Honors Calculus "Summer" Packet – REQUIRED

Name: _____ Teacher: Mrs. Lumsden

This packet is for the students who are going into Honors Calculus. This packet is REQUIRED and is DUE THE FIRST DAY OF CLASS. The packet will be graded for correctness (work must be shown as well). No late work will be accepted, so make sure you have it with you!

We will briefly review algebraic skills the first day, but it is your responsibility to use this packet to brush up on algebraic skills. If you do not have the appropriate Algebra skills, you will struggle through problems in this course, even if you do understand the concepts covered in Calculus. To avoid this frustration, make sure you complete the packet with an understanding of these algebraic concepts.

You have all summer and all fall semester to complete this packet. There should be no excuse as to why it is not complete and in hand the first day of class. You have access to the internet all summer and all fall as well as me during the fall semester. Take the time to review and possibly relearn topics.

Disclaimers:

- Every student, no matter when they join the class, will be required to do this packet.
- The prerequisite for Honors Calculus is an 83 in Trigonometry (or Pre-Calculus, Algebra 3/Trig, or anything else comparable).
- Show work! Attach any additional papers used to do work to this packet. Do not copy answers off of anywhere. That won't help you at all in the long run.

If you have any questions, come see me during the fall semester, and I will point you in the right direction, or you can check out these websites:

- Khan Academy Videos: www.khanacademy.org
- The Math Page – written out explanations: www.themathpage.com
- Math Help Videos: www.mathhelp.com
- Mr. Math Blog Videos: www.mrmathblog.com
- Math is Power 4 U Videos: www.mathispower4u.com
- Patrick's Just Math Tutorials: www.patrickjmt.com

Exponents - all answers must have positive exponents as well as, when necessary, be in fraction form (no decimals) – CIRCLE YOUR ANSWER

a) $x^3 \cdot x^8$

b) $2^4 \cdot 2^2$

c) $(x^2y)(x^3y^4)$

d) $\frac{x^5}{x^2}$

e) $\frac{3^5}{3^3}$

f) $\frac{x^2y^5}{xy^3}$

g) y^0

h) 6^0

i) $(7a^3b^{-1})^0$

j) $(x^3)^2$

k) $(3^2)^4$

l) $(z^5)^2$

m) $(2a)^3$

n) $\left(\frac{x^2}{y}\right)^4$

o) $(6x^3)^2$

p) $\left(\frac{2x}{3y^2}\right)^3$

q) x^{-3}

r) 4^{-2}

s) $-4x^5y^{-2}$

t) $\left(\frac{x^2}{y}\right)^{-3}$

u) $(3x^{-2}y)(-2xy^{-3})$

v) $\frac{a^{-2}b^3}{c^{-4}d^{-1}}$

w) $(-2x^2y^{-4})^2$

x) $(-3)^2$

y) -3^2

z) Were x and y the same answer? Explain.

Fractions – DOT NOT USE A CALCULATOR. Remember: to add and subtract, you need a common denominator, but to multiply and divide, you do not. Simplify if possible – leave in fraction form – CIRCLE YOUR ANSWER

