

Good morning!

1. "Here"
2. Notes on factoring trinomials Special Cases
3. Upload practice p. 14-15 to CTLS

Homework on DeltaMath:)

Factoring – Special Cases

When factoring quadratics, there are two types of special cases.

Difference of Two Squares

$$(x^2 - a^2) = (x + a)(x - a)$$

Perfect Square Trinomials

$$((ax)^2 + 2abx + b^2) = (ax + b)^2$$

$$((ax)^2 - 2abx + b^2) = (ax - b)^2$$

Diff.

$$\sqrt{x^2 - 9} = \sqrt{x^2 - 3^2}$$

When factoring quadratics that are special cases, you can still factor in the same way that we have previously done. The only difference is that you may have to add a 0 term in your expression or change the way you write final answer.

1) $x^2 + 12x + 36$

x^2	$6x$
$6x$	36

$(x+6)(x+6)$
 $(x+6)^2$

2) $x^2 - 9$

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

$ax+bx$ etc

x^2	$10x$	-9
$3x$	$7x$	-9

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

-9	3
3	9

3) $4x^2 - 25$

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

4) $4x^2 - 16x + 16$ **GCF**

$4(x^2 - 4x + 4)$ **Half the middle and square (perfect □ Tri)**

$4(x-2)^2$

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

$(x+10)^2$

6) $9x^2 - 16y^2$

$(3x)^2 - (4y)^2$

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

No GCF
 2 Term with -
 → Diff. of □

$$x^2 + 2\sqrt{3}x + 3$$

Handwritten annotations: A red arrow points from the coefficient $2\sqrt{3}$ to the term x below it. Another red arrow points from the constant term 3 to the term $\sqrt{3}$ below it.

not perfect
tri. \square

$$25x^2 - 40x + 16$$

$$(5x - 4)^2 = (5x - 4)(5x - 4)$$

- ① 1st and last perfect ✓
- ② Double the product of square roots for middle ✓

	$5x$	-4
$5x$	$25x^2$	$-20x$
-4	$-20x$	16

$25x^2 - 40x + 16$

$$\frac{144x^2 + 192x + 256}{2}$$

$$2 \cdot 2 \left(\frac{72x^2 + 96x + 128}{2} \right)$$

$$4 \cdot 4 \left(\frac{36x^2 + 48x + 64}{4} \right)$$

$$16 \left(\frac{9x^2 + 12x + 16}{4} \right)$$

$2(12) = 24x$

$(3x \quad 4)^2$

① ✓
② ✗

Not perfect square trinomial

GCF $4x^2 - 16x + 16$
 $4(x^2 - 4x + 4)$

$$(x-2)^2$$

	x	-2
x	x^2	$-2x$
-2	$-2x$	$+4$

$$(x-2)(x-2) = (x-2)^2$$

$a \cdot c$	4
$-2x$	$-2x$
-4	
b	$+$

4
$1 \mid 4$
$-2 \mid -2$

$$\begin{array}{l}
 \underline{9x^2} + 30x + \underline{25} \\
 \begin{array}{r}
 (3x+5)(3x+5) \\
 \underline{(3x+5)^2}
 \end{array}
 \end{array}$$

$3x+5$
 $3x \mid 9x^2 \quad 15x$
 $+5 \mid 15x \quad 25$

$$\begin{array}{r}
 9 \cdot 25 \\
 \underline{225} \\
 15x \quad 15x \\
 \hline
 30
 \end{array}$$

$$\begin{array}{r}
 225 \\
 \hline
 1 \mid 225 \\
 3 \mid 75 \\
 5 \mid 45 \\
 9 \mid 25 \\
 \hline
 15 \mid 15
 \end{array}$$

- ① 1st and last terms are perfect squares
- ② Double the product of the square roots. \rightarrow middle term

Factoring Matching Worksheet

Directions: Match the polynomials below to the correct factors. Write the letter of the correct answer in the blank next to the question number. Do all work on scratch paper and staple it to this sheet.

F 1) $81x^2 - 16$ *Diff. of 2 squares*

2) $x^2 - 2x - 8$ *Trinomial*

3) $x^2 + 9x + 20$ *Trinomial*

4) $3x^3 - 3x^2 + 2x - 2$ *4 terms Grouping*

5) $2x^3 - x^2 + 6x - 3$

6) $x^2 + x - 42$

7) $49x^2 - 4$

8) $10x^3 + 2x^2 + 15x + 3$

9) $x^2 + 10x + 21$

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

11) $25x^2 - 9$

12) $6x^3 - 15x^2 + 8x - 20$

13) $100x^2 - 1$

14) $x^2 + 9x + 14$

15) $x^2 - 144$

A: $(x + 4)(x + 5)$

B: $(5x + 3)(5x - 3)$

C: $(x^2 + 3)(2x - 1)$

D: $(x + 3)(x + 7)$

E: $(2x^2 + 3)(5x + 1)$

F: $(9x + 4)(9x - 4)$

G: $(x + 2)(x + 7)$

H: $(3x^2 + 2)(x - 1)$

I: $(10x + 1)(10x - 1)$

J: $(x - 4)(x + 2)$

K: $(3x^2 + 4)(2x - 5)$

L: $(7x - 2)(7x + 2)$

M: $(x + 12)(x - 12)$

N: $(x^2 + 4)(x - 1)$

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

Handwritten notes:

