

# algebra 2 placement test



## Welcome!

Thank you for your interest in Thinkwell. We know the curriculum selection process for your homeschool student can be challenging. This Placement Test was created to provide you with a tool to place your student in the appropriate level of math.

Please keep in mind, no Placement Test is perfect. If you have questions or concerns about the results of your student's Placement Test, reach out to us at Thinkwell support: [support@thinkwell.com](mailto:support@thinkwell.com).

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## Instructions and Overview

This Placement Test consists of 25 free-response questions. There is no time-limit for the test, but it shouldn't take your student longer than an hour to an hour and a half to complete. Your student should work each problem to the best of their ability. If they are unable to answer an item, tell them to move on to the next item and leave the question unanswered.

The Algebra 2 Placement Test will assess your student's aptitude for the following skill areas:

- Simplifying powers.
- Using the order of operations.
- Simplifying and evaluating algebraic expressions.
- Finding the square roots of numbers.
- Using properties of exponents to simplify expressions.
- Solving absolute-value equations, equations with variables on both sides, and inequalities.
- Solving systems of linear equations and systems of linear inequalities.
- Graphing functions from ordered pairs.
- Finding the slope of lines.
- Solving quadratic equations.
- Graphing linear inequalities.
- Graphing quadratic functions.
- Writing equations of lines.
- Evaluating functions.

We recommend you **print the question portion of this document (pages 4–7)** so your student can work out the problems with pencil and paper.

Please be aware that **the Answer Key for this test starts on page 11**. We advise you to share the Answer Key with your student only after they've completed the test in its entirety.

Video solutions for all the question items on this test are available by clicking the solution link in the Answer Key.

Questions? Concerns? Please reach out to us at [support@thinkwell.com](mailto:support@thinkwell.com).

# Thinkwell Homeschool Algebra 2 Placement Test

1. Simplify the expression.  
 $(-3)^4$

6. Simplify.  
 $(x^2y^5)^3$

2. Simplify the expression.  
 $-5^2 - 36 \div 4 \cdot 3$

7. Simplify.  
 $(-2)^{-5}$

3. Evaluate the expression for the given value of the variable.  
 $3z^2 - 6z$  for  $z = 5$

8. Simplify.  
 $\frac{x^5y^3}{xy^3}$

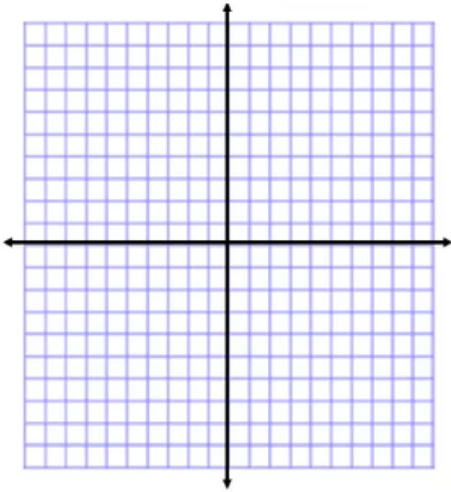
4. Find the root.  
 $-\sqrt{100}$

9. Simplify.  
 $\left(\frac{3p^5}{4k^3}\right)^2$

5. Simplify the expression.  
 $3(x - 2) + 10x$

# Thinkwell Homeschool Algebra 2 Placement Test

10. Generate ordered pairs for the function using the given values for  $x$ . Graph the ordered pairs.  
 $y = 5x + 1$ ;  $x = -2, -1, 0, 1, 2$



11. Write an equation for a function that gives the values in the table. Use the equation to find the value of  $y$  for the indicated value of  $x$ .

