MATH SUMMER ASSIGNMENT FOR ADVANCED QUANTITATIVE REASONING

Mathematics is foundational and it is crucial that students maintain certain skills and conceptual understandings to be able to succeed in future mathematics courses. It is for this reason that we have developed numerous summer assignments that are designed to help students review, refresh, and improve upon **prerequisite skills** to prepare for future courses.

This year, we are requiring students to complete some form of summer preparation to ensure that they are prepared for the year. The assignments were designed by content teachers to help students be better prepared for math work in the fall. Students will be given time in class to clarify questions, practice concepts and will be assessed during the first week of school.

For College AQR, the summer assignment is due the first week of class and is graded as a classwork assignment.

For Honors AQR, the summer assignment is due after the first week of class and graded as a formative assessment.

What students need to know for …
ADVANCED QUANTITATIVE REASONING

Students expecting to take Advanced Quantitative Reasoning next year at Lowell High should demonstrate the ability to:

General:

- take and keep good notes
- be active learners (ask questions and participate in class)
- work with others – this class involves extensive group work
- work with and without a calculator
- give ORAL reports on a regular basis

Specific Math Skills

1) **Tools of Algebra**
   - define and use basic concepts and properties of real numbers, operations, equalities, and inequalities (fractions, decimals, per cents, ratios and proportions)
   - solve and graph one-variable equations and inequalities with/without absolute value

2) **Linear Relationships and Functions**
   - define and specify relations and functions by verbal descriptions, lists, and tables
   - determine equations for specific functions and relations

3) **Quadratic Equalities and Functions**
   - write quadratic functions in standard form
   - solve expressions with radicals

4) **Exponential Functions**
   - model exponential growth and decay
   - translate exponential functions and evaluate e^x
   - write, evaluate and graph logarithmic functions
   - solve exponential and logarithmic equations

Review Problems:

NOTE: Show all of your work on a separate piece of paper. Express all answers as fractions and in simplest form. All work will be collected and graded.
Good luck! - The Lowell High School Math Department

SKILL 1: Tools of Algebra (College does A-F ; Honors does All)

A) Simplify
13% of 87 = _____ 26 is what % of 247? _____ 103 is 28% of what?_____

12 – 2(18÷3) = _____ 2(12÷4) – 3(5-1) = _____ 8 – 8(121 -6) = _____

B) Write each decimal as an equivalent fraction

.2 =_____ .125 =_____ .0625 =_____ .1=_____

C) Graph each number on the number line:
0 , $-\frac{3}{4}$, $\frac{8}{5}$, $3\frac{1}{2}$, $\sqrt{20}$ _____

D) Compare each pair of numbers: use < and > :
$\sqrt{5}$ ____ $\sqrt{7}$ $-\frac{1}{4}$ _____ $-\frac{1}{3}$ -5.2 _____ $-5\frac{1}{2}$ 0.4_____ $\sqrt{0.4}$

E) Evaluate each expression for the given values:
3a + 4b – 2a + b ; a = $-\frac{1}{6}$, b = $\frac{1}{8}$ _____ 3(2c + d) – d ; c = $\frac{1}{3}$, d = $-\frac{1}{2}$ _____

F) Solve for x:
7x + 4 = 3x + 21 15 – $\frac{x}{2}$ = 23 – 2x 4w – 2(x – 6w) = - 16

G) Solve each formula for the indicated variable:
A = ½ bh , for h V = $\pi r^2 h$, for h V = $s^2 + \frac{1}{2}sh$, for h

SKILL 2: Linear Relationships and Functions (College does A-C ; Honors does All)

A) For each function, find f($-\frac{1}{2}$) , f($\frac{1}{3}$) and f($\frac{1}{2}$):

f(x) = $\frac{1}{2}x - 2$ _____ , _____ , _____ f(a) = 2a + 3 _____ , _____ , _____

B) Find the slope of a line through each pair of points: (1,6), (8,-1) m = _____ (0,0),(2,6) m = _____

C) Find slope and intercepts of line: f(x) = $\frac{2}{3}x + 4$ slope_____ Xint_____ Yint_____

D) Write equation for the line: through (-2,1) and parallel to y = $-\frac{1}{4}$x + 1 _____

SKILL 3: Quadratic Equalities and Functions (College does A-B ; Honors does All)

A) Determine whether each function is linear or quadratic; identify the quadratic, linear and constant terms.

y = $\frac{3}{5}$x + 4 _____ $y = 2x^2 - (\frac{5}{9}x - 5)$_____

B) Graph each function; label the vertex and axis of symmetry (use graph paper):

y = $x^2 + 2x + 1$ y = $-6x^2 - 12x - 1$

C) Solve these equations by:

- graphing: $x^2 + 5x + 3 = 0$ $x^2 + 4x = 6$ (use graph paper)

- quadratic formula: $x^2 - 4x + 3 = 0$ $3x^2 + 4x + 10 = 0$

SKILL 4: Exponential Functions (College does A-C ; Honors does All)

A) Graph each function (use graph paper): $y = \frac{1}{2}^x$; $f(x) = 2^{-x}$

B) Find the amount in a continuously compounded account for:

$2000 at 5.1% annual interest for 3 years _____

C) Find the amount in a simple interest CD for:

$2500 at 4.8% annual rate for 4 years _____

D) Iodine-131 has a half-life of 8.14 days. Write the exponential decay function for a 200 mg sample.

Find the amount of iodine-131 remaining after 72 days. _____

E) Write in logarithmic form: $49^{\frac{1}{2}} = 7$_____ $(\frac{1}{3})^3 = \frac{1}{27}$ _____

F) Evaluate each logarithm: $\log_2 16$ _____ $\log_5(-25)$ _____