a) $\frac{1}{2}+1$

b) $\frac{3}{2}+1$

c) $\frac{5}{2}+1$

d) $-\frac{1}{2}+1$

e) $-\frac{3}{2}+1$

f) $\frac{1}{2}-1$

g) $-\frac{3}{2}+\frac{5}{6}$

h) $\frac{8}{2}-\frac{5}{3}$

i) $\frac{7}{3}-\frac{4}{5}$

j) $\frac{2}{3}\cdot\frac{1}{2}$

k) $\frac{8}{3}\cdot\frac{5}{2}$

l) $\frac{3}{5}\cdot\frac{5}{6}$

m) $\frac{4}{5}\cdot\frac{7}{3}$

n) $\frac{4}{5}\div\frac{1}{2}$

o) $3\div\frac{1}{2}$

p) $5\div\frac{2}{3}$

q) $\frac{7}{8}\div\frac{5}{8}$

r) $-\frac{6}{7}\div\frac{2}{3}$

Evaluating – evaluate the following – CIRCLE YOUR ANSWER

a) $x^2 - 3x, x = 2$

b) $\frac{a^3+b}{2a}, a = -2, b = 1$

c) $-c^2 + 9, c = 9$

d) $\frac{-b\pm\sqrt{b^2-4ac}}{2a}, a = 3, b = -4, c = 1$

e) $y - (z + z^2), y = 10, z = 2$

f) $\frac{x^2-3c^3}{3xc}, c = 2, x = -3$

FOIL – to multiply 2 binomials, you must FOIL (F_____, O_____, I_____, L_____) – CIRCLE YOUR ANSWER

(x – 2)(x + 3)

(4x + 1)(x – 4)

(5y – 1)(y + 3)

(-x + 2)(2x – 6)

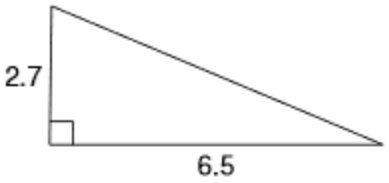
(-2x – 1)(-3x+2)

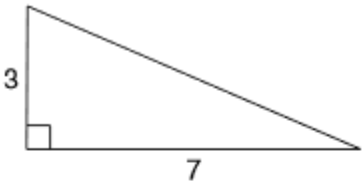
(x + 2)(x – 2)

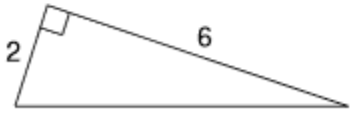
Expand the Binomials (hint: $2^3 = 2 \cdot 2 \cdot 2$) – CIRCLE YOUR ANSWER

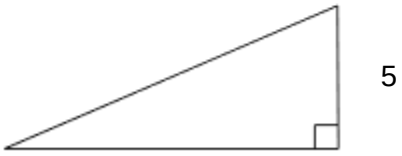
$(x + 3)^3$ $(2x - 1)^3$

Pythagorean Theorem – the lengths of the sides of a right triangle are related by the formula $a^2 + b^2 = c^2$, where a and b are lengths of the legs and c is the length of the hypotenuse – CIRCLE YOUR ANSWER – round to 3 decimals if necessary









Finding Slope – find the slope of the line connecting the two given points. Use the formula $m = \frac{y_2 - y_1}{x_2 - x_1}$ – be sure to simplify your answer (as always, leave as a fraction) – CIRCLE YOUR ANSWER

(2, 1), (5, 8)

(8, -4), (0, 2)

(3, 1), (8, 1)

(7, -2), (-1, 0)

(0, 0), (2, 9)

(8, 2), (8, 5)

(-1, 1), (9, 3)

(3, -1), (-4, -2)

Writing equations of lines – in point-slope form: $y - y_1 = m(x - x_1)$
Once you have your equation in point-slope form, transform your equation into slope-intercept form ($y = mx + b$ … basically, aim to get *y* by itself) – CIRCLE YOUR ANSWER

A line containing (-3, 2) with the slope of 2

a line containing (-5, 2) with the slope of -1

A line containing (4, 1) and (8, 2)

a line containing (3, 1) and the origin

A horizontal line containing (-1, 2)

a vertical line containing (3, -1)

Solving by Factoring – rewriting the equation as a product of its factors (backwards FOIL), then solve for *x* – CIRCLE YOUR ANSWER

$x^2 + 3x = 0$

$2x^2 + 4x = 0$

$x^2 + 2x + 1 = 0$

$x^2 + 6x + 8 = 0$

$x^2 - 11x + 28 = 0$

$x^2 + 4x - 32 = 0$

$2x^2 - 19x + 24 = 0$

$3x^2 + 31x + 36 = 0$

$5x^2 + 28x + 32 = 0$

$5x^2 + 23x + 26 = 0$

Radicals – convert each radical form to exponential form $\left(\sqrt[i]{x^p} = x^{\frac{p}{i}}\right)$ and each exponential form to radical form $\left(x^{\frac{p}{i}} = \sqrt[i]{x^p}\right)$ (**Remember: "power over index") – CIRCLE YOUR ANSWERS