$x$	2	3	4	5	6	7	11
$y$	12	17	22	27	32	37	

12. Evaluate  $f(x) = 5 + 2x$  for  $x = 0$  and  $x = -3$ .

13. Solve the equation.  
 $2v - 9 = 3 + 5v$

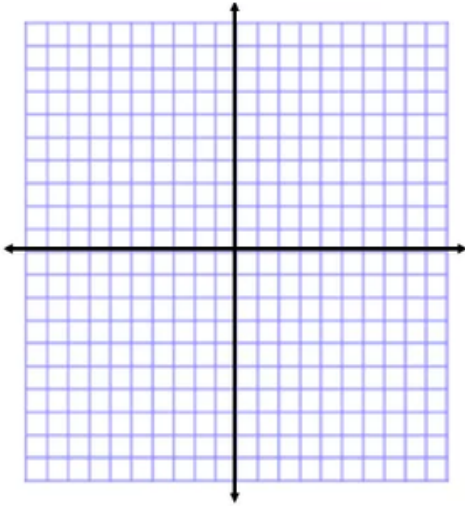
14. Solve the inequality.  
 $5x - 4 \geq 2x + 11$

15. Find the slope of the line that contains  $(5, -3)$  and  $(-1, 2)$ .

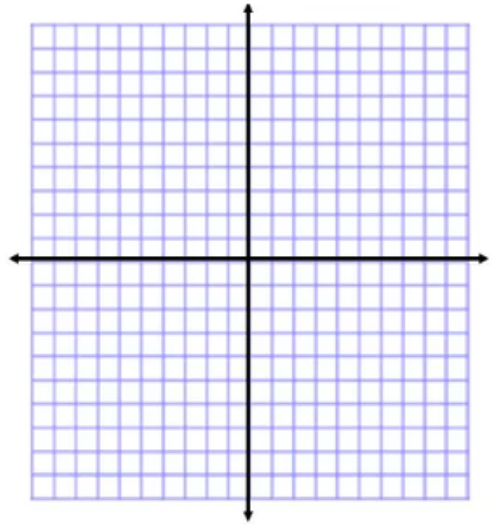
16. Write an equation in slope-intercept form for the line with slope  $-2$  that contains  $(-3, -1)$ .

# Thinkwell Homeschool Algebra 2 Placement Test

17. Graph the solutions of the linear inequality.  
 $y > x - 2$



21. Graph the system of linear inequalities.  
 $y < x + 3$   
 $y \geq x - 1$

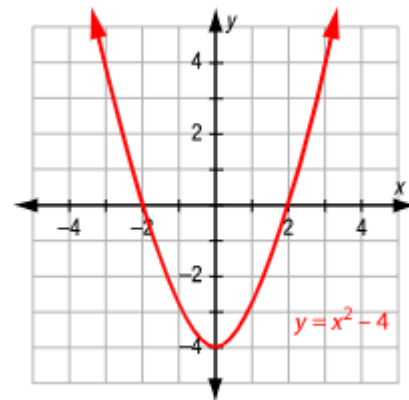


18. Solve the equation.  
 $|x - 4| = 2$

19. Solve the inequality.  
 $\frac{|2x - 5|}{3} \leq 1$

20. Solve the system by elimination.  
 $2x + 5y = 4$   
 $2x - y = -8$

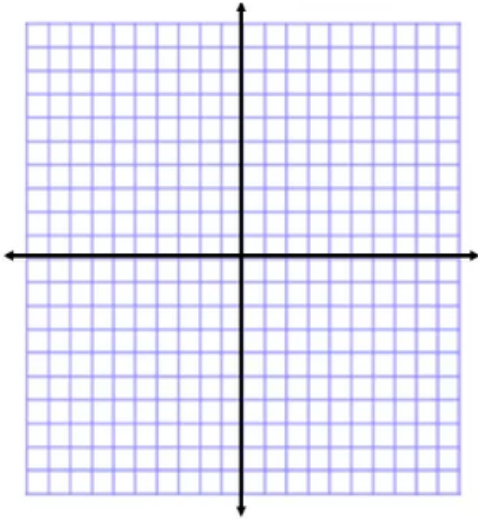
22. Find the zero(s) of the quadratic function from its graph.



# Thinkwell Homeschool Algebra 2 Placement Test

23. Graph.

$$y = x^2 - 6x + 5$$



24. Solve the quadratic equation by factoring.

$$x^2 + 8x + 12 = 0$$

25. Solve using the Quadratic Formula.

$$4x^2 + 3x - 10 = 0$$

## Scoring Guide

Use the scoring rubric below to help determine if Algebra 2 is the appropriate course for your student.

