

Big Ideas Math Algebra 1
Khan Academy alignment guide

Khan Academy alignment guide FAQ

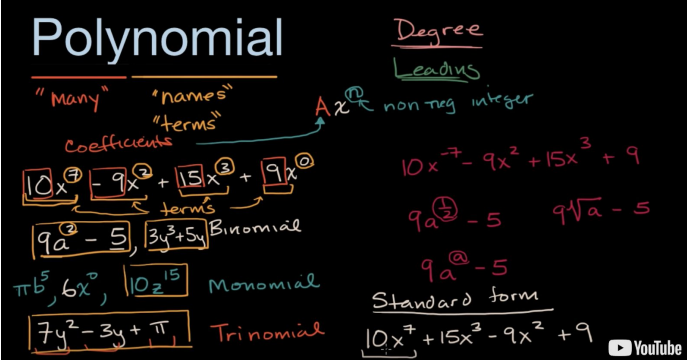
What does this guide contain?

- The purpose of this guide is to make it easier for teachers using the Big Ideas Math Algebra 1 textbook to find best-aligned resources on Khan Academy.
- However, this is not a comprehensive list of all aligned resources. View the full Khan Academy units on [polynomials](#), [factorization](#), and [quadratics](#).

How do exercises work on Khan Academy?

- When teachers assign an exercise on Khan Academy, their students will receive a randomized set of problems from the full item bank for that topic. When they finish the problem set, teachers can view each student's score.
- Students can re-attempt assignments to better understand the concept and improve their performance. When students redo an assignment, they receive a new set of problems, and teachers can view both the total number of attempts and each student's best score on the assignment.

What information does this guide contain?

Textbook section	Videos	Articles	Exercises
<p>7.1 Polynomials</p> <p>This is the chapter and section for the most recent version of Big Ideas Math. If you are using an older edition, exact section numbers may vary.</p>	<p>Polynomial intro (10:48)</p>  <p>This section tells the length of the video and gives a preview of the content covered within the video.</p>	<p>Adding and Subtracting Polynomials Review</p>	<p>Polynomials intro (4 Qs)</p> <p>Pick the expression that matches this description:</p> <p>A polynomial of the 5th degree with a leading coefficient of 7 and a constant term of 6</p> <p>Choose 1 answer:</p> <p>(A) $6x^5 + x^4 + 7$</p> <p>(B) $7x^5 + 2x^2 + 6$</p> <p>(C) $6x^7 - x^5 + 5$</p> <p>(D) $7x^6 - 6x^4 + 5$</p> <p>(4Qs) indicates that students will receive 4 problems from the full item bank per attempt. The example problem shown is meant to preview the difficulty level of problems within the exercise, but not all students will receive the exact problems shown within this guide.</p>

I found content that I'd like to assign to a class. How do I assign it?

Click the hyperlink and use the toolbar at the top of your screen to select a class, student(s), and due date. Then, click the assign button. *Note: You must have a teacher account on Khan Academy as well as existing classes and students to assign content on Khan Academy.*

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Chapter 7: Polynomial Equations and Factoring

[Go here](#) to browse the full unit on polynomials, which includes:

- 36 videos
- 7 interactive articles
- 19 problem sets
- 4 quizzes, plus a unit test

[Go here](#) to browse the full unit on factorization, which includes:

- 39 videos
- 12 interactive articles
- 16 problem sets
- 3 quizzes, plus a unit test

Textbook section

Videos

Articles

Exercises

7.1
Polynomials

[Polynomial intro](#) (10:48)

Polynomial
 Degree: Ax^n , n non-neg integer
 Leading: Ax^n
 "Many" "names" "terms"
 Coefficients: $10x^7 - 9x^2 + 15x^3 + 9x^0$
 Terms: $10x^7, -9x^2, 15x^3, 9x^0$
 Binomial: $9a^2 - 5, 3y^3 + 5y$
 Monomial: $\pi b^5, 6x^7, 10z^{15}$
 Trinomial: $7y^2 - 3y + \pi$
 Standard form: $10x^7 + 15x^3 - 9x^2 + 9$
 YouTube

[Evaluating polynomials](#) (1:08)

Evaluate $3x^2 - 8x + 7$, when $x = -2$.
 $3(-2)^2 - 8(-2) + 7$
 $3 \cdot 4 + (+16) + 7$
 $12 + 16 + 7 = \underline{\underline{35}}$

[Simplifying polynomials](#) (3:36)

Simplify $3x^2 - 8x + 7 + 2x^3 - x^2 + 8x - 3$.
 $x^2 + x^2 = 2x^2$
 $3x^3 + 4x^3 = 7x^3$
 $x^2 + x^3$
 cannot simplify
 $2x^3 + 3x^2 - x^2 - 8x + 8x + 7 - 3$
 $\underline{\underline{2x^3 + 2x^2 + 4}}$

[Polynomials intro](#) (4 Qs)

Pick the expression that matches this description:

A polynomial of the 5th degree with a leading coefficient of 7 and a constant term of 6

Choose 1 answer:

- A $6x^5 + x^4 + 7$
- B $7x^5 + 2x^2 + 6$
- C $6x^7 - x^5 + 5$
- D $7x^6 - 6x^4 + 5$

7.2
Adding and
Subtracting
Polynomials

[Adding Polynomials](#) (2:00)

Simplify: $(5x^2 + 8x - 3) + (2x^2 - 7x + 13x)$

$$\underline{5x^2} + \underline{8x} - \underline{3} + \underline{2x^2} - \underline{7x} + \underline{13x}$$

$$\underline{7x^2 + 14x - 3}$$

[Subtracting polynomials](#) (2:01)

Simplify: $(16x + 14) - (3x^2 + x - 9)$

$$(16x + 14) + -1 \cdot (3x^2 + x - 9)$$

$$\boxed{16x} + \boxed{14} - \boxed{3x^2} - \boxed{x} + \boxed{9}$$

$$\underline{-3x^2 + 15x + 23}$$

[Adding and subtracting multiple polynomials](#) (2:26)

Simplify: $(x^3 + 3x - 6) + (-2x^2 + x - 2) - (3x - 4)$

$$x^3 + \cancel{3x} - 6 - \underline{2x^2} + x - 2 - \cancel{3x} + 4$$

$$\underline{x^3 - 2x^2 + x - 4}$$

[Add polynomials \(intro\)](#) (4 Qs)

Add.

