



# WESTTOWN SCHOOL

Westtown School - Summer Math Skills Practice Enrichment - Summer 2017

All students who will be in 9th, 10th and 11th grade for the 2017-18 school year are expected to spend about 10 hours doing math practice and review throughout the summer. Westtown has subscribed to an online service, IXL, to give each student strong practice problems with immediate feedback. Each student who will be doing summer work has been assigned a username and a password in IXL. ([www.ixl.com](http://www.ixl.com))

New students to Westtown have the following username and password.

- Username: FirstNameLastName403
- Password: MathRocks

Note: The username uses the form of your name that is used for your Westtown School email address (without the dot). For example: susanwaterhouse403

Rising 9th grade students and all returning students who have a Westtown School IXL account already, should use the username and password assigned in the past. We will send this information out as an email near the beginning of the summer. Contact Susan Waterhouse with questions about your password/ login.

80-100% proficiency should be achieved in each skill area. Students are welcome to work for longer and to focus on particular skills as needed. It is very important that students log into their Westtown IXL account each time they work on these assignments.

All students are also encouraged to engage in math enrichment activities. Click [here](#) for a list of ideas.

**Click on the course the math department has placed you in for the fall to get your list of practice skill areas.**

[Algebra 1](#) (Algebra 1 Advanced)

[Geometry](#) (Geometry or Geometry Advanced)

[Algebra 2](#) (including Algebra 2, Algebra 2 Adv or Algebra 2 and Trig)

[Precalculus](#) or [Precalculus Adv](#)

[Calculus 1 or Calculus 1 Adv](#)

[Calculus 2 Adv](#) (Not an IXL assignment.)

We encourage you to take a break from school sessions and begin working in early July about an hour each week to keep your math skills active throughout the summer.

## Algebra 1

Students who are entering **Algebra 1** or **Algebra 1 Adv** should practice the following sections from the **8th grade section** of IXL. Pay particular attention to working with fractions. Please complete as many skills as possible to at least 80% proficiency. We have likely given you more sections than can be completed in 10 hours. Please do what is reasonable. Remember to always login when you do your work on IXL!

### Section D

1. [D.1 Write fractions in lowest terms](#)
2. [D.2 Least common denominator](#)
3. [D.3 Round decimals and mixed numbers](#)
4. [D.4 Convert between decimals and fractions or mixed numbers](#)
5. [D.5 Identify rational and irrational numbers](#)
6. [D.6 Absolute value of rational numbers](#)
7. [D.7 Compare rational numbers](#)
8. [D.8 Put rational numbers in order](#)

### Section E

1. [E.1 Reciprocals and multiplicative inverses](#)
2. [E.2 Add and subtract rational numbers](#)
3. [E.3 Add and subtract rational numbers: word problems](#)
4. [E.4 Apply addition and subtraction rules](#)
5. [E.5 Multiply and divide rational numbers](#)
6. [E.6 Multiply and divide rational numbers: word problems](#)
7. [E.7 Apply multiplication and division rules](#)
8. [E.8 Apply addition, subtraction, multiplication, and division rules](#)
9. [E.9 Evaluate numerical expressions involving rational numbers](#)

### Section F

1. [F.1 Understanding exponents](#)
2. [F.2 Evaluate exponents](#)
3. [F.3 Solve equations with variable exponents](#)
4. [F.4 Exponents with negative bases](#)
5. [F.5 Exponents with decimal and fractional bases](#)
6. [F.6 Understanding negative exponents](#)
7. [F.7 Evaluate negative exponents](#)
8. [F.8 Multiplication with exponents](#)
9. [F.9 Division with exponents](#)
10. [F.10 Multiplication and division with exponents](#)

