

# Welcome to Honors Calculus

You are receiving this packet because you are currently enrolled in Honors Calculus for the 2019-2020 school year. The purpose of this summer assignment is to review some prerequisite math topics.

In order to be successful in this course, it is imperative that you have a strong foundation in Algebra and PreCalculus. Please understand that the topics covered in this packet will **not** be explicitly taught in Honors Calculus.

You are expected to have **ALL** of the problems included in this packet **finished and ready to hand in on the first day of class as a homework assignment.** **\*\*To get full credit you must show your work on all problems\*\*** Feel free to attach a separate sheet of paper if there isn't enough room in the packet to show your work. Questions about this packet will be answered throughout the first couple days of school.

## Topics:

- Exponent Rules
- Finding Equation of Lines in Point-Slope Form
- Factoring/Solving Equations
- Solving for the intersection points of two lines/a line and a curve, etc.

If you are struggling with any of the questions in this packet feel free to use online resources, like Khan Academy. You can also send me an email, and I will get back to you as soon as possible.

*Please refrain from working with your peers on this packet.* The goal is for me to better understand the starting knowledge of the class, so that I can better tailor the curriculum.

**\*\*Please Note:** The problems labeled **\*\*** are considered challenge problems. Do your best and the problems **must** be attempted, but do not be nervous if you do not get the correct answer.

I look forward to having a fantastic Honors Calculus class next year!

Enjoy your summer!

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Name: \_\_\_\_\_

Amount of Time Spent On this Packet (Be honest!) \_\_\_\_\_

## Exponents:

Rules of Exponents
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<b>Product of Powers Property</b> $a^m * a^n = a^{m+n}$	<b>Power of a Power Property</b> $(a^m)^n = a^{mn}$	<b>Fractional Exponents</b> $a^{\frac{m}{n}} = \sqrt[n]{a^m} = (\sqrt[n]{a})^m$
<b>Negative Exponent Property</b> $a^{-m} = \frac{1}{a^m}$ $a \neq 0$	<b>Quotient of Powers Property</b> $\frac{a^m}{a^n} = a^{m-n}$	

Simplify each of the following as completely as possible. Final answers should not include negative exponents (You do not need to rationalize)

a.  $a^3 a^3 * a^{-4} a^{-2} * (2a^2)^{-3}$       b.  $\frac{a^2 a + a^2 a}{a^2}$

c.  $\frac{2a^0 * \sqrt[4]{a^3}}{3a^{-2} a^4}$       d.  $\frac{3}{a^5} * \frac{1}{a^3}$

e.  $\frac{(2a^3 a^2)^3}{a^3 a^4 a^2 * a^{-4} a^3}$       f.  $\frac{\sqrt[3]{a}}{a}$

g.

$$\frac{3(x + 4)^2 - 6(x + 4)}{6x + 24}$$

h.

$$\frac{x^2 * \sqrt[3]{x^2}}{x^5 * \sqrt{x} * \sqrt[5]{x}}$$

**Linear Functions: Writing Equation of Lines:** In Calculus, we almost always use point-slope form to write the equation of a line.

<b>Slope Intercept Form:</b> $y = mx + b$	<b>Vertical Line:</b> $x = a$ , slope is undefined
<b>Point-Slope Form:</b> $y - y_1 = m(x - x_1)$	<b>Horizontal Line:</b> $y = b$ , slope is zero

- Write the equation of a line passing through the point  $(-6, 5)$  with a slope of  $\frac{2}{3}$  in point slope form.
- Write the equation of a line passing through the points  $(-7, 6)$  and  $(1, 2)$  in point slope form
- Write the equation of a line passing through the point  $(2, -8)$  and parallel to the line  $y = \frac{5}{6}x - 1$  in point slope form.
- Write the equation of a line passing through the point  $(2, -8)$  and perpendicular to the line  $y = \frac{5}{6}x - 1$  in point slope form

**Factoring:** Factor each of the following as completely as possible

a.  $\square^2 - \square^2$

b.  $\square^3 + \square^3$

c.  $4\square^2 - 21\square - 18$

d.  $2\square^3 + \square^2 - 3\square$

e.\*\*  $(\square + 1)^3(4\square - 9) - (16\square + 9)(\square + 1)^2$

f.\*  
\*  $2\square - 8\square^{\frac{1}{3}}$

**Solving Equations:** Find the value(s) of x. Round to three decimal places if necessary. If no solution exists, write no solution.

a.  $\square^2 + 11\square + 18 = 0$

b.  $\square^2 + 2\square + 1 = 15$

c.  $(\square + 2)^2 = 36$

d.  $3\square^4 - 11\square^2 + 10 = 0$

d.  $3\square^2 = -7\square$

e.  $2\square^2 + 6\square + 14 = 0$

e.  $8\square^2 + 4\square - 16 = -\square^2$

f.  $3 - 4(\square + 3)^2 = -33$

g.\*  
\*

$$(\square^2 + 2\square)^2 - 16 = 6(\square^2 + 2\square)$$

h.\*\*

$$\frac{2}{\square^2} + 12 = \frac{11}{\square}$$

**Miscellaneous:**

What is the expanded form of  $(\square - 1)^2$  ?

**Intersection Points:** Determine the point(s) of intersection for the given systems.

a.

$$\begin{aligned}\square + \square &= 8 \\ 4\square - \square &= 7\end{aligned}$$

b.

$$\begin{aligned}\square^2 + \square &= 4 \\ \square + \square &= 4\end{aligned}$$

c. \*\*

$$\square = \frac{\square^2}{16}$$
$$\square = \sqrt{2\square}$$

d.

$$\square^4 - 9\square^2 = \square$$
$$\square + 36 = 4\square^2$$