

GUIDED PRACTICE

Algebra I — Unit 7

Polynomials & Factoring

90 problems · you choose where to start

Know your lane.

Be good in it. Look to expand outside of it when you are ready to grow.

Every lesson has the same 15 problems, split into three zones. Start in the zone that fits you today. Staying in your lane is not failing — it is knowing yourself. When you want more room, move up. You can always come back.

**1–5
SHOWN**

The first step is done for you. Pick up from there.

**6–10
HINT**

A question to point you at the first move. You take it from there.

**11–15
ON YOUR
OWN**

Just the problem. The strategy is at the top of the page if you need it.

_____ Name _____

_____ Date _____

Lesson 7.1 — Multiplying Polynomials

STRATEGY FOR THIS LESSON

Every term in the first factor multiplies every term in the second, then combine like terms.

Zone 1 · Problems 1–5

The first step is done for you.

① $(x + 2)(x + 3)$

FIRST STEP

Multiply the First terms: $x \cdot x = x^2$

SHOW YOUR WORK

Answer:

② $(x + 4)(x + 1)$

FIRST STEP

Multiply the First terms: $x \cdot x = x^2$

SHOW YOUR WORK

Answer:

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

FIRST STEPMultiply the First terms: $x \cdot x = x^2$

SHOW YOUR WORK

Answer:

4 $(x - 3)(x + 6)$

FIRST STEPMultiply the First terms: $x \cdot x = x^2$

SHOW YOUR WORK

Answer:

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

FIRST STEP

Multiply the First terms: $x \cdot x = x^2$

SHOW YOUR WORK

Answer:

Zone 2 · Problems 6–10

A hint only — you find the first step.

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

HINT

How many pairs must you multiply?

SHOW YOUR WORK

Answer:

7 $(x + 3)^2$

HINT

Write it out as two factors first.

SHOW YOUR WORK

Answer:

8 $(2x + 1)(x + 4)$

HINT

What are the First terms?

SHOW YOUR WORK

Answer:

9 $(3x + 2)(x + 5)$

HINT

What are the First terms?

SHOW YOUR WORK

Answer:

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

HINT

What are the First terms?

SHOW YOUR WORK

Answer:

Zone 3 · Problems 11–15

On your own. Strategy is at the top of the lesson.

11 $(2x - 3)(x + 2)$

SHOW YOUR WORK

Answer:

12 $(x + 6)(x - 1)$

SHOW YOUR WORK

Answer:

13 $2x(x + 4)$

SHOW YOUR WORK

Answer:

14 $(4x + 1)(2x - 3)$

SHOW YOUR WORK

Answer:

15 $(3x - 1)(3x + 1)$

SHOW YOUR WORK

Answer:

Lesson 7.2 — Factoring — GCF First

STRATEGY FOR THIS LESSON

Find the largest number and variable that divides every term, write it outside, and put what is left inside.

Zone 1 · Problems 1–5

The first step is done for you.

1 $2x + 8$

FIRST STEP

Both terms divide by 2

SHOW YOUR WORK

Answer:

2 $3x + 12$

FIRST STEP

Both terms divide by 3

SHOW YOUR WORK

Answer:

3 $5x^2 + 10x$

FIRST STEPBoth terms divide by $5x$

SHOW YOUR WORK

Answer:

4 $4x^2 + 6x$

FIRST STEPBoth terms divide by $2x$

SHOW YOUR WORK

Answer:

5

$6x + 9$

FIRST STEP

Both terms divide by 3

SHOW YOUR WORK

Answer:

Zone 2 · Problems 6–10

A hint only — you find the first step.

6 $x^2 + 7x$

HINT

What number divides both terms?

SHOW YOUR WORK

Answer:

7 $8x^2 - 12x$

HINT

What divides both — and is there an x?

SHOW YOUR WORK

Answer:

8 $10x^2 + 5x$

HINT

What is the biggest common factor?

SHOW YOUR WORK

Answer:

9 $12x + 18$

HINT

Does an x come out too?

SHOW YOUR WORK

Answer:

10 $9x^2 - 3x$

HINT

What divides all of them?