Your answer should be a polynomial in standard form.

$$(-2k^3 - 7k^2 + 5k) + (6k^2 + 3k) = \boxed{}$$

[Subtracting polynomials](#) (4 Qs)

Subtract.

Your answer should be a polynomial in standard form.

$$(-5m^2 - 8) - (-3m^2 + m + 2) = \boxed{}$$

[Add & subtract polynomials](#) (4 Qs)

Subtract $3x^2 + 7x - 4$ from $8x^2 - 6x + 2$.

Your answer should be a polynomial in standard form.

[Adding and
Subtracting
Polynomials Review](#)

Section 7.3
Multiplying
Polynomials

Multiplying monomials by polynomials (2:42)

Multiply $-4x^2(3x^2 + 25x - 7)$

$$\underbrace{(-4x^2 \cdot 3x^2)} + \underbrace{(-4x^2 \cdot 25x)} + \underbrace{(-4x^2 \cdot -7)}$$

$$-4 \cdot 3 \cdot x^2 \cdot x^2 + 25(-4) \cdot x^2 \cdot x^1 + (-4 \cdot -7) \cdot x^2$$

$$-12x^4 - 100x^3 + 28x^2$$

Multiplying binomials intro (4:46)

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

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

$$x^2 - 4x + 7x - 28$$

$$x^2 + (-4+7)x - 28$$

$$x^2 + 3x - 28$$

Multiplying binomials (5:47)

Multiply $(3x+2)(5x-7)$

First
Outside
Inside
Last

$$3x \cdot 5x + 3x(-7) + 2 \cdot 5x + 2(-7)$$

$$15x^2 - 21x + 10x - 14$$

$$15x^2 - 11x - 14$$

Multiplying
monomials by
polynomials review

Multiply monomials by polynomials (4 Qs)

Expand.

Your answer should be a polynomial in standard form.

$$-4w(w^2 - 9) = \boxed{}$$

Multiplying binomials intro (4 Qs)

Expand.

Your answer should be a polynomial in standard form.

$$(x + 1)(x + 8) = \boxed{}$$

Multiply binomials (4 Qs)

Expand.

Your answer should be a polynomial in standard form.

$$(3b - 4)(b + 2) = \boxed{}$$

Section 7.4
Special Products
of Polynomials

Special products of the form $(x+a)(x-a)$ (4:53)

$(x+3)(x-3)$
 $x(x+3) - 3(x+3)$
 $x^2 + 3x - 3x - 9$
 $x^2 - 9$

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

$(x+\frac{a}{a})(x-\frac{a}{a}) = x^2 - a^2$

Squaring binomials of the form $(x+a)^2$ (5:42)

$(x+7)^2 = (x+7)(x+7)$
 $x(x+7) + 7(x+7)$
 $x^2 + 7x + 7x + 49$
 $x^2 + 14x + 49$

$(x-\frac{a}{a})^2 = x^2 - 6x + 9$

Special products of the form $(ax+b)(ax-b)$ (2:29)

Find the product: $(2x+8)(2x-8)$

$(2x)^2 - (8)^2$
 $4x^2 - 64$

Special products of binomials intro (4 Qs)

Expand.

Your answer should be a polynomial in standard form.

$(x+6)(x+6) =$

Special products of binomials (4 Qs)

Expand.

Your answer should be a polynomial in standard form.

$(3r+5t)^2 =$

Special products of binomials: two variables (5:11)

Find the area of a square with side $(6x - 5y)$

$A = (6x - 5y)(6x - 5y) = (6x - 5y)^2$
 $6x(6x - 5y) - 5y(6x - 5y)$
 $36x^2 - 30xy - 30xy + 25y^2$
 $36x^2 - 60xy + 25y^2$
 $(6x - 5y)^2 = (6x)^2 + 2(6x)(-5y) + (-5y)^2$
 $36x^2 - 60xy + 25y^2$

Binomial special products review

Section 7.5
Solving Polynomial Equations in Factored Form
and
Section 7.6
Factoring Polynomials using the GCF

Intro to factors & divisibility (5:25)

$(3xy)(-2x^2y^3) = -6x^3y^4$
 $3xy$ is a factor of $-6x^3y^4$
 $-6x^3y^4$ is divisible by $3xy$
 $(x+3)(x+7) = x^2 + 10x + 21$
 $x+7$ is a factor of $x^2 + 10x + 21$
 $x^2 + 10x + 21$ is divisible by $x+7$

Factoring with the distributive property (3:27)

$4x + 18 = 2(2x + 9)$
 $12 + 32y = 4(3 + 8y)$

Intro to factors & divisibility

Factors & divisibility (4 Qs)

A teacher writes the following product on the board:

$$(3k^2)(6k^5) = 18k^7$$

Ana says that $3k^2$ is a factor of $18k^7$.

Felipe says that $18k^7$ is divisible by $3k^2$.

Who is correct?