$\sqrt{7}$ $\sqrt[3]{m^2}$ $\sqrt[4]{r^5}$ $\sqrt[3]{n^4}$

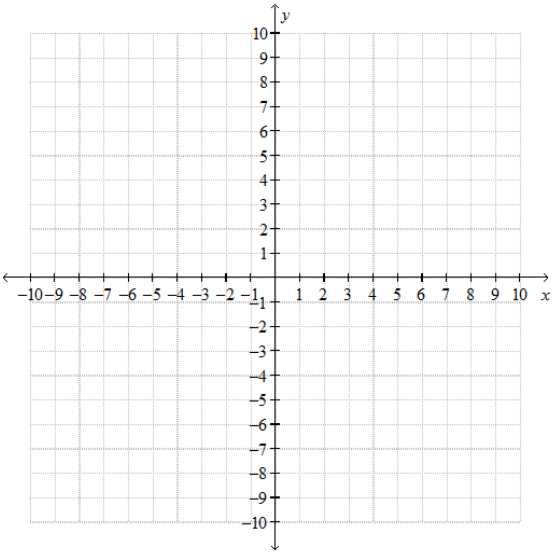
$\sqrt{c^3}$ $\sqrt{x-5}$ $\sqrt[3]{n-6}$ $\sqrt[5]{y^2}$

$x^{\frac{1}{2}}$ $f^{\frac{2}{3}}$ $m^{\frac{4}{3}}$ $h^{\frac{3}{5}}$

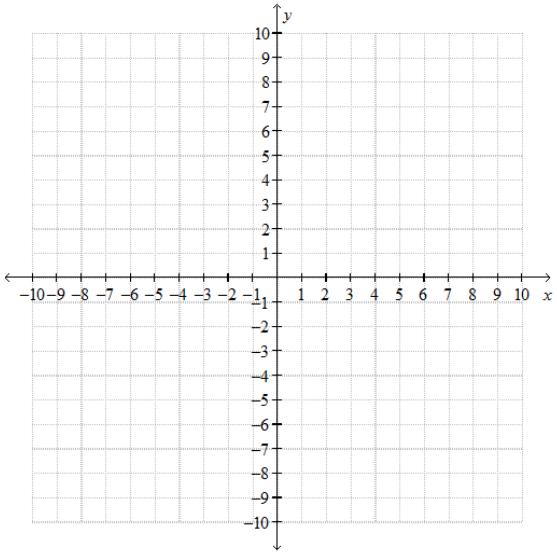
$x^{\frac{1}{3}}$ $(n-4)^{\frac{5}{8}}$ $(p+4)^{\frac{5}{3}}$ $(x+2)^{\frac{1}{2}}$

Graphing – graph the following equations on the given coordinate planes (use a ruler!)