SHOW YOUR WORK

Answer:

Zone 3 · Problems 11–15

On your own. Strategy is at the top of the lesson.

11 $14x^2 + 7x$

SHOW YOUR WORK

Answer:

12 $6x^2 + 15x$

SHOW YOUR WORK

Answer:

13 $20x^2 - 16x$

SHOW YOUR WORK

Answer:

14 $12x^3 + 18x^2$

SHOW YOUR WORK

Answer:

15 $6x^2 - 9x + 3$

SHOW YOUR WORK

Answer:

Lesson 7.3 — Difference of Squares

STRATEGY FOR THIS LESSON

$a^2 - b^2$ becomes $(a - b)(a + b)$. A sum of squares does not factor.

Zone 1 · Problems 1–5

The first step is done for you.

1 $x^2 - 9$

FIRST STEP

Both are perfect squares: $\sqrt{x^2} = x$, $\sqrt{9} = 3$

SHOW YOUR WORK

Answer:

2 $x^2 - 16$

FIRST STEP

Both are perfect squares: $\sqrt{16} = 4$

SHOW YOUR WORK

Answer:

3 $x^2 - 25$

FIRST STEPBoth are perfect squares: $\sqrt{25} = 5$

SHOW YOUR WORK

Answer:

4 $x^2 - 4$

FIRST STEPBoth are perfect squares: $\sqrt{4} = 2$

SHOW YOUR WORK

Answer:

5 $x^2 - 36$

FIRST STEP

Both are perfect squares: $\sqrt{36} = 6$

SHOW YOUR WORK

Answer:

Zone 2 · Problems 6–10

A hint only — you find the first step.

6 $x^2 - 1$

HINT

Is each part a perfect square?

SHOW YOUR WORK

Answer:

7 $x^2 - 49$

HINT

What is the square root of each part?

SHOW YOUR WORK

Answer:

8 $x^2 - 64$

HINT

What is the square root of each part?

SHOW YOUR WORK

Answer:

9 $x^2 - 100$

HINT

What is the square root of each part?

SHOW YOUR WORK

Answer:

10 $4x^2 - 9$

HINT

Check the sign between them.

SHOW YOUR WORK

Answer:

Zone 3 · Problems 11–15

On your own. Strategy is at the top of the lesson.

11 $9x^2 - 25$

SHOW YOUR WORK

Answer:

12 $16x^2 - 1$

SHOW YOUR WORK

Answer:

13 $25x^2 - 4$

SHOW YOUR WORK

Answer:

14 $x^2 - 121$

SHOW YOUR WORK

Answer:

15 $x^2 + 16$

SHOW YOUR WORK

Answer:

Lesson 7.4 — Factoring Trinomials ($a = 1$)

STRATEGY FOR THIS LESSON

Find two numbers that multiply to c and add to b . Those numbers go in the binomials.

Zone 1 · Problems 1–5

The first step is done for you.

1 $x^2 + 5x + 6$

FIRST STEP

Need two numbers: $\times = 6$ and $+= 5$

SHOW YOUR WORK

Answer:

2 $x^2 + 7x + 12$

FIRST STEP

Need two numbers: $\times = 12$ and $+= 7$

SHOW YOUR WORK

Answer:

3 $x^2 + 6x + 8$

FIRST STEPNeed two numbers: $\times = 8$ and $+ = 6$

SHOW YOUR WORK

Answer:

4 $x^2 + 8x + 15$

FIRST STEPNeed two numbers: $\times = 15$ and $+ = 8$

SHOW YOUR WORK

Answer:

5 $x^2 + 9x + 20$

FIRST STEPNeed two numbers: $\times = 20$ and $+ = 9$

SHOW YOUR WORK

Answer:

Zone 2 · Problems 6–10

A hint only — you find the first step.

6 $x^2 + 5x + 4$

HINT

Two numbers: what do they multiply to? add to?

SHOW YOUR WORK

Answer:

7 $x^2 - 5x + 6$

HINTIf c is positive and b negative, what signs?