Factoring binomials: common factor (4:58)

Factor the polynomial below by its greatest common monomial factor.

$$\boxed{8x^2y} + \boxed{12xy^2} = \boxed{4xy}(2x+3y) \quad \text{gcf}(8,12) = 4$$

$$4xy \swarrow \quad \nwarrow$$
$$\boxed{4xy}(2x) + \boxed{4xy}(3y) = (4xy)(2x + 3y)$$

Factoring polynomials: common factor (5:53)

Factor: $4x^4y - 8x^3y - 2x^2$

$$2x^2(2x^2y - 4xy - 1)$$
$$4x^4y - 8x^3y - 2x^2$$
$$2x^2\left(\frac{4x^4y}{2x^2}\right) - 2x^2\left(\frac{8x^3y}{2x^2}\right) - 2x^2\left(\frac{2x^2}{2x^2}\right)$$
$$2x^2(2x^2y) - 2x^2(4xy) - 2x^2(1)$$
$$2x^2(2x^2y - 4xy - 1)$$

Zero product property (7:16)

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

for what x values does $f(x) = 0$?

$$(x-5)(5x+2) = 0$$
$$x-5 = 0 \quad \text{or} \quad 5x+2 = 0$$
$$\boxed{x=5} \quad \frac{5x}{5} = \frac{-2}{5}$$

or

$$\boxed{x = -\frac{2}{5}}$$

Factoring polynomials by taking a common factor

Factoring polynomials by common factor review

Factor polynomials: common factor (4 Qs)

Factor the polynomial as the product of two binomials.

$$n(n-1) + 3(n-1) = \boxed{}$$

Zero product property (4 Qs)

Find the zeros of the function.
Write the smaller solution first, and the larger solution second.

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

smaller $x = \boxed{}$

larger $x = \boxed{}$

Section 7.7
Factoring x^2+bx+c

Factoring quadratics as $(x+a)(x+b)$ (6:33)

$$x^2 - 3x - 10 = (x+a)(x+b)$$

10: 1×10
 2×5

$$= x^2 + ax + bx + ab$$

$$= x^2 + (a+b)x + ab$$

-10: -2×5
 2×-5

$$a+b = -3 \quad ab = -10$$

$$a = 2$$

$$b = -5$$

$$x^2 - 3x - 10 = (x+2)(x-5)$$

Factoring quadratics:
leading coefficient = 1

Factoring quadratics as $(x+a)(x+b)$ (example 2) (4:20)

$$x^2 - 14x + 40$$

$a+b = -14$
 $ab = 40$ (same sign)

$$(x+a)(x+b)$$

$$x^2 + (a+b)x + ab$$

$-4 + (-10) = -14$
 $(-4)(-10) = 40$

$$(x+(-4))(x+(-10))$$

$$(x-4)(x-10)$$

$$x^2 - x - 12$$

$a+b = -1$
 $ab = -12$ (different signs)

$3 + (-4) = -1$
 $(3)(-4) = -12$

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

Factoring simple
quadratics review

Factoring quadratics intro (4 Qs)

Factor as the product of two binomials.

$$x^2 - 10x + 21 = \boxed{}$$

Section 7.8
Factoring
 ax^2+bx+c

Intro to grouping (13:57)

$$6x^2 + 7x + 1$$

$a \cdot b = 1 \cdot 6 = 6$
 $a+b = 7$
 $1, 6$

$$(6x^2 + 6x + 1x + 1)$$

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

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

Factoring by grouping

[Factoring quadratics by grouping](#) (3:55)

Factor. $a \cdot b = 4 \cdot -15 = -60$
 $a + b = 4$

$4y^2 + 4y - 15$

$4y^2 - 6y + 10y - 15$

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

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

5, -12 -7
 -5, 12 +7
 6, -10 -4
 -6, 10 4

[Factoring quadratics: leading coefficient \$\neq 1\$](#)

[Factor quadratics by grouping](#) (4 Qs)

Factor the quadratic expression completely.

$2x^2 - 13x + 20 =$

Section 7.9
Factoring Special Products

[Difference of squares intro](#) (4:54)

$x^2 - 9 = (x + 3)(x - 3)$ $(x+a)(x-a)$

$(x)^2 - (3)^2$ $x^2 + ax - ax - a^2$

$y^2 - 25 = (y + 5)(y - 5)$ $x^2 - a^2 = (x+a)(x-a)$

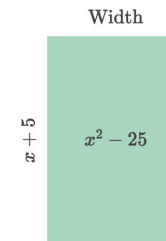
$121 - b^2 = (11 + b)(11 - b)$

[Factoring difference of squares: leading coefficient \$\neq 1\$](#) (2:22)

[Difference of squares intro](#) (4 Qs)

The rectangle below has an area of $x^2 - 25$ square meters and a length of $x + 5$ meters.

What expression represents the width of the rectangle?



Width = meters

[Factoring quadratics: Difference of squares](#)

[Difference of squares](#) (4 Qs)

$$45x^2 - 125$$

$$5 \left(\underbrace{9x^2}_{a^2} - \underbrace{25}_{5^2} \right)$$

$$a = 3x \quad b = 5$$

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

[Factoring quadratics: Perfect squares](#)

[Perfect square factorization intro \(5:18\)](#)

$$\begin{aligned} x^2 + 6x + 9 &= (x+3)^2 \\ a^2 + 14a + 49 &= (a+7)^2 \end{aligned}$$

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

$$(a+7)a + (a+7)7 = a^2 + 7a + 7a + 49 = a^2 + 14a + 49 = (a+7)^2$$

$$(a+b)^2 = (a+b)(a+b)$$

$$(a+b)a + (a+b)b = a^2 + ab + ab + b^2 = a^2 + 2ab + b^2$$

$$25 + 10x + x^2 = (5+x)^2$$

$$x^2 + 10x + 25 = (x+5)^2$$

[Factoring perfect squares \(4:53\)](#)

Factor completely.

$$4x^2 - 1 = \boxed{}$$

[Perfects squares intro \(4 Qs\)](#)

Factor as the product of two binomials.

$$36 + 12x + x^2 = \boxed{}$$

[Perfect squares \(4 Qs\)](#)

Factor: $25x^2 - 30x + 9$

$(5x-3)^2$ or $(-5x+3)^2$
 $(-1)(5x-3)^2$
 $(-1)^2(5x-3)^2$

$(a+b)^2 = (a+b)(a+b)$
 $a^2x^2 + abx + abx + b^2$
 $a^2x^2 + 2ax + b^2$
 $25x^2 - 30x + 9$
 $a = 5$ $b = 3$
 $2ab = -30$
 $ab = -15$

[Factoring quadratics in any form](#)

Factor completely.

