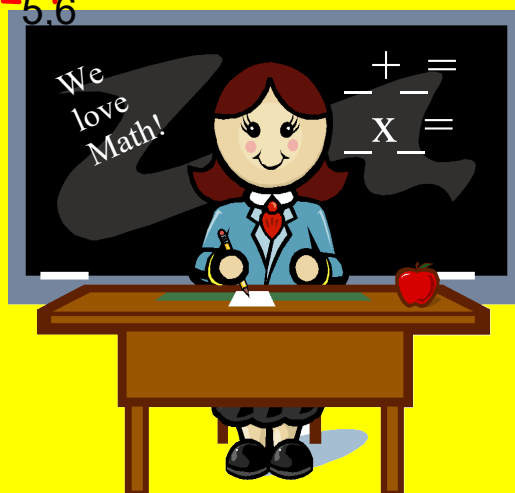


Factor Completely!

2. $10x^2 + 13x - 3$
 diff

$(10x^2 - 3x) + (10x - 3)$
 $x(10x - 3) + 1(10x - 3)$
 $(10x - 3)(x + 1)$

<u>x</u>	<u>+</u>
-30	+13
-1, +30	
-2, +15 ✓	
-3, +10	
-5, +6	



Look for

1) GCF

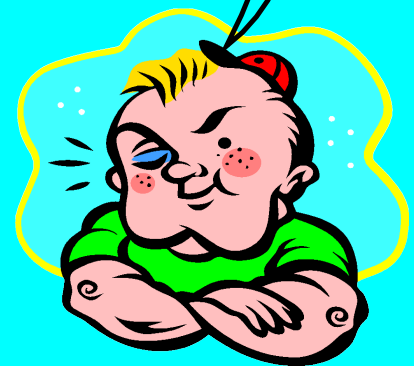
2) Simple trinomial

3) Hard trinomial

★ 4. $2x^2+6x+4$ ★

$$\begin{array}{l} 2 \quad (x^2 + 3x + 2) \\ \downarrow \\ 2 \quad (x+1)(x+2) \end{array}$$

I suppose she wants me to do two types of factoring!