SHOW YOUR WORK

Answer:

8 $x^2 - 7x + 12$

HINT

If c is negative, what must be true of the signs?

SHOW YOUR WORK

Answer:

9 $x^2 + 2x - 8$

HINT

What multiplies to c and adds to b?

SHOW YOUR WORK

Answer:

10 $x^2 - x - 12$

HINT

What multiplies to c and adds to b?

SHOW YOUR WORK

Answer:

Zone 3 · Problems 11–15

On your own. Strategy is at the top of the lesson.

11 $x^2 + 3x - 10$

SHOW YOUR WORK

Answer:

12 $x^2 - 2x - 15$

SHOW YOUR WORK

Answer:

13 $x^2 + 10x + 21$

SHOW YOUR WORK

Answer:

14 $x^2 - 9x + 18$

SHOW YOUR WORK

Answer:

15 $x^2 + x - 20$

SHOW YOUR WORK

Answer:

Lesson 7.5 — Factoring Trinomials ($a \neq 1$)

STRATEGY FOR THIS LESSON

Multiply $a \cdot c$, find two numbers that multiply to that and add to b , split the middle term, then factor by grouping.

Zone 1 · Problems 1–5

The first step is done for you.

1 $2x^2 + 5x + 2$

FIRST STEP

Multiply $a \cdot c = 2 \cdot 2 = 4$

SHOW YOUR WORK

Answer:

2 $2x^2 + 7x + 3$

FIRST STEP

Multiply $a \cdot c = 2 \cdot 3 = 6$

SHOW YOUR WORK

Answer:

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

FIRST STEPMultiply $a \cdot c = 3 \cdot 4 = 12$

SHOW YOUR WORK

Answer:

4 $2x^2 + 7x + 6$

FIRST STEPMultiply $a \cdot c = 2 \cdot 6 = 12$

SHOW YOUR WORK

Answer:

5 $5x^2 + 11x + 2$

FIRST STEPMultiply $a \cdot c = 5 \cdot 2 = 10$

SHOW YOUR WORK

Answer:

Zone 2 · Problems 6–10

A hint only — you find the first step.

6 $3x^2 + 7x + 2$

HINT

What is a times c?

SHOW YOUR WORK

Answer:

7 $2x^2 + 9x + 4$

HINT

What is a times c?

SHOW YOUR WORK

Answer:

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

HINT

What is a times c?

SHOW YOUR WORK

Answer:

9 $3x^2 + 10x + 3$

HINT

What is a times c — watch the sign.

SHOW YOUR WORK

Answer:

10 $6x^2 + 11x + 3$

HINT

What is a times c — watch the sign.

SHOW YOUR WORK

Answer:

Zone 3 · Problems 11–15

On your own. Strategy is at the top of the lesson.

11 $2x^2 + 11x + 5$

SHOW YOUR WORK

Answer:

12 $3x^2 + 11x + 6$

SHOW YOUR WORK

Answer:

13 $4x^2 + 4x - 3$

SHOW YOUR WORK

Answer:

14 $2x^2 - x - 6$

SHOW YOUR WORK

Answer:

15 $6x^2 + 7x - 3$

SHOW YOUR WORK

Answer:

Lesson 7.6 — Which Method? — Factor Completely

STRATEGY FOR THIS LESSON

GCF first. Then count terms: two terms means check difference of squares; three terms means trinomial. Factor completely.

Zone 1 · Problems 1–5

The first step is done for you.

1 $3x^2 + 12x$

FIRST STEP

GCF first — both terms divide by $3x$

SHOW YOUR WORK

Answer:

2 $x^2 - 16$

FIRST STEP

Two terms, both perfect squares

SHOW YOUR WORK

Answer:

3 $x^2 + 7x + 12$

FIRST STEPThree terms with $a = 1$ — find two numbers

SHOW YOUR WORK

Answer:

4 $5x^2 - 20$

FIRST STEP

GCF first — both terms divide by 5

SHOW YOUR WORK

Answer:

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

FIRST STEP

Three terms with $a \neq 1$ — use $a \cdot c = 4$

SHOW YOUR WORK

Answer:

Zone 2 · Problems 6–10

A hint only — you find the first step.