$25x^2 - 30x + 9 =$

[Factoring perfect squares: 4th degree polynomial \(2:24\)](#)

Factor: $25x^4 - 30x^2 + 9 = (5x^2 - 3)(5x^2 - 3)$

$(5x^2)^2 - 2 \cdot 5x^2 \cdot 3 + 3^2$
 $2 \cdot 5x^2 \cdot 3 = -30x^2$
 $= -30x^2$

[Factor polynomials: special product forms \(4 Qs\)](#)

Factor completely.

$49m^4 + 140m^2 + 100 =$

Chapter 8: Graphing Quadratic Functions

[Go here](#) to browse the full unit on quadratic functions, which includes:

- 41 videos
- 11 interactive articles
- 29 problem sets
- 5 quizzes
- 1 unit test

Textbook section

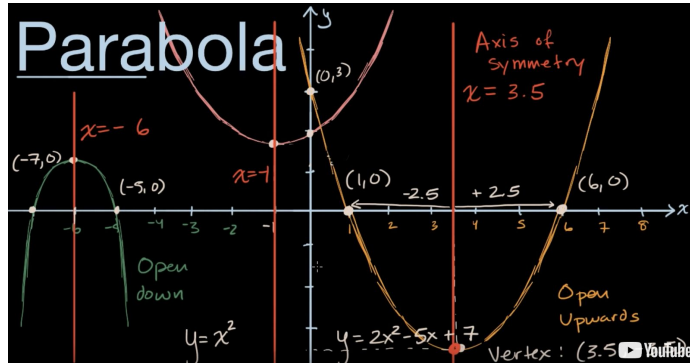
Videos

Articles

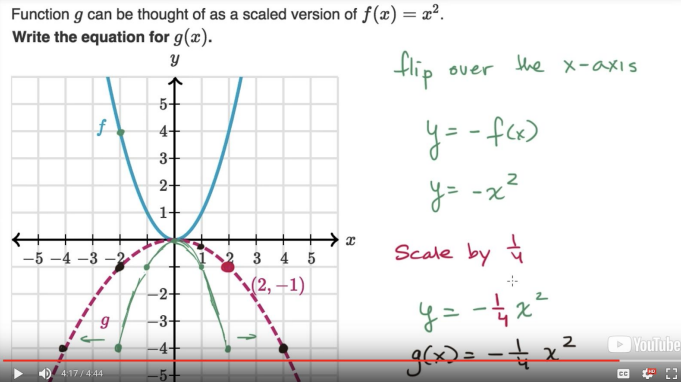
Exercises

8.1
Graphing $y = ax^2$

[Parabolas intro](#) (8:13)

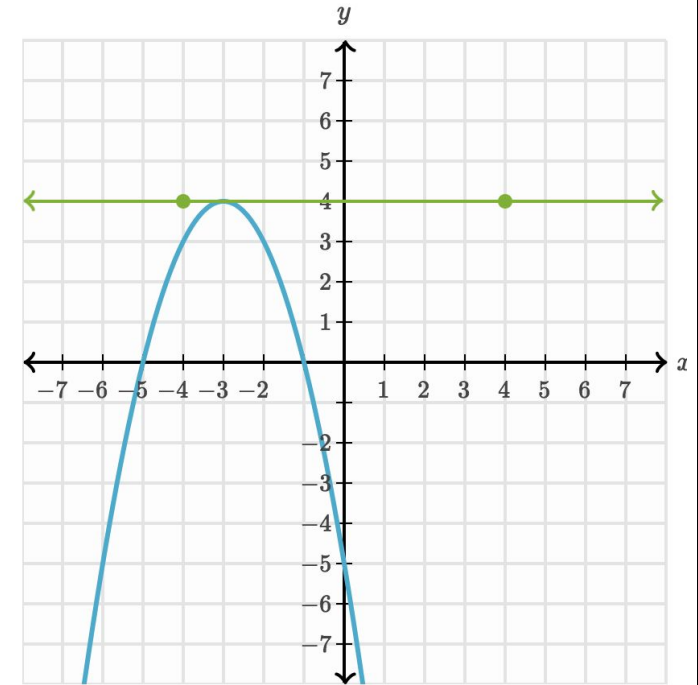


[Scaling and reflecting parabolas](#) (4:44)



[Background] [Parabolas intro](#) (7 Qs)

Draw the parabola's axis of symmetry.



[Scale and reflect parabolas](#) (4 Qs)

The parabola $y = x^2$ is scaled vertically by a factor of 7.

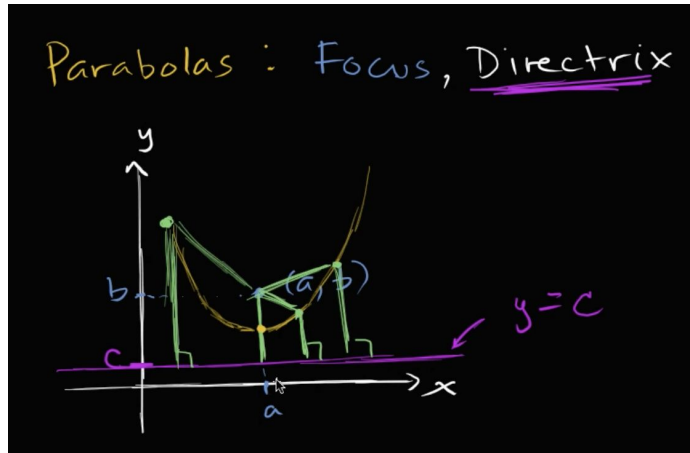
What is the equation of the new parabola?