3.6 Polynomials of the Form $ax^2 + bx + c$

Homework

Page 177

Questions: ~~8~~, 13, ~~15~~, ~~19~~

13. Factor. Check by expanding.

a) $2y^2 + 5y + 2$

b) $2a^2 + 11a + 12$

c) $2k^2 + 13k + 15$

d) $2m^2 - 11m + 12$

e) $2k^2 - 11k + 15$

f) $2m^2 + 15m + 7$

g) $2g^2 + 15g + 18$

h) $2n^2 + 9n - 18$

solution to page 177

13. Factor. Check by expanding.

a) $2y^2 + 5y + 2$

$2y^2 + 4y + 1y + 2$

$(2y^2 + 4y) + (1y + 2)$

$2y(y + 2) + 1(y + 2)$

$(y + 2)(2y + 1)$

b) $2a^2 + 11a + 12$

$2a^2 + 8a + 3a + 12$

$(2a^2 + 8a) + (3a + 12)$

$2a(a + 4) + 3(a + 4)$

$(a + 4)(2a + 3)$

c) $2k^2 + 13k + 15$

$2k^2 + 10k + 3k + 15$

$(2k^2 + 10k) + (3k + 15)$

$2k(k + 5) + 3(k + 5)$

$(k + 5)(2k + 3)$

d) $2m^2 - 11m + 12$

$2m^2 - 8m - 3m + 12$

$(2m^2 - 8m) - (3m + 12)$

$2m(m - 4) - 3(m - 4)$

$(m - 4)(2m - 3)$

13. Factor. Check by expanding.

$$e) 2k^2 - 11k + 15$$

$$2k^2 - 6k - 5k + 15$$

$$(2k^2 - 6k) - (5k + 15)$$

$$2k(k - 3) - 5(k - 3)$$

$$(k - 3)(2k - 5)$$

$$f) 2m^2 + 15m + 7$$

$$2m^2 + 14m + 1m + 7$$

$$(2m^2 + 14m) + (1m + 7)$$

$$2m(m + 7) + 1(m + 7)$$

$$(m + 7)(2m + 1)$$

$$g) 2g^2 + 15g + 18$$

$$2g^2 + 4g + 9g + 18$$

$$(2g^2 + 4g) + (9g + 18)$$

$$2g(g + 2) + 9(g + 2)$$

$$(g + 2)(2g + 9)$$

$$h) 2n^2 + 9n - 18$$

$$2n^2 + 12n - 3n - 18$$

$$(2n^2 + 12n) - (3n - 18)$$

$$2n(n + 6) - 3(n + 6)$$

$$(n + 6)(2n - 3)$$

Extra practice if needed

Math 10B

Name _____

Factoring: Hard Trinomials

Date _____

Factor each completely.

1) $6m^2 + 2m - 8$

2) $3x^2 - 16x + 5$

3) $28r^2 - 116r + 16$

4) $2n^2 - 17n - 9$

5) $3r^2 + 2r - 16$

6) $5a^2 - 34a + 45$

7) $8x^2 - 50x + 50$

8) $4n^2 - 15n + 9$

9) $4x^2 + 17x + 4$

10) $4m^2 + 13m + 10$

11) $4b^2 - 3b - 10$

12) $8n^2 - 26n - 24$

13) $u^2 + 16uv + 64v^2$

14) $2x^2 - 22xy + 48y^2$

15) $x^2 - 11xy + 30y^2$

16) $4a^2 - 8ab - 12b^2$

Look for

1) GCF

2) Simple trinomial

3) Hard trinomial

Answers to Factoring: Hard Trinomials (ID: 1)

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

2) $(3x - 1)(x - 5)$

3) $4(7r - 1)(r - 4)$

4) $(2n + 1)(n - 9)$

5) $(3r + 8)(r - 2)$

6) $(5a - 9)(a - 5)$

7) $2(x - 5)(4x - 5)$

8) $(n - 3)(4n - 3)$

9) $(x + 4)(4x + 1)$

10) $(m + 2)(4m + 5)$

11) $(b - 2)(4b + 5)$

12) $2(n - 4)(4n + 3)$

13) $(u + 8v)^2$

14) $2(x - 8y)(x - 3y)$

15) $(x - 5y)(x - 6y)$

16) $4(a - 3b)(a + b)$

3.6 Polynomials of the Form $ax^2 + bx + c$

Look for

Worksheet: GCF, Simple Trinomials & Hard Trinomials
 Questions: 1-12

1) GCF

2) Simple trinomial

3) Hard trinomial

Math 10

Name _____

GCF, Simple Trinomials, Hard Trinomials

Date _____

Choose a factoring Method and factor each completely:

1) $-9n^5 + 6n^3$

2) $36r^6 + 54r - 45$

3) $-40 + 4b^2 - 32b^4$

4) $4xy^2 + 20x^2y + 16xy$

5) $x^2 + 13x + 42$

6) $x^2 + 13x + 36$

7) $k^2 + k - 12$

8) $a^2 + 4a - 45$

9) $2p^2 + 11p - 63$

10) $3n^2 + 11n - 20$

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

12) $6n^2 - 29n + 20$

Answers to GCF, Simple Trinomials, Hard Trinomials

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

2) $9(4r^6 + 6r - 5)$

3) $4(-10 + b^2 - 8b^4)$

4) $4xy(y + 5x + 4)$

5) $(x + 6)(x + 7)$

6) $(x + 9)(x + 4)$

7) $(k + 4)(k - 3)$

8) $(a - 5)(a + 9)$

9) $(2p - 7)(p + 9)$

10) $(3n - 4)(n + 5)$

11) $(2n + 3)(2n - 5)$

12) $(n - 4)(6n - 5)$