6 $x^2 - 9$

HINT

Is there a common factor first?

SHOW YOUR WORK

Answer:

7 $4x^2 + 12x + 8$

HINT

How many terms, and are they squares?

SHOW YOUR WORK

Answer:

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

HINT

Is there a GCF before anything else?

SHOW YOUR WORK

Answer:

9 $2x^3 - 8x$

HINT

How many terms? What pattern?

SHOW YOUR WORK

Answer:

10 $3x^2 - 27$

HINT

Check the sign between the two terms.

SHOW YOUR WORK

Answer:

Zone 3 · Problems 11–15

On your own. Strategy is at the top of the lesson.

11 $x^2 + 6x + 9$

SHOW YOUR WORK

Answer:

12 $6x^2 + 9x$

SHOW YOUR WORK

Answer:

13 $x^2 - x - 6$

SHOW YOUR WORK

Answer:

14 $2x^2 + 8x + 6$

SHOW YOUR WORK

Answer:

15 $x^2 + 4$

SHOW YOUR WORK

Answer:

Answer Key — Teacher Copy

Unit 7 Guided Practice · 90 problems

Lesson 7.1 — Multiplying Polynomials

1	$(x + 2)(x + 3)$	$x^2 + 5x + 6$
2	$(x + 4)(x + 1)$	$x^2 + 5x + 4$
3	$(x + 5)(x - 2)$	$x^2 + 3x - 10$
4	$(x - 3)(x + 6)$	$x^2 + 3x - 18$
5	$(x - 4)(x - 2)$	$x^2 - 6x + 8$
6	$(x + 7)(x - 7)$	$x^2 - 49$
7	$(x + 3)^2$	$x^2 + 6x + 9$
8	$(2x + 1)(x + 4)$	$2x^2 + 9x + 4$
9	$(3x + 2)(x + 5)$	$3x^2 + 17x + 10$
10	$(x - 5)(x - 5)$	$x^2 - 10x + 25$
11	$(2x - 3)(x + 2)$	$2x^2 + x - 6$
12	$(x + 6)(x - 1)$	$x^2 + 5x - 6$
13	$2x(x + 4)$	$2x^2 + 8x$
14	$(4x + 1)(2x - 3)$	$8x^2 - 10x - 3$
15	$(3x - 1)(3x + 1)$	$9x^2 - 1$

Lesson 7.2 — Factoring — GCF First

1	$2x + 8$	$2(x + 4)$
2	$3x + 12$	$3(x + 4)$
3	$5x^2 + 10x$	$5x(x + 2)$
4	$4x^2 + 6x$	$2x(2x + 3)$
5	$6x + 9$	$3(2x + 3)$
6	$x^2 + 7x$	$x(x + 7)$
7	$8x^2 - 12x$	$4x(2x - 3)$
8	$10x^2 + 5x$	$5x(2x + 1)$
9	$12x + 18$	$6(2x + 3)$
10	$9x^2 - 3x$	$3x(3x - 1)$
11	$14x^2 + 7x$	$7x(2x + 1)$
12	$6x^2 + 15x$	$3x(2x + 5)$
13	$20x^2 - 16x$	$4x(5x - 4)$
14	$12x^3 + 18x^2$	$6x^2(2x + 3)$
15	$6x^2 - 9x + 3$	$3(2x^2 - 3x + 1)$

Lesson 7.3 — Difference of Squares

1	$x^2 - 9$	$(x - 3)(x + 3)$
2	$x^2 - 16$	$(x - 4)(x + 4)$
3	$x^2 - 25$	$(x - 5)(x + 5)$
4	$x^2 - 4$	$(x - 2)(x + 2)$
5	$x^2 - 36$	$(x - 6)(x + 6)$
6	$x^2 - 1$	$(x - 1)(x + 1)$
7	$x^2 - 49$	$(x - 7)(x + 7)$
8	$x^2 - 64$	$(x - 8)(x + 8)$
9	$x^2 - 100$	$(x - 10)(x + 10)$
10	$4x^2 - 9$	$(2x - 3)(2x + 3)$
11	$9x^2 - 25$	$(3x - 5)(3x + 5)$
12	$16x^2 - 1$	$(4x - 1)(4x + 1)$
13	$25x^2 - 4$	$(5x - 2)(5x + 2)$
14	$x^2 - 121$	$(x - 11)(x + 11)$
15	$x^2 + 16$	does not factor

