Algebra 2

3. Quadratic Functions and Equations

3.2 Solving Quadratic Equations

Exercises

Find all solutions to exercises via https://mathleaks.com/study/solving_quadratic_equations or scan the QR code

1.1 Solve the equations without a calculator.

A $x^2 = 9$

B $2x^2 = 32$

C $x^2 = \frac{1}{4}$

1.2 Solve the quadratic equations without using a calculator and answer exactly.

A $3x^2 = 75$

B $4x^2 - 16 = 0$

C $\frac{x^2}{6} - 4 = 2$

D $x^2 = 15 - 2x^2$

1.3 Which of the following are quadratic equations?

$\mathbf{A}:\ x = 7^2$
$\mathbf{B}:\ x + 8 = 15$
$\mathbf{C}:\ 10x^2 - 8 + 2x$
$\mathbf{D}:\ x^2 = 25$
$\mathbf{E}:\ y = x^2 + 3$
$\mathbf{F}:\ x^2 + 2x - 30 = 0$

1.4 Given the equation $x^2 = d$. Find a value of d that makes the equation have

A two real solutions?

B one real solution?

C no real solution?

1.5 Solve the quadratic equation. Answer both exactly and with two decimal places.

A $x^2 = 7$

B $12x^2 = 24$

C $10x^2 - 3090 = 0$

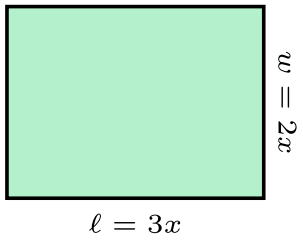
D $4 = 9 - \frac{x^2}{3}$

1.6 Write a quadratic function in the form $f(x) = x^2 + bx + c$ that has zeros 8 and 12.

1.7 Solve the equation $0 = x^2 + 6x + 9$ by factoring the right-hand side.

1.8 Write a quadratic function in standard form which has zeros 8 and 11.

1.9 **A** Create an expression for the area of the rectangle.



B Determine the length of the sides if the area is 54 square units.

1.10 Factor the polynomial $x^2 - 4x - 21$.

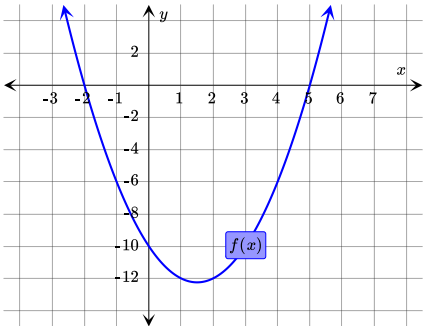
1.11 Solve the equation $x^2 + 3x + 2 = 0$ by graphing.

1.12 Which equation has one real solution? Explain.

- I: $3x^2 + 4 = -2(x^2 + 8)$
- II: $5x^2 - 4 = x^2 - 4$
- III: $2(x + 3)^2 = 18$
- IV: $\frac{3}{2}x^2 - 5 = 19$

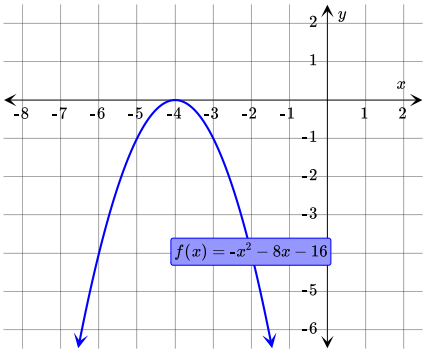
1.13 Factor the quadratic trinomial $x^2 - 3x - 28$. Then use the resulting expression to solve the equation $x^2 - 3x - 28 = 0$.

1.14 Use the graph to solve the equation $f(x) = 0$.



1.15 Factor the quadratic trinomial $12x^2 - 2x - 2$. Then use the resulting expression to solve the equation $12x^2 - 2x - 2 = 0$.

1.16 Use the graph to solve the equation $-x^2 - 8x - 16 = 0$.



1.17 Does there exist two real numbers that multiply to 42 and whose sum is -13? Is so, find them.

1.18 Solve the equation $3x^2 = 6x - 3$ by graphing.

2.1 Solve the quadratic equations.

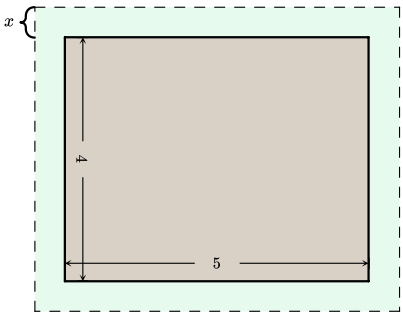
A $(x-3)^2 = 16$

B $(x+6)^2 = 9$

C $(2x-4)^2 = 64$

2.2 Factor the quadratic function $4x^4 + 24x^3 + 32x^2$.

2.3 The cat shelter *Happy Paw* has a 5 feet by 4 feet large litter box filled with sand for the little felines to use. Last week, the cat shelter received a donation from a philanthropist named Patricia, which will be used to build a carpeted platform around the box that will catch the sand that gets stuck on the cats' paws.



The organization *Cat Shelters International* has published guidelines on how to build a platform around a litter box. They recommend that the platform should have the same width on all sides and its total area should be half that of the box. Find the width x of the carpeted platform.

2.4 Does there exist two real numbers that multiply to -54 and whose sum is -15? Is so, find them.

2.5 For some real values of a, b, and c the equation $ax^2 + bx + c = 0$ has no real solution. The related function, $f(x) = ax^2 + bx + c$, has a graph with its vertex in the second quadrant.

A Is a a positive or a negative number? Explain your reasoning.

B If the graph of the related function is translated so that its vertex is in the fourth quadrant. Does the graph have any x-intercepts? Explain.

2.6 Does there exist two real numbers that multiply to -117 and whose sum is 4? Is so, find them.

2.7 The product of two consecutive odd integers is 143. Find the integers by writing and solving an equation.

2.8 Does there exist two real numbers that multiply to -209 and whose sum is -8? Is so, find them.

2.9 A quadratic equation can be solved by graphing its related quadratic function. Explain the process how to do this.

3.1 The equation $2x^2 - ax + b = 0$ has the solutions $x = -3$ and $x = 4$. What are the constants a and b?

3.2 The quadratic function $y = x^2 - 2kx + 55$, where k is a positive integer, has zeros at $k + 3$ and $k - 3$. Find the value of k.

3.3 If $16^a = 225$, find the value of 4^a.