SUMMER ASSIGNMENT

HONORS PRECALCULUS

CARDINAL MOONEY HIGH SCHOOL

2023-24 ACADEMIC YEAR

INSTRUCTOR | MR. RYAN KRAUSE

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Dear Incoming Honors Precalculus Students:

Congratulations on choosing to take Honors Precalculus! This is a college-level course that will prepare you to take a course in college calculus – whether that be while you are still at CMHS or later at university.

This summer assignment is meant to ensure you have down the essential skills needed to enter this course. Nothing in this packet is new material – you already have experience with it all. Overall, this review assignment should take you approximately 4-6 hours to complete throughout the summer. I would suggest that you spread the work of the assignment out over the course of the summer. Do not wait until one week before the end of the summer to get started!

You would not be taking this course if you didn't have a passion for mathematics and want to be here. That being said, I expect that all work you submit in this course is done honestly and to the best of your ability. If you have any instinct to use PhotoMath or another source to quickly get yourself through this assignment, or if you feel you should wait until a couple days before school starts to begin this assignment, then Honors Precalculus is not the course for you. You are only going to get out of this course (i.e. grades on assessments) what you put into it (i.e. the quality of your work). Those who rush through homework and don't practice outside of class will not do well on major assessments.

Students in Honors Precalculus are required to own a graphing calculator. My recommendation is that you own a TI-84 Plus CE as that is the model that I will be using for all my in-class demonstrations and is the one that is most commonly used.

Your grade for this course will be determined as follows: 40% test grades, 30% quiz grades, 15% skill builders, and 15% homework. Assignments in the "homework" category will be graded for completion, while assignments in the "skill builder" category will be graded for accuracy.

This summer assignment will be counted in the skill builder category. The assignment will be worth 50 points, some of which will be based off completion, and some of which will be based off your accuracy of some randomly selected problems.

Completeness Score Is the assignment fully completed? Are <u>all</u> answers supported by adequate work?	30 points
Accuracy Score Twenty random problems from this assignment will be checked for accuracy. Each will be worth one point.	20 points

If you find that there are topics you are struggling with on this assignment, I encourage you to either look back at notes from prior courses or consult the vast number of online resources at your disposal. Also, I will host Zoom sessions on the following dates where anyone is welcome to join and ask any questions they may have as they work through this assignment. You can join each Zoom session by scanning the QR codes below.

Zoom Session #1	**Zoom Session #2**
July 11th 7-8 PM	August 1st 7-8 PM

You are also welcome to email me over the summer with questions. Please include a screenshot of your work so that I can see where you're at and best help you.

This assignment will be due on the first day of classes, August 10th. You may either submit the assignment to Canvas (if working in Notability), or you may submit a hard copy of the assignment. If submitting to Canvas, you may do so in-class on Thursday, August 10th. If working out the assignment on paper, please bring your completed version to class on Thursday, August 10th.

Also, there will be a short quiz on Thursday, August 10th, covering the material in this summer assignment. You are expected to come into the course knowing all of the concepts in this summer assignment.

Don't hesitate to reach out to me by email with any questions or concerns.

Have a great summer!

Mr. Krause

FUNCTIONS

1. Transform the given function $f(x)$ as described and write the resulting function as an equation.

(a) $f(x) = x^3$ Compress horizontally by a factor of 2, translate right 2 units

(b) $f(x) = |x|$ Reflect across the x-axis, translate up 2 units

(c) $f(x) = \sqrt{x}$ Stretch vertically by a factor of 3, translate up 1 unit, translate left 3 units