$y =$

**8.2
Focus of a
Parabola**

No videos are perfectly aligned at this time.

Related resource: [Intro to focus and directrix](#) (4:06) [Algebra II video]



No articles perfectly aligned at this time.

Related resource: [Parabola focus & directrix review](#) [Algebra II article]

No exercises perfectly aligned at this time.

Related resource: [Equation of a parabola from focus & directrix](#) (4 Qs) [Algebra II exercise]

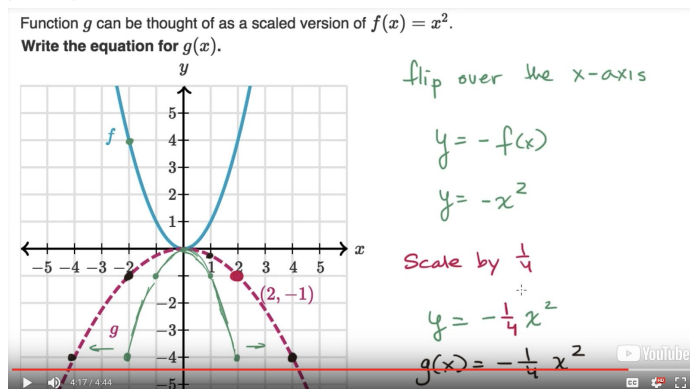
Write the equation for a parabola with a focus at $(6, -4)$ and a directrix at $y = -7$.

$y =$

**8.3
Graphing $y = ax^2+c$**

No videos perfectly aligned at this time.

Related resource: [Scaling and reflecting parabolas](#) (4:44)



No articles perfectly aligned at this time.
[Browse the full unit.](#)

No exercises perfectly aligned at this time.

Related resource: [Scale and reflect parabolas](#) (4 Qs)

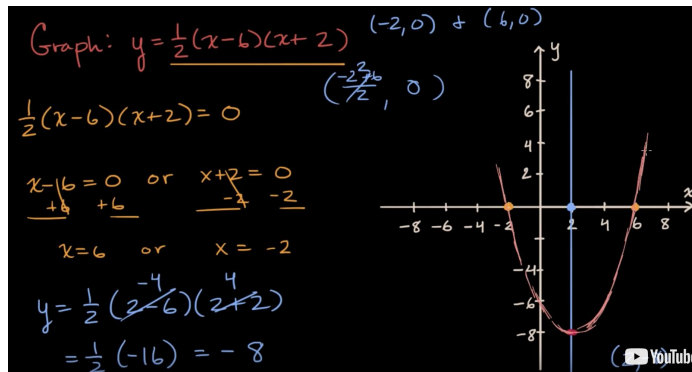
The parabola $y = x^2$ is scaled vertically by a factor of 7.

What is the equation of the new parabola?

$y =$

Related resource: [Warmup: graphing quadratics in factored form](#) (4 Qs)

Related resource: [Graphing quadratics in factored form](#) (6:02)



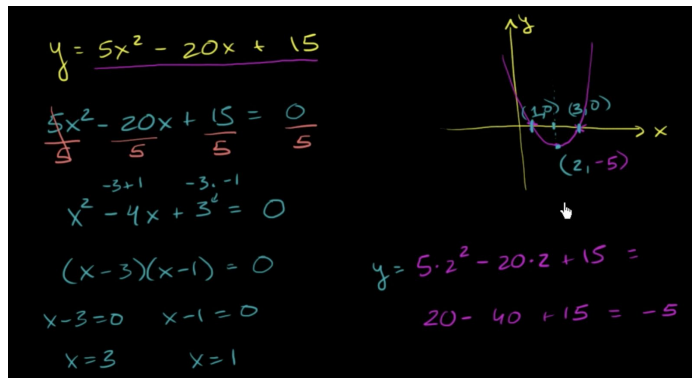
$$y = (x - 5)(x + 1)$$

What is the vertex of the parabola?

(,)

8.4
Graphing $y = ax^2 + bx + c$

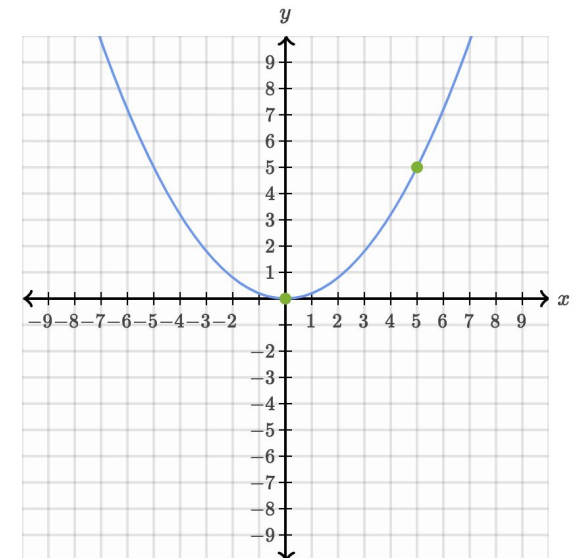
[Graph quadratics: standard form](#) (4:40)



[Graph equations in standard form](#) (4 Qs)