Your placement test score and corresponding course recommendation should not be the only determining factor when deciding the appropriate course for your student. Your student's grade-level experience in previously completed math courses should also be considered.

Please feel free to contact a Thinkwell representative at [support@thinkwell.com](mailto:support@thinkwell.com) if you'd like to discuss your student's course placement in greater detail.

<u>Number of questions correct</u>	<u>Course recommendation</u>
7 or less	Algebra 1 or Geometry
8 – 20	Algebra 2
20 or more	Honors Algebra 2


See the Answer Key for explanations of all placement test questions. Click the blue video link to view instructional video explanations for all question items.

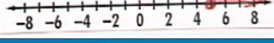
14. Solve the inequality.  
 $5x - 4 \geq 2x + 11$

Answer:  $x \geq 5$

[View Video Explanation: Solving Inequalities with Variables on Both Sides](#)

$5x - 4 \geq 2x + 11$



$$\begin{array}{r} 5x - 4 \geq 2x + 11 \\ -2x \quad -2x \\ \hline 3x - 4 \geq 11 \\ +4 \quad +4 \\ \hline 3x \geq 15 \\ \div 3 \quad \div 3 \\ \hline x \geq 5 \end{array}$$


English
Professor Edward Burger

than or equal to 5, so I go to 5 and color that in. It can be 5 or larger, so I go off to the right. There it is. Not a big deal at all. All you have to

**Key Objectives**

- Solve inequalities that contain variables on both sides.

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Algebra 1

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Solving Inequalities with Variables on Both Sides

Solve the inequality and graph the solutions.

$5x - 4 \geq 2x + 11$

$$\begin{array}{r} 5x - 4 \geq 2x + 11 \\ -2x \quad -2x \\ \hline 3x - 4 \geq 11 \end{array}$$

Subtract 2x from both sides.

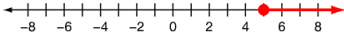
$$\begin{array}{r} 3x - 4 \geq 11 \\ +4 \quad +4 \\ \hline 3x \geq 15 \end{array}$$

Since 4 is subtracted from 3x, add 4 to both sides to undo the subtraction.

$$\begin{array}{r} 3x \geq 15 \\ \div 3 \quad \div 3 \\ \hline x \geq 5 \end{array}$$

Since x is multiplied by 3, divide both sides by 3 to undo the multiplication.

$x \geq 5$



Use an **inverse operation** to "undo" the operation in an inequality.

Wondering about the difference between our standard Algebra 2 and Honors Algebra 2? Read on to learn more.



## Standard vs Honors Algebra 2

Honors Algebra 2 is a faster-paced, more rigorous course than our standard Algebra 2 course. Both courses will prepare your student for success in Precalculus; however, if you anticipate your student going on to higher level mathematics, like Calculus, the Honors sequence will benefit your student.

In brief:

- The content in Honors Algebra 2 covers a greater scope and includes more advanced concepts than the standard Algebra 2.
- Each of the 102 daily lessons in Honors Algebra 2 includes an average of 11 minutes of video content, while each of the 67 daily lessons in the standard Algebra 2 includes an average of 7 minutes of video content.
- The assessments in Honors Algebra 2 provide students with questions that are a higher level of difficulty than those in the standard Algebra 2.

answer  
key



# Answer Key

1. Simplify the expression.  
 $(-3)^4$

Answer: 81

View Video Explanation: [Powers and Exponents](#)

2. Simplify the expression.  
 $-5^2 - 36 \div 4 \cdot 3$

Answer: -52

View Video Explanation: [Order of Operations](#)

3. Evaluate the expression for the given value of the variable.  
 $3z^2 - 6z$  for  $z = 5$

Answer: 45

View Video Explanation: [Variables and Algebraic Expressions](#)