2. If $p(x) = x^3 + 5x^2$, find:

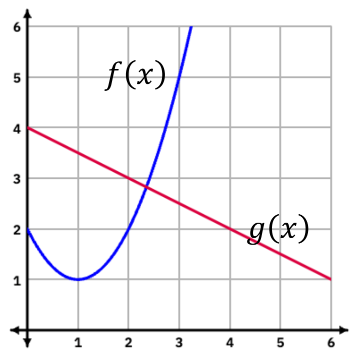
(a) $p(-8)$

(b) $p(x+1)$

3. Given the graphs of f and g in the image to the right, find:

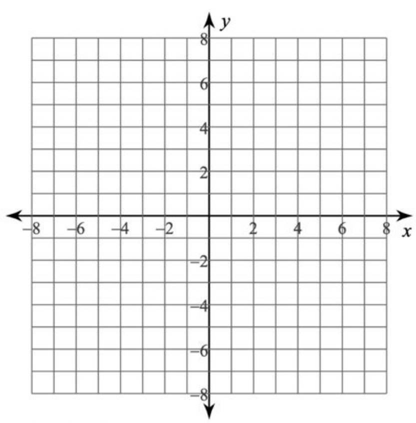
(a) $f(3) + g(2)$

(b) $\frac{g(1)}{f(2)}$



4. Graph the piecewise-defined function $f(x)$ on the coordinate grid to the right.

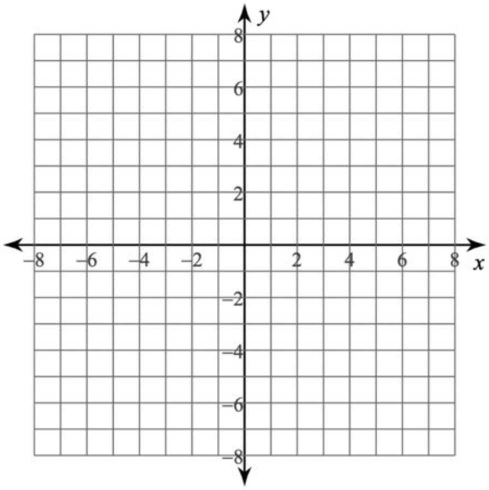
$$f(x) = \begin{cases} x - 1 & x \leq -3 \\ 4 - x^2 & -3 < x < 3 \\ \sqrt{x - 4} & x \geq 3 \end{cases}$$



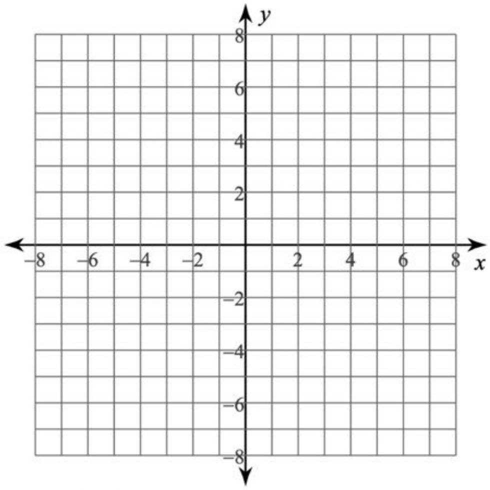
LINEAR FUNCTIONS

1. Graph the linear function or inequality.

(a) $x + 2y = 2$



(b) $y < -\frac{8}{3}x - 3$

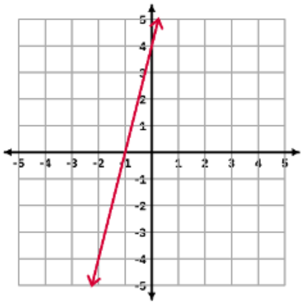


2. Solve the system of linear equations using substitution or elimination.

$$\begin{cases} x = y + 3 \\ -y + 3 = -7x \end{cases}$$

3. Given each set of information below, write the linear equation in slope-intercept form.

(a)