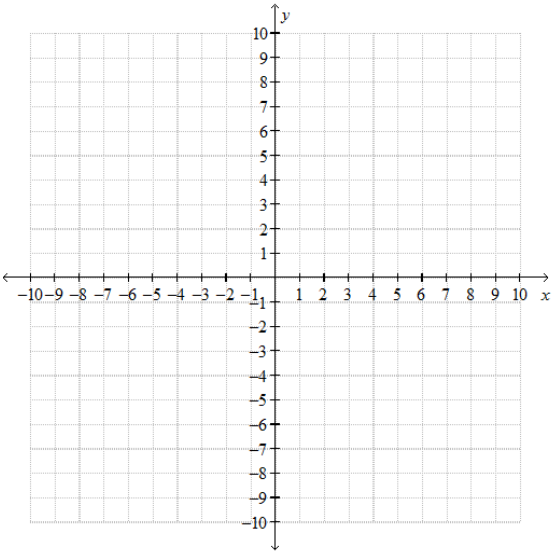
$y = 3x + 2$



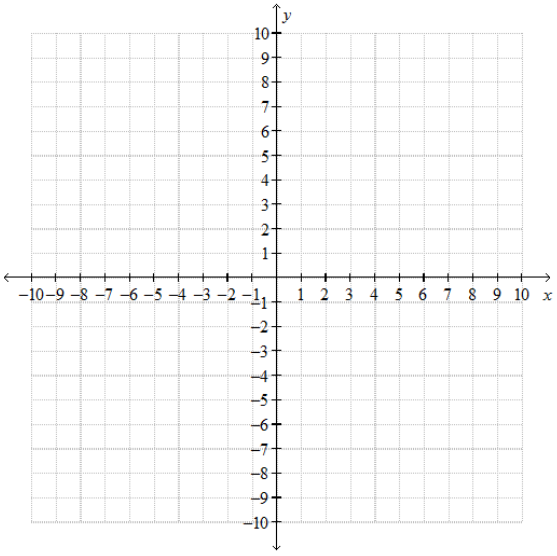
$y = -\frac{1}{2}x - 3$



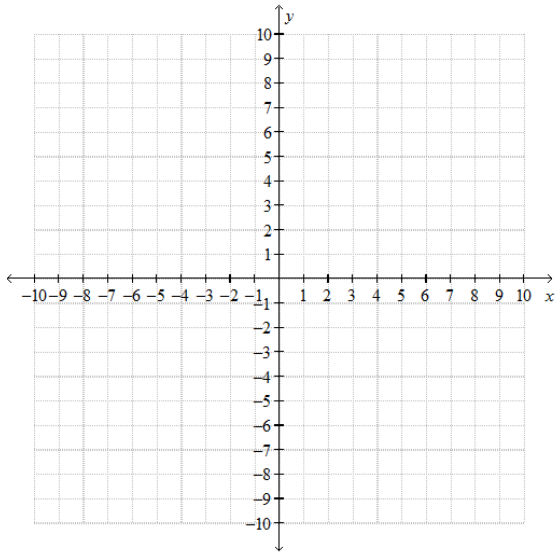
$y = \frac{2}{3}x - 1$



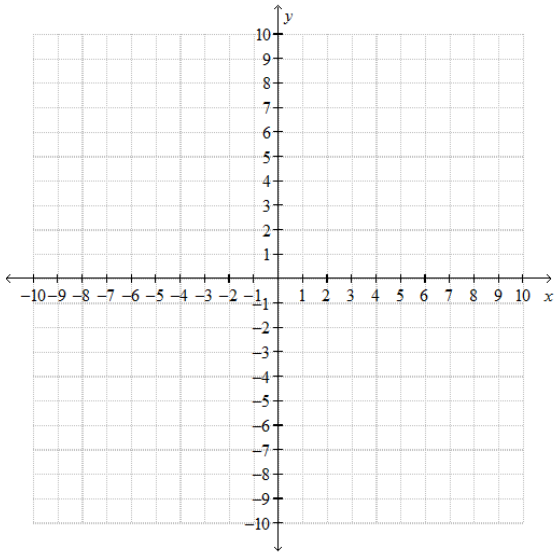
$y = x$



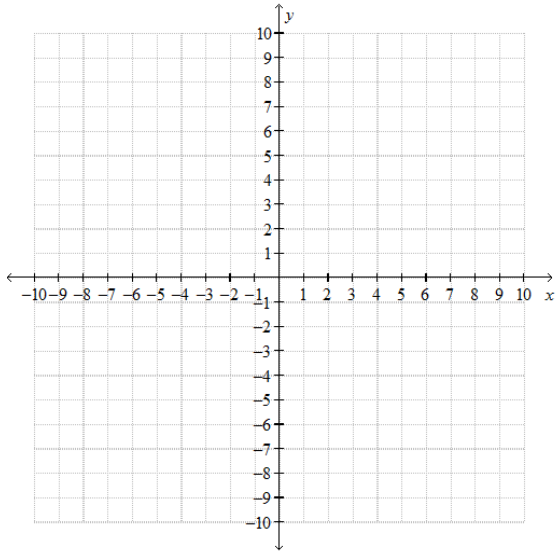
$x = 2$



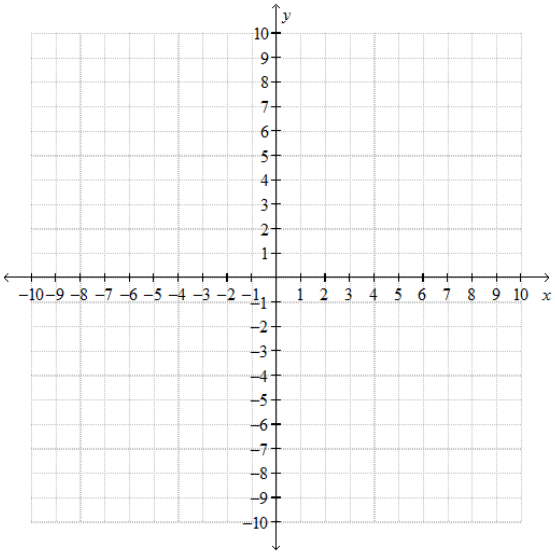
$y = -5$



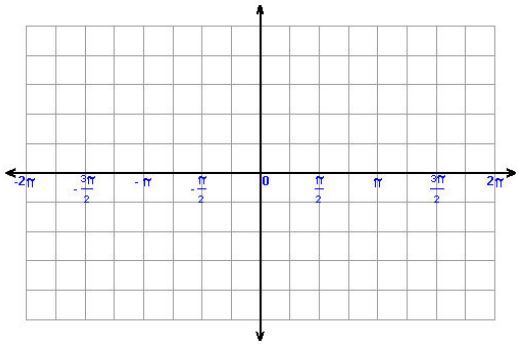
$4x - 2y = 8$



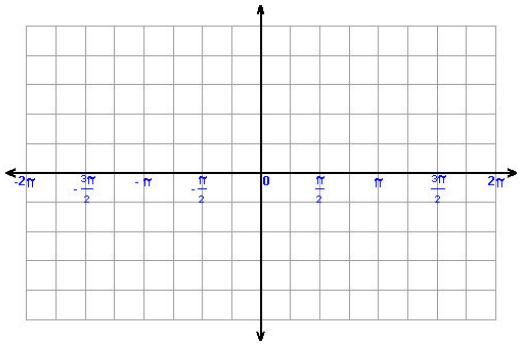
$3x + 5y = 15$



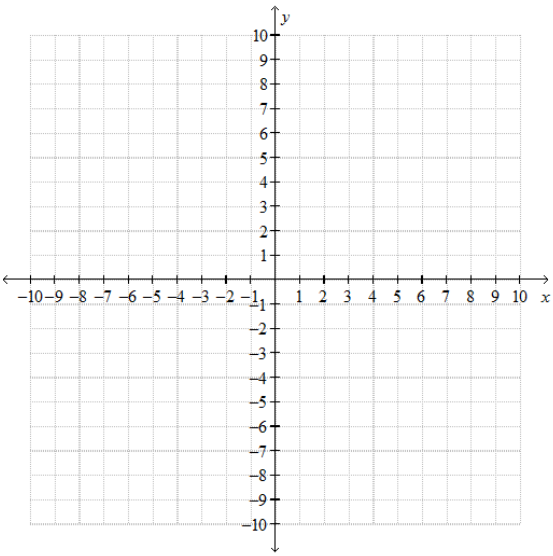
$y = \sin x$



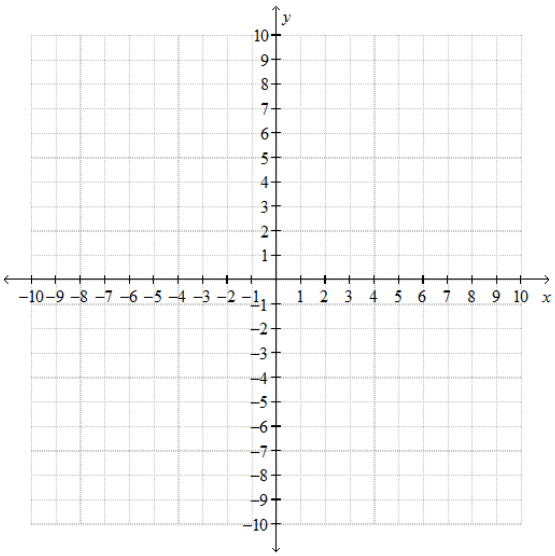
$y = \cos x$



Sketch*: $y = \log x$



Sketch*: $y = e^x$