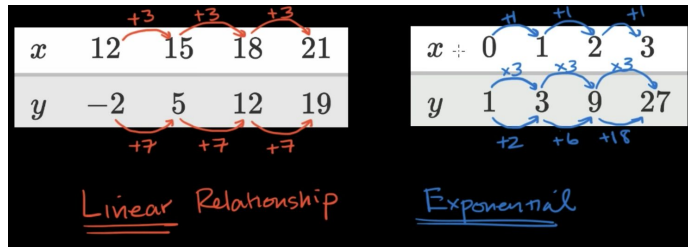
Graph the equation.

$$y = 4x^2 + 8x + 7$$

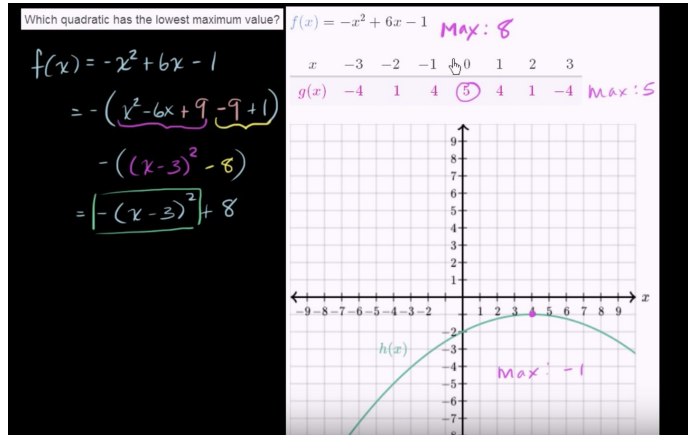


8.5 Comparing Linear, Exponential, and Quadratic Functions

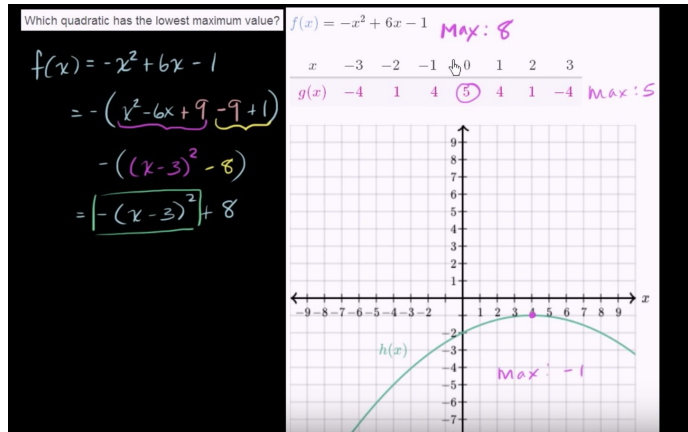
Related resource: [Exponential vs. linear models](#) (3:04)



Comparing maximum points of quadratic functions
(3:58)



Comparing functions: x-intercepts (2:46)



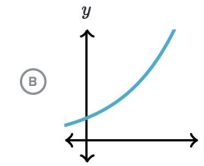
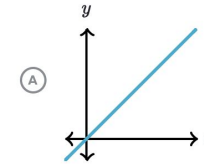
No articles are perfectly
aligned at this time.
[Browse the full unit.](#)

Related resource: [Exponential vs. linear models](#) (4 Qs)

You work as a taxi driver. You earn an average of \$75 in tips every day.

Which graph best represents the relationship between time and the cumulative total of your tips?

Choose 1 answer:



Related resource: [Compare features of functions](#) (4 Qs) [Algebra II skill, challenging]

f is a function defined on all real numbers. Its formula is given below.

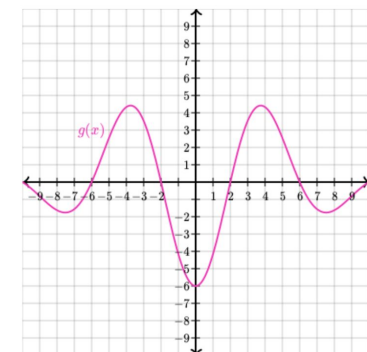
g is a function defined on all real numbers. Its graph when $-10 \leq x \leq 10$ is given below.

Which of the features are shared by $f(x)$ and $g(x)$?

Choose all answers that apply:

- (A) They are both periodic.
- (B) They are both even.
- (C) They have at least one x-intercept in common.
- (D) They have a relative minimum at the same x value.

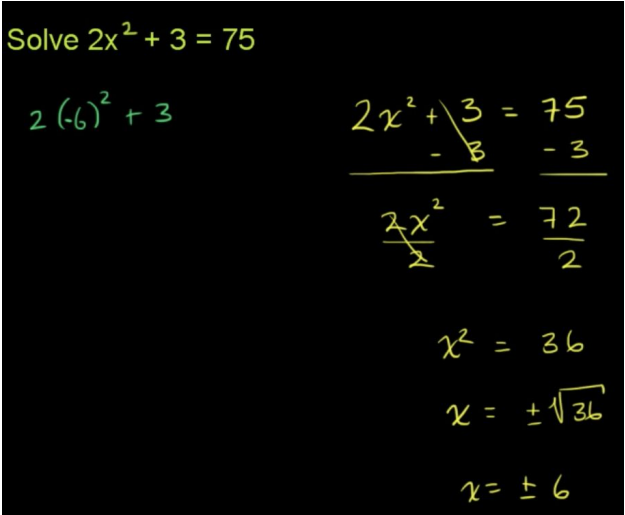
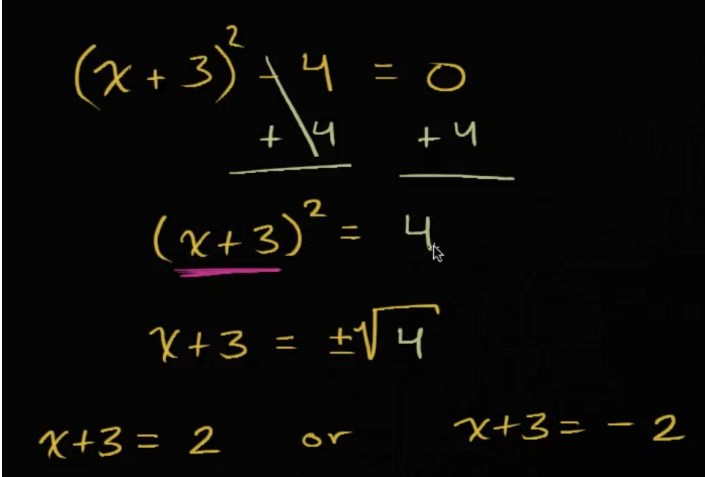
$f(x) = x^2 - 4$



