SUMMER WORK FOR STUDENTS ENTERING HONORS MATH 3

Dear Honors Math 3 student,

Welcome to your summer work assignment for Honors Math 3.

Your summer work will be completed through Khan Academy practice assignments and articles. You and I will be able to track your progress throughout the summer. Follow the steps below to join the "Honors Math 3 Summer work 2019" course.

If you already have an active Khan Academy account...
If you already have a Khan Academy account, you may join the class using the following steps:
1) Sign into your Khan Academy account at khanacademy.org
2) On your homepage you should see a link to "Coaches" (near the top of the page). Click on this link.
3) On the page that opens you should see a place to enter the "Class Code" (just below "Join a class").
4) Type in the code **KP7NTMMD** and then click "Join the class".

You should now be enrolled in the "Honors Math 3 Summer work 2019" course. In order to get access to all of the assignments, Mr. Fitzpatrick does have to approve you joining the class. This may take 24-48 hours. It may be a good idea to email him at dfitzpatrick@pingree.org to possibly expedite the process.

Your assignments will show up on your Khan Academy homepage or you can click on the "Assignments" link to see them all.

If you DO NOT already have an active Khan Academy account…
1) Go to khanacademy.org.
2) Click on "Learners".
3) Join as a Learner, enter your birth date, and create an account through Google or sign up through your personal email account. Note: If you have a Pingree email account, it is preferred that you use this email account and sign up through Google.
4) After you sign in, you can personalize your account with your grade and "Mathematics III." Note: the course you select does not matter.
5) On your homepage you should see a link to "Coaches" (near the top of the page). Click on this link.
6) On the page that opens you should see a place to enter the "Class Code" (just below "Join a class").
7) Type in the code **KP7NTMMD** and then click "Join the class".

You should now be enrolled in the "Honors Math 3 Summer work 2019" course. In order to get access to all of the assignments, Mr. Fitzpatrick does have to approve you joining the class. This may take 24-48 hours. It may be a good idea to email him at dfitzpatrick@pingree.org to possibly expedite the process.

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A few important details on the summer work:
- All of the content in the summer work is (or should be) review for you at this stage in your math career. If most or all of the content is unfamiliar, you should reach out to Eric Olson the Math Department Chair to

notify him.You should be able to complete almost the entire list of assignments, as all the skills below are required for Honors Mathematics 3.

- **No calculator** (unless specified) should be used on any of the assignments.
- These skills can and will be sprinkled across future tests and/or pop quizzes.
- You do not need to do the assignments in any particular order but it may make the most sense if you do them in the order they are given. **All assignments are due September 6, 2019.**
- If necessary, you may reference other sources (i.e. textbooks, notebooks, KhanAcademy), but all the work <u>must</u> be done on your own, without the use of any device (e.g. graphing calculator, Geogebra, Desmos, etc.).
- While it is not essential, make the goal of obtaining at least 70% on each practice assignment. You may try each assignment as many times as you would like.

Here are a few resources that might be helpful for you.

Pingree Quant Center: www.qc.pingree.org
Khan Academy: www.khanacademy.org
Purplemath: www.puplemath.com
Math is fun: www.mathsisfun.com

I encourage you to use available hints, linked resources, and videos on Khan Academy to learn any material you do not already know or that is unfamiliar at first. The entire process should take between three and five hours to complete. It does not have to be done all at one time. Khan Academy will track and save your progress, even while you are working through an individual assignment. Once again, while it is not essential, make the goal of obtaining at least 70% on each practice assignment. **<u>You may try each assignment as many times as you would like.</u>**

In addition:

- Familiarize yourself with the distance, midpoint and slope formulas below. This is useful on the first few assignments on KA too.
- Read and learn the definitions of each quadrilateral in the chart below.
- Read the information and complete the logic puzzle on the last page.

If you have any questions about this summer work assignment, please feel free to contact Mr. Fitzpatrick at dfitzpatrick@pingree.org

Distance, midpoint, slope

Three important formulas that relate to lines are the **distance**, **midpoint** and **slope** formulas. When given two points (x_1, y_1) and (x_2, y_2) the formulas are:

Distance: $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Midpoint: $\left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2} \right)$

Slope: $\dfrac{y_2 - y_1}{x_2 - x_1}$

<u>Note</u>: It doesn't matter which point is (x_1, y_1) and which is (x_2, y_2) as long as you are consistent when using each formula.

Quadrilateral definitions and properties

Below are definitions for key **quadrilaterals** (four-sided polygons). You will want to know the definitions in the table below and properties when you arrive back to Pingree in September.

Good definitions are as short as possible and describe only the features that make the figure what it is. Extra features of a polygon that result from the definition are *properties* of the figure. Be careful to know the distinction. For example, the definition of an equilateral triangle is just that: "a polygon with exactly three sides all of which are equal in measure (congruent)." A *property* of the figure is that all three angles are equal too--but that is NOT part of the definition. (Note: Definitions below are "inclusive." This means that a rhombus, for example, is considered to be a special type of kite (Rhombuses are included in the definition of a kite.). A rhombus is also included as a parallelogram--just as a parallelogram is included as a special type of trapezoid--because it does have *one* pair of sides that are parallel--even if the other sides are parallel also.) Some texts try to write definitions that exclude this sort of overlap, but we do not.

Shape name and definition	Properties
Quadrilateral A polygon with exactly four sides.	All angles add up to 360º! (However, try connecting all four midpoints of any quadrilateral, and see what figure is created...)
Parallelogram A quadrilateral with two pairs of parallel sides.	Diagonals bisect each other. Opposite sides, and opposite angles, are congruent.
Rhombus A quadrilateral with four congruent sides. (Or, *equilateral* quadrilateral)	Diagonals are perpendicular bisectors of each other. Opposite angles are congruent. Opposite sides are parallel.
Rectangle A quadrilateral with all angles congruent. (Four 90 degree (right) angles.)	Diagonals are congruent and bisect each other. Opposite sides are congruent and parallel.
Square A quadrilateral with congruent sides and angles.	The diagonals are congruent and perpendicular bisectors of each other.
Kite A quadrilateral with two pairs of consecutive congruent sides.	Diagonals are perpendicular. Non-vertex angles are congruent. The diagonal between the vertex angles bisects the other diagonal.
Trapezoid A quadrilateral with at least one pair of parallel sides.	The "midsegment" (the line formed by connecting the midpoints of the non-parallel sides) is parallel to the bases and the average of their lengths.
Isosceles Trapezoid A trapezoid with at least one pair of congruent sides.	Diagonals are congruent. The midsegment is parallel to the bases, and the average of their lengths.

Logic Puzzles

KenKen is a type of mathematical logic puzzle, similar to Sudoku. The rules are simple and the puzzles can be played at a range of levels of difficulty. Being able to pull together given information to make new conclusions will become very important in Math 3 this fall during our unit on proofs.

1. Go on the website below to learn how to play KenKen. You should be able to fill in squares <u>without guessing</u>. Start with the easiest level (3x3) and progress to at least a 5x5. Then complete the puzzle below. With a bit of practice, it should take less than 10 minutes. Number each box with a small subscript number in the order in which you were able to fill out the puzzle.

Website: http://www.kenkenpuzzle.com/