## Section J

1. [J.1 Convert between percents, fractions, and decimals](#)
2. [J.2 Compare percents to fractions and decimals](#)
3. [J.3 Find what percent one number is of another](#)
4. [J.4 Find what percent one number is of another: word problems](#)
5. [J.5 Estimate percents of numbers](#)
6. [J.6 Percents of numbers and money amounts](#)
7. [J.7 Percents of numbers: word problems](#)
8. [J.8 Compare percents of numbers](#)
9. [J.9 Solve percent equations](#)
10. [J.10 Percent of change](#)
11. [J.11 Percent of change: word problems](#)

## Section N

1. [N.1 Coordinate plane review](#)
2. [N.2 Quadrants and axes](#)
3. [N.3 Follow directions on a coordinate plane](#)

## Section S [S.1 Parts of three-dimensional figures](#)

## Section T

1. [T.1 Perimeter](#)
2. [T.2 Area](#)
3. [T.3 Area and perimeter: word problems](#)

## Section V

1. [V.1 Write variable expressions](#)
2. [V.2 Write variable expressions from diagrams](#)
3. [V.3 Write variable expressions: word problems](#)
4. [V.4 Evaluate one-variable expressions](#)
5. [V.5 Evaluate multi-variable expressions](#)

## Section W

1. [W.1 Which  \$x\$  satisfies an equation?](#)
2. [W.2 Write an equation from words](#)
3. [W.6 Solve one-step equations](#)
4. [W.7 Solve two-step equations](#)
5. [W.8 Solve multi-step equations](#)
6. [W.9 Solve equations involving like terms](#)
7. [W.10 Solve equations with variables on both sides](#)

8. [W.11 Solve equations: mixed review](#)
9. [W.12 Solve equations: complete the solution](#)

#### Section X

1. [X.2 Graph inequalities on number lines](#)
2. [X.3 Write inequalities from number lines](#)
3. [X.4 Solve one-step inequalities](#)
4. [X.5 Graph solutions to one-step inequalities](#)

#### Section Y

1. [Y.1 Find the slope of a graph](#)
2. [Y.2 Find the slope from two points](#)
3. [Y.5 Graph a line using slope](#)
4. [Y.6 Graph a line from an equation in slope-intercept form](#)

Section Z    [Z.2 Does  \$\(x, y\)\$  satisfy the linear function?](#)

Section DD    [DD.1 Calculate mean, median, mode, and range](#)

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## Geometry

Students who are entering **Geometry** should practice the following Algebra 1 skills this summer from the Algebra 1(A1) section of IXL, pay particular attention to working with fractions. Please complete as many skills as possible to at least 80% proficiency. Always sign into IXL when you work on these problems!

A		<b>Numbers</b>
	2	Absolute value and opposites
	5	Convert between repeating decimals and fractions
	6	Square roots
	7	Cube roots
B		<b>Operations</b>
	4	Add and subtract rational numbers
	5	Multiply and divide rational numbers
	7	Evaluate variable expressions involving rational numbers
C		<b>Ratios, rates, and proportions</b>
	1	Identify equivalent ratios
D		<b>Percents</b>
	1	Convert between percents, fractions, and decimals
H		<b>Properties</b>
	1	Properties of addition and multiplication
	2	Distributive property
	3	Simplify variable expressions using properties
	4	Properties of equality
I		<b>Variable expressions and equations</b>
	2	Simplify variable expressions involving like terms and the distributive property
J		<b>Solve equations</b>

	9	Create equations with no solutions or infinitely many solutions
K		<b>Single-variable inequalities</b>
	6	Solve one-step linear inequalities
	8	Solve two-step linear inequalities
	10	Solve advanced linear inequalities
V		<b>Exponents</b>
	2	Exponents with decimal and fractional bases
AA		<b>Factoring</b>
	1	GCF of monomials
	2	Factor out a monomial
	4	Factor quadratics with leading coefficient 1
BB		<b>Quadratic equations</b>
	6	Solve a quadratic equation using the zero product property
EE		<b>Radical expressions</b>
	1	Simplify radical expressions
	2	Simplify radical expressions involving fractions
	3	Multiply radical expressions
	4	Add and subtract radical expressions
GG		<b>Rational functions and expressions</b>
	2	Simplify complex fractions
	3	Simplify rational expressions
	4	Multiply and divide rational expressions
	6	Add and subtract rational expressions
	7	Solve rational equations

Students are welcome to work any other problems in the Algebra 1 (A1) or 8th grade sections as well. [Back to top](#)

## Algebra 2

Students who are entering **Algebra 2** should practice the following Algebra 1 and Geometry skills this summer from the Algebra 1(A1) section of IXL, pay particular attention to working with fractions, lines and solving equations. Please complete as many skills as possible to at least 80% proficiency. Be sure to always sign into IXL when doing your summer math practice.