Lesson 7.4 — Factoring Trinomials (a = 1)

1	$x^2 + 5x + 6$	$(x + 2)(x + 3)$
2	$x^2 + 7x + 12$	$(x + 3)(x + 4)$
3	$x^2 + 6x + 8$	$(x + 2)(x + 4)$
4	$x^2 + 8x + 15$	$(x + 3)(x + 5)$
5	$x^2 + 9x + 20$	$(x + 4)(x + 5)$
6	$x^2 + 5x + 4$	$(x + 1)(x + 4)$
7	$x^2 - 5x + 6$	$(x - 2)(x - 3)$
8	$x^2 - 7x + 12$	$(x - 3)(x - 4)$
9	$x^2 + 2x - 8$	$(x + 4)(x - 2)$
10	$x^2 - x - 12$	$(x - 4)(x + 3)$
11	$x^2 + 3x - 10$	$(x + 5)(x - 2)$
12	$x^2 - 2x - 15$	$(x - 5)(x + 3)$
13	$x^2 + 10x + 21$	$(x + 3)(x + 7)$
14	$x^2 - 9x + 18$	$(x - 3)(x - 6)$
15	$x^2 + x - 20$	$(x + 5)(x - 4)$

Lesson 7.5 — Factoring Trinomials ($a \neq 1$)

1	$2x^2 + 5x + 2$	$(2x + 1)(x + 2)$
2	$2x^2 + 7x + 3$	$(2x + 1)(x + 3)$
3	$3x^2 + 8x + 4$	$(3x + 2)(x + 2)$
4	$2x^2 + 7x + 6$	$(2x + 3)(x + 2)$
5	$5x^2 + 11x + 2$	$(5x + 1)(x + 2)$
6	$3x^2 + 7x + 2$	$(3x + 1)(x + 2)$
7	$2x^2 + 9x + 4$	$(2x + 1)(x + 4)$
8	$4x^2 + 8x + 3$	$(2x + 1)(2x + 3)$
9	$3x^2 + 10x + 3$	$(3x + 1)(x + 3)$
10	$6x^2 + 11x + 3$	$(3x + 1)(2x + 3)$
11	$2x^2 + 11x + 5$	$(2x + 1)(x + 5)$
12	$3x^2 + 11x + 6$	$(3x + 2)(x + 3)$
13	$4x^2 + 4x - 3$	$(2x - 1)(2x + 3)$
14	$2x^2 - x - 6$	$(2x + 3)(x - 2)$
15	$6x^2 + 7x - 3$	$(3x - 1)(2x + 3)$

Lesson 7.6 — Which Method? — Factor Completely

1	$3x^2 + 12x$	$3x(x + 4)$
2	$x^2 - 16$	$(x - 4)(x + 4)$
3	$x^2 + 7x + 12$	$(x + 3)(x + 4)$
4	$5x^2 - 20$	$5(x - 2)(x + 2)$
5	$2x^2 + 5x + 2$	$(2x + 1)(x + 2)$
6	$x^2 - 9$	$(x - 3)(x + 3)$
7	$4x^2 + 12x + 8$	$4(x + 1)(x + 2)$
8	$3x^2 + 10x + 3$	$(3x + 1)(x + 3)$
9	$2x^3 - 8x$	$2x(x - 2)(x + 2)$
10	$3x^2 - 27$	$3(x - 3)(x + 3)$
11	$x^2 + 6x + 9$	$(x + 3)^2$
12	$6x^2 + 9x$	$3x(2x + 3)$
13	$x^2 - x - 6$	$(x - 3)(x + 2)$
14	$2x^2 + 8x + 6$	$2(x + 1)(x + 3)$
15	$x^2 + 4$	does not factor