*****You may look up the graph of the last two graphs that say "sketch". I'm more concerned that you know what the shape of these two graphs look like as opposed to how to graph them exactly. Be sure to copy down their shape (as best as you can) onto the graph.

Simplifying Algebraic Expressions – simplify as far as possible (hint: you may need to factor before you simplify) – CIRCLE YOUR ANSWER

a) $\frac{30hxy}{54kxy}$

b) $\frac{12h^3k}{16h^2k^2}$

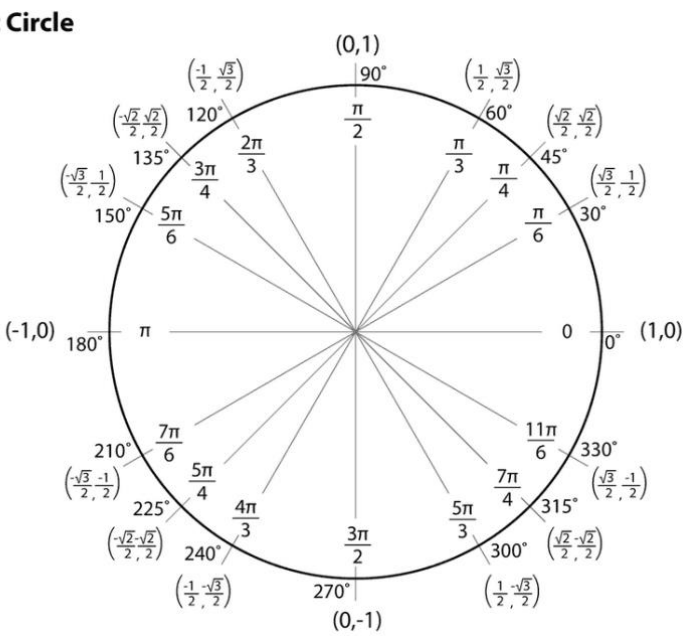
c) $\frac{4x+6}{2x+3}$

d) $\frac{2y}{y^2+6y}$

e) $\frac{x^2+3x-18}{x^2-36}$

f) $\frac{x^2+13x+40}{x^2-2x-35}$

Unit Circle – remember that cosine refers to the *x*-value and sine refers to the *y*-value



$\sin(\pi/2) =$ $\cos(\pi/2) =$

$\sin(\pi/4) =$ $\cos(3\pi/4) =$

$\sin(0) =$ $\cos(\pi) =$

Basic Trig Functions

$\frac{\sin x}{\cos x} =$ $\frac{1}{\sin x} =$

$\frac{1}{\sec x} =$ $\frac{1}{\cos x} =$

$\frac{1}{\tan x} =$ $\frac{1}{\cot x} =$

$\frac{1}{\csc x} =$ $\sin^2 x + \cos^2 x =$

Now that you have finished, be sure to read back over every set of directions, making sure that you answered every problem fully and correctly. Remember: this is being graded, so double checking your work is for your benefit. Make sure that your memory is refreshed on these topics when you come in to class on Day 1 of Semester 2.

See you in Honors Calculus!