### From Algebra 1 (A1) List

Section B: Operations	B2-B6
Section G: Coordinate Plane	G1-G3
Section I: Variable Expressions & Equations	I2, I7, I8
Section J: Solve Equations	J3-J6, J11
Section K: Single-Variable Inequalities	K9, K10
Section S: Linear Functions	S1-S24
Section AA: Factoring	AA2,AA4

### From Geometry (G) List

Section A: Algebra Review	A3, A4, A8, A10
Section E: Lines in the Coordinate Plane	E5
Section Q: Right Triangles	Q1, Q4
Section S: Area & Perimeter	S1-S10



Section T: Surface Area & T9  
Volume

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## Precalculus

Students who have completed Algebra 2 and are preparing to take Precalculus in the fall should practice the following skills from the **Algebra 2 (A2)** section of IXL this summer. Particular attention should be paid to the following skills:

B		<b>Equations</b>
	5	Solve multivariable equations
D		<b>Functions</b>
	1	Domain and range
	8	Write the equation of a linear function
E		<b>Systems of equations</b>
	10	Solve a system of equations using any method
	11	Solve a system of equations using any method: Word problems
H		<b>Complex Numbers</b>
	6	Add, subtract, multiply, and divide complex numbers
I		<b>Factoring</b>
	1	Factor out a monomial
	7	Factor Polynomials
J		<b>Quadratic Functions</b>
	4	Solve a quadratic equation using square roots
	11	Match quadratic functions and graphs
K		<b>Polynomials</b>
	1	Polynomial vocabulary
	2	Add and subtract polynomials
	3	Multiply polynomials

L		<b>Radical Functions and expressions</b>
	5	Simplify radical expressions with variables II
	13	Solve radical equations
N		<b>Rational functions and expressions</b>
	4	Simplify rational expressions
	7	Solve rational equations
R		<b>Logarithms</b>
	1	Convert between exponential and logarithmic form: Rational bases
	3	Convert between exponential and logarithmic form: All bases
	4	Evaluate Logarithms
	11	Properties of Logarithms: Mixed Review
	12	Solving Logarithmic equations: Mixed Review
S		<b>Exponential and Logarithmic functions</b>
	1	Domain and range of exponential and logarithmic functions
	2	Evaluate exponential functions
	3	Solve exponential equations using factoring

For extra practice see [list below](#).

Students who have completed Algebra 2 and are preparing to take **Precalculus Advanced** in the fall should practice the following skills from the **Algebra 2 (A2)** section of IXL this summer in addition to those listed for Precalculus above.

K4-K6

N1

P

R7-R10

S4, S5, S7-S9, S12, S13

Students in **Precalculus or Precalculus Adv** who wish to do additional practice, or who are moving up a level, should work on skills from the following sections:

A

B

C

D

E1-E11

F1-F4

H

I2, I4-7

J

L1-L11

M

N2-N6

O

T1, T2, T4, T5, T7, T8, T9

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## Calculus 1 or Calculus 1 Advanced

Students entering Calculus 1 or Calculus 1 Advanced should focus on math enrichment activities listed [here](#). You may also choose to work any of the following sections from the Precalculus (PC) section of IXL

Section A: Functions- all parts

Section E: Rational Functions- all parts

Section F: F9, F12: logarithms

K: Inequalities- all parts

M6, M7, M9- Trigonometry and Unit Circle Practice

N9- Graph Sine and Cosine

All Students entering Calculus 1 or Calculus 1 Advanced are expected to have a basic introduction to limits as part of PreCalculus. You can use these Kahn Academy videos to help learn this material if it is unfamiliar to you:

<https://www.khanacademy.org/math/algebra-home/prec calculus/limit-topic-prec calc>

Then do these sections from the Calculus (C) tab on IXL:

Section E: Introduction to limits:

1. [E.1 Find limits using graphs](#)
2. [E.2 Find one-sided limits using graphs](#)
3. [E.3 Determine if a limit exists](#)

Section F: Calculate Limits : [F.5 Find limits of polynomials and rational functions](#)

Section G: Limits involving infinity

1. [G.1 Find limits at vertical asymptotes using graphs](#)
2. [G.2 Determine end behavior using graphs](#)
3. [G.3 Determine end behavior of polynomial and rational functions](#)

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## Calculus 2 Advanced

If you are moving from Calculus 1 to **Calculus 2 Adv**, there are several topics that you need to study on your own this summer. T. Susan Waterhouse has previewed these topics in class, and some students may need to do additional work beyond the in-class preview in order to be ready for the fall. Expect a short quiz on these topics in the fall.

**Integration by Parts:** Section 6.3 in textbook

Video Series with some practice problems

[https://www.khanacademy.org/math/integral-calculus/integration-techniques/integration\\_by\\_parts/v/deriving-integration-by-parts-formula](https://www.khanacademy.org/math/integral-calculus/integration-techniques/integration_by_parts/v/deriving-integration-by-parts-formula)

A textbook style explanation with worked examples.

<http://tutorial.math.lamar.edu/Classes/Calcl/IntegrationByParts.aspx>

[https://www.math.hmc.edu/calculus/tutorials/int\\_by\\_parts/](https://www.math.hmc.edu/calculus/tutorials/int_by_parts/)

**L'Hospital's Rule:** Section 8.1 in textbook

Video Series with a bit of practice

[https://www.khanacademy.org/math/differential-calculus/derivative\\_applications/lhopital\\_rule](https://www.khanacademy.org/math/differential-calculus/derivative_applications/lhopital_rule)

Textbook style explanation

<http://tutorial.math.lamar.edu/Classes/Calcl/LHospitalsRule.aspx>

**Further Practice- Volumes of revolutions and Volumes by cylindrical shells:** Section 7.3 in textbook.

Video series with a bit of practice:

<https://www.khanacademy.org/math/integral-calculus/solid-revolution-topic>

Textbook style explanation

<http://tutorial.math.lamar.edu/Classes/Calcl/VolumeWithRings.aspx>

In addition to the topics not covered in the regular class, we recommend practicing taking derivatives. This can be done through Kahn Academy or via IXL (Sections L, M and N in Calculus (C) tab.). Contact T. Susan Waterhouse for login information if you don't already have it.

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## General Math Enrichment Activities (Fun things...)

Students enrolled in math courses at Westtown School are invited to engage in the following types of activities to continue to grow as problem solvers and mathematicians over the summer...

- Read a math or computer science related book. For example: Flatland by A Square, Math Girls series by Hiroshi Yuki., The Simpsons and Their Mathematical Secrets or The Code Book or another book by Simon Singh etc.
- Go to a science or math museum
- Play board games
- Learn something about computer programming. (Use a free online tutorial to learn the basics of Scratch, Python, C++, Javascript or PHP. These tutorials vary in length from 4 to 15 hours.)
- Help younger kids learn about fun math and science topics.
- Help with a building or home improvement project.
- Create math animations with Geogebra
- Learn origami
- Track 5 stocks from different industries daily, including prices, volumes, and market news; graph data daily in Excel, and learn about correlations.
- Learn about mapping GIS data and do geocaching
- Solve puzzles (jigsaw, Kenken, logic etc)
- Watch some Vi Hart Math videos- look for her fibonacci or snowflake videos etc....

Come back to school ready to talk about what you learned or experienced with your classmates.

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