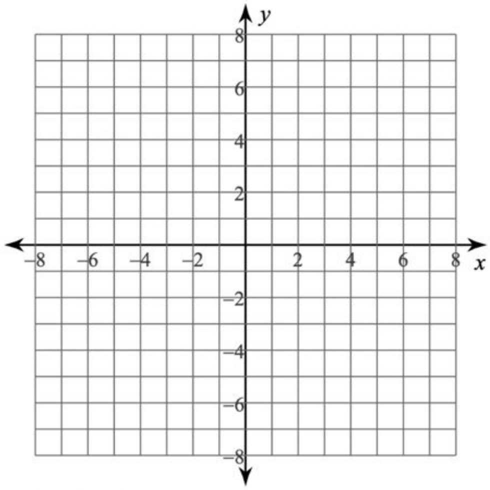
(b) Point-slope form: $y - 1 = \frac{6}{5}(x - 5)$

(c) passes through $(-5, -1)$ and $(0, 2)$

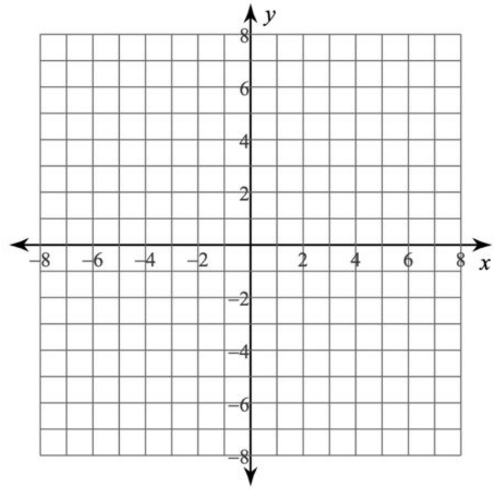
(d) Passes through $(-1, -5)$ and is perpendicular to the line $y = -\frac{1}{7}x - 5$

1. Identify the vertex and axis of symmetry of each quadratic function. Then graph the function. Your graph should include the vertex, axis of symmetry, and four other key points.

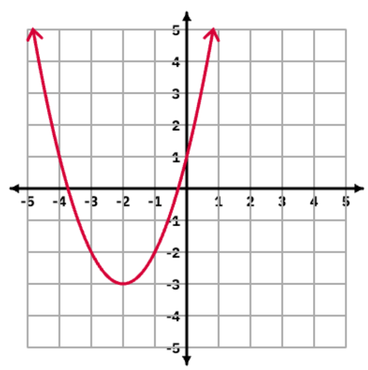
(a) $y = -x^2 + 2x + 3$



(b) $y = 2(x+1)^2 - 2$



2. Write the equation of the quadratic function graphed to the right.



3. Solve each equation below using the requested method. Leave your answers in <u>exact</u> form (do not approximate to a decimal.)