4. Find the root.  
 $-\sqrt{100}$

Answer: -10

View Video Explanation: [Square Roots and Real Numbers](#)

5. Simplify the expression.  
 $3(x - 2) + 10x$

Answer:  $13x - 6$

View Video Explanation: [Simplifying Expressions](#)

6. Simplify.  
 $(x^2y^5)^3$

Answer:  $x^6y^{15}$

View Video Explanation: [Product and Power Properties of Exponents](#)

7. Simplify.  
 $(-2)^{-5}$

Answer:  $-1/32$

View Video Explanation: [Integer Exponents](#)

8. Simplify.  
 $\frac{x^5y^3}{xy^3}$

Answer:  $x^4$

View Video Explanation: [Quotient Properties of Exponents](#)

9. Simplify.  
 $\left(\frac{3p^5}{4k^3}\right)^2$

Answer:  $\frac{9p^{10}}{16k^6}$

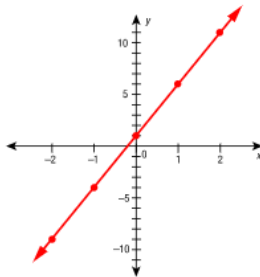
View Video Explanation: [Quotient Properties of Exponents](#)

# Answer Key

10. Generate ordered pairs for the function using the given values for  $x$ . Graph the ordered pairs.  
 $y = 5x + 1$ ;  $x = -2, -1, 0, 1, 2$

Answer:

Input	Ordered Pair
$x$	$(x, y)$
-2	$(-2, -9)$
-1	$(-1, -4)$
0	$(0, 1)$
1	$(1, 6)$
2	$(2, 11)$



View Video Explanation: [Introduction to Functions](#)

11. Write an equation for a function that gives the values in the table. Use the equation to find the value of  $y$  for the indicated value of  $x$ .

$x$	2	3	4	5	6	7	11
$y$	12	17	22	27	32	37	

Answer:  $y = 5x + 2$ ;  $y = 57$

View Video Explanation: [Writing Function Rules](#)

12. Evaluate  $f(x) = 5 + 2x$  for  $x = 0$  and  $x = -3$ .

Answer:  $f(0) = 5$ ;  $f(-3) = -1$

View Video Explanation: [Writing Function Rules](#)

13. Solve the equation.

$$2v - 9 = 3 + 5v$$

Answer:  $-4$

View Video Explanation: [Solving Equations with Variables on Both Sides](#)

14. Solve the inequality.  
 $5x - 4 \geq 2x + 11$

Answer:  $x \geq 5$

View Video Explanation: [Solving Inequalities with Variables on Both Sides](#)

15. Find the slope of the line that contains  $(5, -3)$  and  $(-1, 2)$ .

Answer:  $-5/6$

View Video Explanation: [The Slope Formula](#)

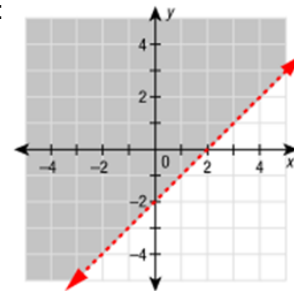
16. Write an equation in slope-intercept form for the line with slope  $-2$  that contains  $(-3, -1)$ .

Answer:  $y = -2x - 7$

View Video Explanation: [Point-Slope Form](#)

17. Graph the solutions of the linear inequality.  
 $y > x - 2$

Answer:



View Video Explanation: [Graphing Linear Inequalities](#)

18. Solve the equation.

$$|x - 4| = 2$$

Answer:  $x = 2$  or  $x = 6$

View Video Explanation: [Solving Absolute-Value Equations](#)

# Answer Key

19. Solve the inequality.

$$\frac{|2x - 5|}{3} \leq 1$$

Answer:  $1 \leq x \leq 4$

View Video Explanation: [Solving Absolute-Value Inequalities](#)

20. Solve the system by elimination.

$$2x + 5y = 4$$

$$2x - y = -8$$

Answer:  $(-3, 2)$

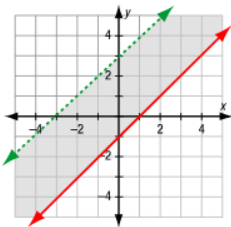
View Video Explanation: [Solving Systems by Elimination](#)