Chapter 9: Solving Quadratic Functions

[Go here](#) to browse the full unit on quadratic functions, which includes:

- 41 videos
- 11 interactive articles
- 29 problem sets
- 5 quizzes
- 1 unit test

Textbook section	Videos	Articles	Exercises
<p>9.1 Solving Quadratic Equations by Graphing</p>	<p>No videos are perfectly aligned at this time. Browse the full unit.</p>	<p>No articles perfectly aligned at this time. Browse the full unit.</p>	<p>No exercises are perfectly aligned at this time. Browse the full unit.</p>
<p>9.2 Solving Quadratic Equations using Square Roots</p>	<p>Solving quadratics by taking square roots (2:18)</p>  <p>$2x^2 + 3 = 75$</p> $2(-6)^2 + 3$ $\begin{array}{r} 2x^2 + 3 = 75 \\ -3 \quad -3 \\ \hline 2x^2 = 72 \\ \frac{2x^2}{2} = \frac{72}{2} \\ x^2 = 36 \\ x = \pm\sqrt{36} \\ x = \pm 6 \end{array}$ <p>Solving quadratics by taking square roots examples (5:11)</p>  <p>$(x+3)^2 - 4 = 0$</p> $\begin{array}{r} (x+3)^2 - 4 = 0 \\ +4 \quad +4 \\ \hline (x+3)^2 = 4 \\ x+3 = \pm\sqrt{4} \\ x+3 = 2 \quad \text{or} \quad x+3 = -2 \end{array}$	<p>Solving quadratics by taking square roots</p> <p>Solving simple quadratics review</p>	<p>Quadratics by taking square roots intro (4 Qs)</p> <p>Solve for x. Write the smaller solution first, and the larger solution second.</p> $3x^2 + 4 = 436$ <p>smaller $x =$ <input type="text"/></p> <p>larger $x =$ <input type="text"/></p> <p>Quadratics by taking square roots (4 Qs)</p> <p>Solve for x. Write the smaller solution first, and the larger solution second.</p> $(x+7)^2 - 49 = 0$ <p>smaller $x =$ <input type="text"/></p> <p>larger $x =$ <input type="text"/></p>

Solving quadratics by taking square roots: strategy

(4:24)

Use the cards below to create a list of steps, in order, that will solve the following equation.

$$3(x+6)^2 = 75$$

Handwritten solution for the equation $3(x+6)^2 = 75$:

$$\frac{3(x+6)^2}{3} = \frac{75}{3}$$
$$(x+6)^2 = 25$$
$$x+6 = \pm\sqrt{25}$$
$$x+6 = \pm 5$$
$$\begin{array}{r} x+6 \\ -6 \\ \hline x = -6 \pm 5 \end{array}$$
$$x = -1 \text{ or } x = -11$$

Interactive buttons for solving the equation:

- Add 6 to both sides
- 1 Divide both sides by 3
- Divide both sides by $\frac{1}{3}$
- 3 Subtract 6 from both sides
- Square both sides
- 2 Take the square root of both sides

Solving quadratics by taking square roots: with steps

(1:44)

Meredith is solving the following problem for homework.

$$2(x+4)^2 = 242$$

She completes the problem as seen in the steps below.

Step 1 $2(x+4)^2 = 242$

Step 2 $(x+4)^2 = 121$

Step 3 $x+4 = 11$

$x = 7$

When she gets to school the next day, her teacher tells her that the answer is $x = 7$ and $x = -15$.

In what step did she make an error?

Answer

- Step 1
- Step 2
- Step 3

Correct! Next Question.

Show me how

Show hints (2 available)



Quadratics by taking square roots: strategy (4 Qs)

Seth solved a quadratic equation. His work is shown below, with Step 3 missing.

What could Seth have written as the result from Step 3?

$$\frac{1}{2}(x-1)^2 + 5 = 23$$

$$\frac{1}{2}(x-1)^2 = 18 \quad \text{Step 1}$$

$$(x-1)^2 = 36 \quad \text{Step 2}$$

Step 3

$$x = -5 \text{ or } x = 7 \quad \text{Step 4}$$

Choose 1 answer:

Quadratics by taking square roots: with steps (4 Qs)

Create a list of steps, in order, that will solve the following equation.

$$3(x+1)^2 = 108$$

Solution steps:

Add 1 to both sides

Divide both sides by 3

Multiply both sides by 3

Subtract 1 from both sides

Square both sides

Take the square root of both sides

9.3
Solving Quadratic
Equations by
Completing the
Square

Completing the square (14:06)

$$\frac{10x^2}{2} - \frac{30x}{2} - \frac{8}{2} = \frac{0}{2}$$

$$\frac{5x^2}{5} - \frac{15x}{5} - \frac{4}{5} = \frac{0}{5}$$

hard using
factoring

$$x^2 - 3x - \frac{4}{5} = 0$$

$$+ \frac{4}{5} \quad \frac{4}{5}$$

$$x^2 - 3x + \frac{9}{4} = \frac{4}{5}$$

$a = -\frac{3}{2}$

Worked example: Completing the square (intro) (3:21)

Use completing the square to find the value of c that makes $x^2 - 44x + c$ a perfect square trinomial. Then write the expression as the square of a binomial.