(a) $10n^2 + 4 = 414$
Square Root Method

(b) $x^2 - 140 = 4x$
Quadratic Formula

FACTORING

1. Factor each completely.

(a) $x^2 + 4x - 60$ **(b)** $n^2 - 12n + 32$ **(c)** $28r^2 + 16r$

(d) $8x^2 + 89x + 90$ **(e)** $16a^4 - 49$ **(f)** $15x^3 + 24x^2 - 20x - 32$

(g) $2x^2 - 21x + 40$ **(h)** $b^3 + 8$ **(i)** $4r^2 - 4r + 1$

2. Solve each equation by factoring. Leave your answers in exact form (do not approximate to a decimal).

(a) $4x^2 - 96 = 20x$ **(b)** $x^2 + 3x = 40$

(c) $(4v - 3)(2v + 3) = 0$ **(d)** $41m^2 - 9m - 28 = 6m^2 + 4 + 3m$

FRACTIONS

1. Perform the fraction operation. Leave your answer as an improper fraction.

(a) $\frac{2}{9} + \frac{1}{3} =$

(b) $2\frac{1}{3} + 1\frac{2}{5} =$

(c) $\frac{3}{4} - \frac{5}{8} =$

(d) $\frac{8}{3} - \frac{9}{5} =$

(e) $\frac{1}{5} \cdot \frac{2}{9} =$

(f) $\frac{8}{9} \times \frac{10}{14} =$

(g) $\frac{7}{12} \div \frac{8}{10} =$

(h) $\frac{\frac{10}{11}}{\frac{2}{5}} =$

2. Simplify each expression as a single fraction.

(a) $\frac{8x}{3} + \frac{x-2}{9} =$

(b) $\frac{5x}{7} - \frac{x-3}{3} =$

(c) $\frac{7x-9}{2} + \frac{5x+6}{5} + \frac{x}{6} =$

(d) $\frac{3(x-1)}{7} - \frac{7x-8}{6} =$

EXPONENTS

1. Simplify. Your answer should only contain positive exponents.

(a) $4n^4 \cdot 2n^{-3}$

(b) $2^2 \cdot (2^3)^{-3}$

(c) $\dfrac{2^{-2} \cdot 2^4}{(2^0)^0} =$

(d) $\dfrac{3m^{-4}}{m^3}$

(e) $(2yx^3(x^{-4}y^3)^{-4})^{-2} =$

(f) $\dfrac{2u^{-3}v^2 \cdot u^2v^{-2}}{(2u^2v^2)^4} =$

(g) $(125n^3)^{2/3}$

(h) $\dfrac{x^{1/2}\sqrt{x}}{x^{-2}y^{-7/4}} =$

SOLVING EQUATIONS

1. Solve each equation or inequality using an algebraic method.

(a) $5(2x-1)+3=2x-4(x+1)$

(b) $\sqrt{3x-2}=x-2$

(c) $3|x-2|=6$

(d) $2x^3-9x^2+9x=0$

(e) $\dfrac{4x-5}{x+2}=\dfrac{1-5x}{x+6}$

(f) $-9<4x+1<13$

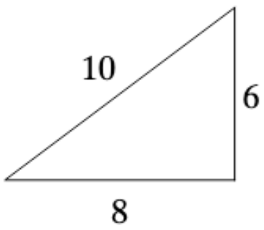
(g) $81p^4-18p^2+1=0$

(h) $\sqrt[3]{y^2-12y}=4$

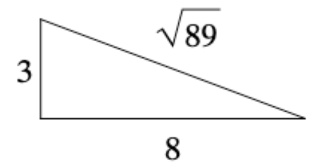
RIGHT TRIANGLE TRIGONOMETRY

1. Use the Pythagorean Theorem to determine if each triangle below is a right triangle.

(a)

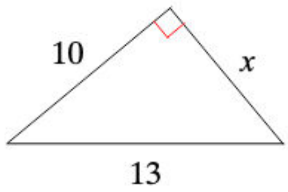


(b)

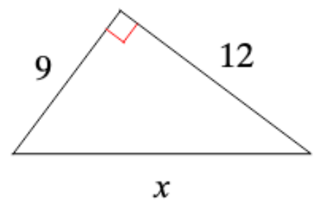


2. Use the Pythagorean Theorem to find the missing side length in each right triangle below.

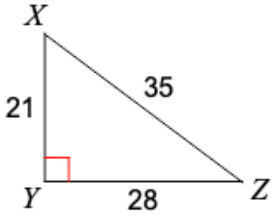
(a)



(b)



3. Use the triangle below to find the value of each trigonometric ratio.



(a) $\sin X =$

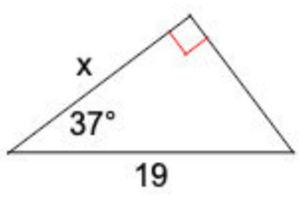
(b) $\tan Z =$

(c) $\cos Z =$

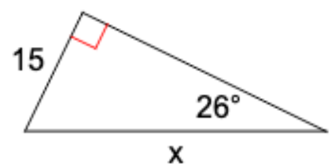
(d) $\tan X =$

4. Find the missing side length in each triangle below. Round to the nearest tenth. You will need to use a calculator – make sure it is in degree mode!

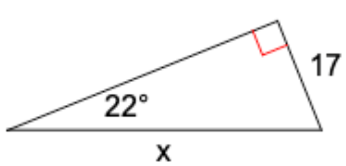
(a)



(b)



(c)



(d)