- ① GCF 1st 2 terms
- ② GCF last 2 terms
- ③ GCF terms (SAME)

$$-5(2x^2 - x^2) + (6x - 3)$$

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

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

- ① GCF in 2 terms
- ② GCF last 2 terms E: (2:)
- ③ GCF terms (SAME)

$$\begin{aligned} & \underline{4} (3x^3 - 3x^2) + (2x - 2) \\ & 3x^2 (x - 1) + 2(x - 1) \\ & \boxed{(3x^2 + 2)(x - 1)} \end{aligned}$$

Grouping

① GCF 1st
2 terms

② GCF last
2 terms

③ GCF
terms (same)

What Happened When the Boarding House Blew Up?

Factor each trinomial below. Find one of the factors in **each** column on binomials. Notice the letter next to one factor and the number next to the other. Write the letter in the box at the bottom of the page that contains the matching number

1) $3x^2 + 7x + 2$	5. $(5u + 3)$	Y. $(3u - 2)$
2) $2x^2 + 5x + 3$	3. $(x - 1)$	E. $(x - 5)$
3) $3x^2 - 16x + 5$	8. $(3x + 1)$	G. $(8u - 1)$
4) $7x^2 - 9x + 2$	14. $(3u - 1)$	O. $(7x - 2)$
5) $6u^2 + 5u + 1$	6. $(2u + 3)$	R. $(5u + 1)$
6) $8u^2 - 9u + 1$	15. $(x + 1)$	W. $(x + 2)$
7) $10u^2 + 17u + 3$	9. $(5u + 6)$	L. $(7x + 2)$
8) $9u^2 - 9u + 2$	11. $(3x - 1)$	I. $(2x + 3)$
9) $5u^2 + 11u + 6$	7. $(2u + 1)$	E. $(u + 1)$
	17. $(u - 1)$	S. $(3u + 1)$
10) $3n^2 + 2n - 1$	12. $(3t - 1)$	N. $(n + 3)$
11) $5n^2 - 4n - 1$	5. $(n - 1)$	R. $(t - 1)$
12) $2n^2 + 5n - 3$	4. $(3t + 1)$	P. $(2t + 1)$
13) $7n^2 - 13n - 2$	10. $(n - 2)$	O. $(n + 1)$
14) $3t^2 + 14t - 5$	13. $(t + 1)$	F. $(t + 5)$
15) $4t^2 - 11t + 7$	2. $(3n - 1)$	E. $(5n + 1)$
16) $6t^2 + 5t - 1$	16. $(2n - 1)$	M. $(t - 7)$
17) $3t^2 - 20t - 7$	4. $(3t - 7)$	R. $(7n + 1)$
	1. $(4t - 7)$	L. $(6t - 1)$

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
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Factoring Matching Worksheet

Factor each quadratic expression below and match it to one of the answer choices.

A: $3(x - 2)(x + 4)$	B: $4x(x - 3)$	C: $2(x + 2)(x + 4)$
D: $(5x - 3)(x - 2)$	E: $(5x - 6)(x - 5)$	F: $(x - 2)^2$
G: $(4x + 1)(4x - 1)$	H: $3(x + 2)^2$	I: $2(x + 2)^2$
J: $(x + 2)(x - 2)$	K: $(2x - 5)(3x - 2)$	L: $2(3x + 1)(3x - 1)$
M: $(5x - 1)^2$	N: $(4x + 1)^2$	O: $3(3x + 2)(3x - 2)$
P: $(2x + 3)(x + 5)$	Q: $(3x + 2)(2x + 1)$	R: $6x(x - 6)$

1) $3x^2 + 12x + 12$

2) $16x^2 - 1$

3) $6x^2 - 19x + 10$

4) $3x^2 + 6x - 24$

5) $2x^2 + 8x + 8$

6) $6x^2 - 36x$

7) $18x^2 - 2$

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

9) $27x^2 - 12$

10) $x^2 - 4$

11) $16x^2 + 8x + 1$

12) $2x^2 + 13x + 15$