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

$$x^2 + ax + ax + a^2$$

$$x^2 + 2ax + a^2$$

$$x^2 - 44x + c$$

$$\frac{-44 = 2a}{2} \quad c = a^2$$

$$-22 = a \quad a = (-22)^2$$

$$x^2 - 44x + 484$$

$$x^2 + 2(-22)x + (-22)^2$$

$$(x - 22)(x - 22)$$

$$\begin{array}{r} 22 \\ \times 22 \\ \hline 44 \\ 440 \\ \hline 484 \end{array}$$

Solving quadratics
by completing the
square

Completing the square (intro) (4 Qs)

What is the missing constant term in the perfect square that starts with $x^2 + 14x$?

Completing the square (intermediate) (4 Qs)

Rewrite the equation by completing the square.

$$x^2 + 16x + 64 = 0$$

$$(x + \boxed{})^2 = \boxed{}$$

Worked example: Solving equations by completing the square (6:19)

$$x^2 - 2x - 8 = 0$$

$$\boxed{x^2 - 2x + 1} - 9 = 0 \quad \boxed{x^2 + 2ax + a^2} + b$$

$$2ax \quad -9$$

$$2a = -2$$

$$a = -1$$

$$\frac{(x-1)^2 - 9}{+9} = \frac{0}{+9}$$

$$(x-1)^2 = 9$$

$$\frac{x-1}{+1} = \frac{3}{+1} \quad \text{or} \quad \frac{x-1}{+1} = \frac{-3}{+1}$$

$$x = 4 \quad \quad \quad x = -2$$

Completing the square review

Completing the square (4 Qs)

Rewrite the equation by completing the square.

$$4x^2 + 28x + 49 = 0$$

$$(x + \boxed{})^2 = \boxed{}$$

9.4 Solving Quadratic Equations using the Quadratic Formula

The quadratic formula (16:31)

Quadratic Formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$$ax^2 + bx + c = 0$$

$$x^2 + 4x - 21 = 0$$

$$a = 1, b = 4, c = -21$$

$$x = 3 \quad \text{or} \quad x = -7$$

$$(x+7)(x-3) = 0$$

$$x+7=0 \quad \text{or} \quad x-3=0$$

$$\therefore x = \frac{-4 \pm \sqrt{16 + 4 \cdot 1 \cdot (-21)}}{2} = \frac{-4 \pm 10}{2} = -2 \pm 5$$

Understanding the quadratic formula

Quadratic formula review

Discriminant review

Quadratic formula (4 Qs)

Solve.

$$10x^2 - 6 = 9x$$

Choose 1 answer:

(A) $x = \frac{5 \pm \sqrt{65}}{-2}$

(B) $x = \frac{9 \pm \sqrt{321}}{20}$

(C) $x = \frac{4 \pm \sqrt{26}}{10}$

(D) $x = \frac{-1 \pm \sqrt{109}}{18}$

Using the quadratic formula (5:34)

Use the quadratic formula to solve the equation

$$0 = \boxed{-7}x^2 + \boxed{2}x + \boxed{9}$$

$$0 = ax^2 + bx + c$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-2 \pm \sqrt{2^2 - 4 \cdot (-7) \cdot 9}}{2 \cdot (-7)}$$

$$= \frac{-2 \pm \sqrt{4 + 252}}{-14}$$

$$= \frac{-2 \pm \sqrt{256}}{-14} = \frac{-2 \pm 16}{-14} \text{ or } \frac{-2 - 16}{-14} = \frac{18}{14} = \frac{9}{7}$$

$x = -1$ or $\frac{9}{7}$

Worked example: quadratic formula (2:21)

Rewrite the equation $6x^2 + 3 = 2x - 6$ in standard form and identify a, b, and c.

$$ax^2 + bx + c = 0$$

$$6x^2 + 3 = 2x - 6$$

$$\begin{array}{r} 6x^2 + 3 = 2x - 6 \\ -2x \quad -2x \\ \hline 6x^2 - 2x + 3 = -6 \end{array}$$

$$\begin{array}{r} 6x^2 - 2x + 3 = -6 \\ +6 \quad +6 \\ \hline 6x^2 - 2x + 9 = 0 \end{array}$$

$a = 6$
 $b = -2$
 $c = 9$

Using the quadratic formula: number of solutions (4:58)

Determine the number of solutions to the quadratic equation

$$x^2 + 14x + 49 = 0$$

$$ax^2 + bx + c = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

discriminant

if $b^2 - 4ac > 0 \Rightarrow 2$ solutions
if $b^2 - 4ac = 0 \Rightarrow 1$ solution
if $b^2 - 4ac < 0 \Rightarrow$ no real solution

$$14^2 - 4 \cdot 1 \cdot 49 = 196 - 196 = 0$$

$$\frac{-14}{2} = -7$$

Number of solutions of quadratic equations (4 Qs)

$$f(x) = -4x^2 + 12x - 9$$

What is the value of the discriminant of f ?

How many x -intercepts does the graph of f have?

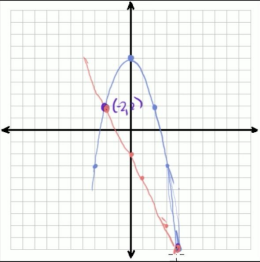
9.5
Solving Systems
of Linear and
Quadratic
Equations

Quadratic systems: graphical solution (5:43)

Solve the system of equations by graphing. Check your solution algebraically.

$$y = -x^2 + 6$$
$$y = -2x - 2$$
$$-2(4) - 2$$
$$-8 - 2 = -10$$

x	-x ² +6
2	2
-2	2
3	-3
-3	-3
4	-10



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aligned at this time.
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unit.](#)

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unit.](#)