21. Graph the system of linear inequalities.

$$y < x + 3$$

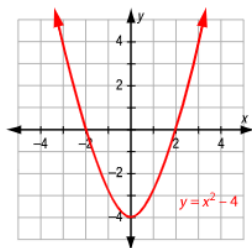
$$y \geq x - 1$$

Answer:



View Video Explanation: [Solving Systems of Linear Inequalities](#)

22. Find the zero(s) of the quadratic function from its graph.



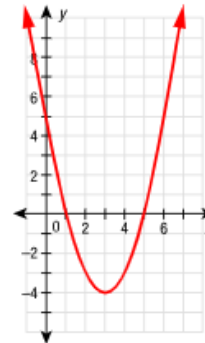
Answer:  $x = -2, x = 2$

View Video Explanation: [Characteristics of Quadratic Functions](#)

23. Graph.

$$y = x^2 - 6x + 5$$

Answer:



View Video Explanation: [Graphing Quadratic Functions](#)

24. Solve the quadratic equation by factoring.

$$x^2 + 8x + 12 = 0$$

Answer:  $x = -6; x = -2$

View Video Explanation: [Solving Quadratic Equations by factoring](#)

25. Solve using the Quadratic Formula.

$$4x^2 + 3x - 10 = 0$$

Answer:  $x = -2$  and  $x = 5/4$

View Video Explanation: [The Quadratic Formula](#)

## About Thinkwell Courses

Thinkwell offers the following core courses in our Homeschool Math series:

- 6th Grade Math
- 7th Grade Math
- 8th Grade Math (Prealgebra)
- Algebra 1
- Geometry
- Algebra 2
- Precalculus
- Trigonometry
- Calculus
- Honors 6th Grade Math
- Honors 7th Grade Math
- Honors 8th Grade Math (Prealgebra)
- Honors Algebra 1
- Honors Geometry
- Honors Algebra 2
- AP Calculus AB
- AP Calculus BC

*What's the difference between the standard Thinkwell courses and the honors courses?* In general, the Thinkwell Honors courses will be faster-paced and more rigorous than our standard courses. Our Honors courses will cover more material than the standard courses and the assessments will be more challenging. Unless you need the Honors recognition for your student's transcript, or unless your student is aiming to pursue a science or math-related course of study, we recommend sticking with the standard course sequence.

## Typical Sequence of Secondary Math Courses

A typical sequence of secondary math courses completed by a college-bound student is listed below. Most college-bound students will take seven or eight years of math between 6<sup>th</sup> and 12<sup>th</sup> grades, beginning with 6<sup>th</sup> Grade Math and ending with Precalculus or Calculus.

### Standard Sequence:

#### Middle school:

<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>
6 <sup>th</sup> Grade Math	7 <sup>th</sup> Grade Math	8 <sup>th</sup> Grade Math (Prealgebra)

#### High School:

<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>
Algebra 1	Geometry	Algebra 2	Precal or Trig

### Accelerated Sequence:

#### Middle school:

Year 1	Year 2	Year 3
7 <sup>th</sup> Grade Math	8 <sup>th</sup> Grade Math (Prealgebra)	Algebra 1

#### High School:

Year 1	Year 2	Year 3	Year 4
Geometry	Algebra 2	Precal or Trig	Calculus

### Where Do You Begin?

If you are wondering about where to start your student with the Thinkwell math course sequence, we recommend that you **begin with the end in mind**.

In other words, where do you want your student to be at the end of their course of study in high school? If your student is college-bound, and you want them to take Calculus before they go to college, then work backwards from the ‘accelerated sequence’ above to see where you need to be right now.

Unless your student is planning to pursue a science or math-related degree, Calculus doesn’t necessarily need to be the terminal course for your high school student.

Questions? Please reach out to us at [support@thinkwell.com](mailto:support@thinkwell.com). We’re here and happy to help.