

# Math Summer Enrichment Packet for Calculus Honors

**Purpose:** The purpose of our summer math enrichment program is to ensure that the skills, knowledge, and content mastered over the course of the year are retained over the summer. This will help students to be better prepared and ready to succeed in their next math course.

**Grading:** Completion of all the assigned pages/problems will be counted as your first test/project grade of the year. You will be graded upon completion of all the work.

## What portions of the math packet do I need to complete?

On the chart below (a copy of this packet is also available on the SJP website), teachers have identified specific portions of the math packet for you to complete. You only need to complete the problems assigned for your course level – i.e. CP or Honors. Any unused portions of the packet will be used as a supplementary resource during the course of the upcoming school year.

## Where do I complete the assignments?

All problems should be completed on lined paper. Neatness is important in math, so take your time and use a pencil. Show all of your work and clearly number all of the problems. Circle your answers.

**Due Dates:** The assignment will be due to your teacher on Tuesday, September 12<sup>th</sup>. (Note the first day of school is Thursday, September 7, 2017.)

## What if I struggle with the work?

Parents/guardians and students, please be aware that the math packet does not come with additional examples and/or instructions. Sections of this packet may be challenging for you at times. We suggest that if you run into difficulty with certain concepts and/or problems that you seek out advice from family and friends, previous math tutors, or utilize resources such as Khan Academy. Also, the back of the packet has answers to every odd numbered problem. You may use the answers to check your work. The key is to give the assignment your best effort and to only use the solutions at the back of the packet as an aid.

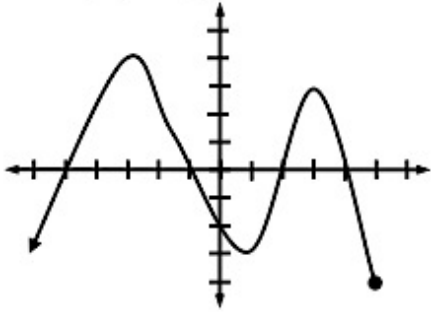
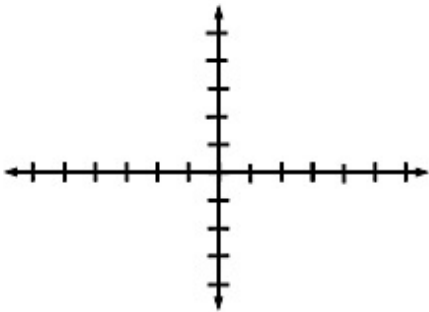
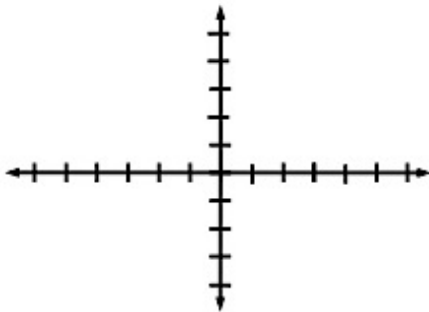
Have a great summer!

We look forward to working with all of you next year.

Best wishes,  
Your Math Department

On this assignment, you may use your calculator, internet resources, and notes/books from previous mathematics courses. You may not work together or get help from another person. Your teacher will be available at school to answer questions before the assignment is due. Also, you can email your teacher over the summer. They will do their best to get back to you quickly. You may write work on additional paper and attach if necessary.

1. Use the graph of  $g(x)$  to answer the following questions.

	a) What is the domain of $g(x)$ ?
	b) What is the range of $g(x)$ ?
	c) Is $g(-4)$ positive or negative?
	d) For what values of $x$ does $g(x) = -3$ ?
e) What are the x-intercepts?	f) What is the y-intercept?
g) On which interval(s) is $g(x)$ increasing?	h) On which interval(s) is $g(x)$ decreasing?
i) For which interval(s) is $g(x) > 0$ ?	j) For which interval(s) is $g(x) < 0$ ?
k) How many times does $y = 2$ intersect $g(x)$ ?	l) What are the local maxima?
m) Graph $-g(x) - 3$ .	n) Graph $g(2x)$ .
	

Perform the indicated operations and simplify the expression completely.

2) $(2x^2 - 6x + 11) - (-3x^2 + 7x - 2)$	3) $-6(2y^2 + 4y - 3) + 4(-y^2 + 6y - 3)$
4) $(3t - 2y)(3t + 5y)$	5) $\left(\frac{2}{5}y + \frac{1}{4}x\right)\left(\frac{3}{2}y + \frac{1}{2}x\right)$
6) $(2m + 1)(4m^2 - 2m + 1)$	7) $(2a - 4b)^2$

Factor each polynomial completely. Remember to check for the GCF, special products, and factoring by grouping.

8) $7a^3 + 14a^2$	9) $60m^4 - 120m^3n + 50m^2n^2$
10) $x^2 + 9x + 20$	11) $a^2 - 6ab + 5b^2$
12) $3x^2 + 10x + 7$	13) $9x^2 - 64$

Simplify each rational expression (try factoring the numerator and denominator).

14) $\frac{4x^3 - 8x^2}{4x^2}$	15) $\frac{m^2 - 4m + 4}{m^2 + m - 6}$
16) $\frac{2k - 16}{6} \div \frac{4k - 32}{3}$	17) $\frac{8}{3a - 1} + \frac{2}{a - 1}$

Solve each equation.

18) $2[3m - 2(3 - m) - 4] = 6m - 4$	19) $\frac{2}{3}k - k + \frac{3}{8} = \frac{1}{2}$
20) $m^2 = 14m - 49$	21) $\frac{2m}{m - 2} - \frac{6}{m} = \frac{12}{m^2 - 2m}$

Simplify each expression.

22) $\sqrt[3]{8r^6s^3t^9}$	23) $-3\sqrt{5} + \sqrt{20}$
24) $\sqrt{6} \cdot \sqrt{2}$	25) $(-7 + \sqrt{3x})(4 + \sqrt{3x})$

Find the asymptotes and holes in the graph of each function, if any.

<p>26) <math>f(x) = \frac{x^2-4}{x+4}</math></p> <p>Asymptotes: _____</p> <p>Holes: _____</p>	<p>27) <math>g(x) = \sqrt{2x-4}</math></p> <p>Asymptotes: _____</p> <p>Holes: _____</p>
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Use  $f(x) = \frac{5x}{x^2-9}$  and  $g(x) = \frac{7}{x-3}$  to find the following.

28) $f(-3)$	29) $f(2x)$
30) $g(f(x))$	31) $f(x) + g(x)$