

Calculus Honors
Summer 2018 Packet

Dear Prospective Calculus Honors Students,

This packet has been put together to help you prepare and be successful in Calculus Honors. This course is an overview of Calculus topics such as limits and continuity, derivatives, applications of derivatives, integrals and applications of integrals. This course will challenge your mind and encourage you to continue to grow as a problem solver.

There are skills and concepts from previous courses that are essential for success in this course. This packet contains problems that demonstrate these. It is important for you to make sure you fully understand these concepts and can demonstrate your understanding. Utilize online resources such as Kahn Academy or math tutorials on YouTube for extra guidance.

This summer assignment is due on the first day of class. You must show all work to receive full credit. Please make sure you have mastered the material in this packet!

I look forward to getting to know you and to working with you this fall! If you have any questions, feel free to email me.

Sincerely,

Mrs. Kendra Pitkin

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Algebra Review

Factor Completely

1) $x^4 - 16$

2) $4m^2 - 12mn + 9n^2$

3) $3n^3 + 375$

4) $3p^2 + 10p - 8$

Simplify

5) $\frac{n^3 - 8}{3n^2 - 12}$

6) $\frac{15m^3 - 24m^2 + 9m}{25m^3 - 9m}$

Perform the indicated operation

7) $\frac{x^2 - 16}{9 - x} \cdot \frac{x^2 + x - 90}{x^2 + 14x + 40}$

8) $\frac{6x^2 + x - 1}{5x^2} \div \frac{4x^2 - 1}{15x^2 - 5x}$

9) $\frac{y}{y^2 + 2y - 3} - \frac{1}{y^2 + 4y + 3}$

$$10) \quad \frac{2}{a+2} + \frac{a-1}{a^2+2a}$$

$$11) \quad \frac{x}{x^2-7x+6} - \frac{x}{x^2-2x-24}$$

Non-Calc

Simplify to a single integer:

$$1) \quad 9^{\frac{3}{2}}$$

$$2) \quad 8^{\frac{4}{3}}$$

$$3) \quad (\sqrt{2})^6$$

Simplify to a quotient of two integers

$$4) \quad \left(\frac{9}{16}\right)^{\frac{1}{2}}$$

$$5) \quad \left(\frac{125}{8}\right)^{\frac{2}{3}}$$

Evaluate

$$6) \quad (-3)^{-2}$$

$$7) \quad \frac{4 \cdot 3^{-2}}{2^{-2} \cdot 3^{-1}}$$

$$8) \quad \left(-\frac{3}{4}\right)^{-3}$$

Simplify (leaving only positive exponents)

$$9) \quad (-3ac^2)^2$$

$$10) \quad 3(-ac^2)^3$$

$$11) \quad \frac{6m^3n^{-2}}{8m^{-3}n^2}$$

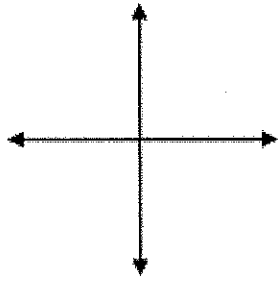
$$12) \quad \left(\frac{1}{2}m^2n^{-2}\right)^3$$

$$13) \quad \frac{4a^3c^5}{(2a^2c)^4}$$

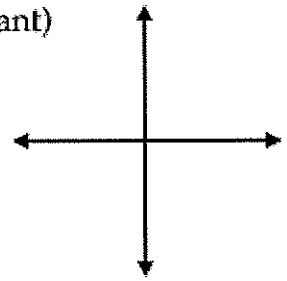
Graphing Review:

Sketch the graphs of the following:

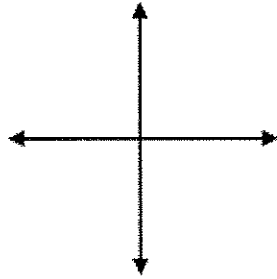
14. G1: $y = x$



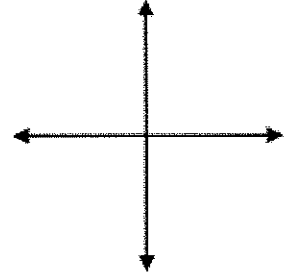
G2: $y = c$ (c is a constant)



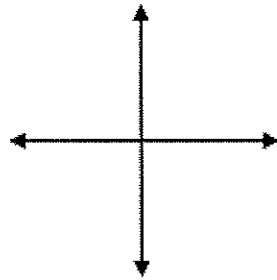
G3: $y = x^2$



G4: $y = x^3$



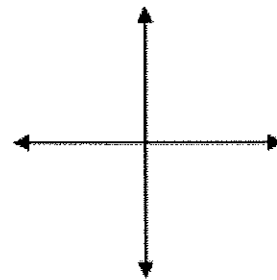
G5: $y = |x|$



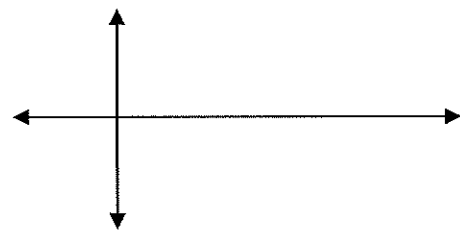
G6: $y = \sin x$



G7: $y = \sqrt{x}$

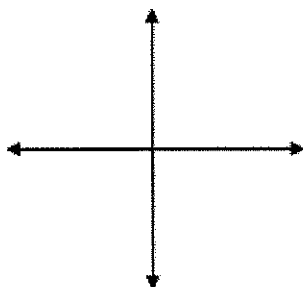


G8: $y = \cos x$

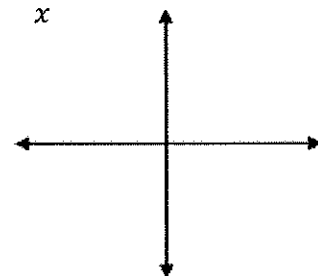


For G9 and G10: Draw asymptotes as a dotted line and label at least two points on the graph.

G9: $y = e^x$



G10: $y = \frac{1}{x}$



15. Find equation of the lines passing through (2,4) and having the following characteristics.

a) Slope of $-\frac{2}{3}$

b) passes through the point (6, 1)

c) Perpendicular to the line $x + y = 1$

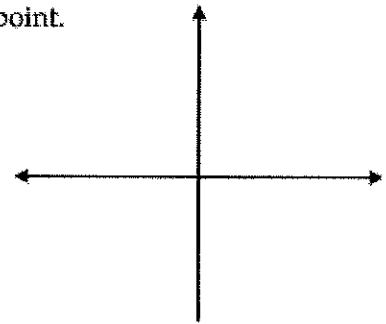
d) Parallel to the x-axis

16. Given $y = 2 + \log_3(x-1)$,

a. find the domain.

c. Sketch the graph showing the asymptote and at least one point.

b. find the x intercept(s).



17. Solve for x.

a. $\log_3 9 = x$

b. $\log_x 8 = \frac{3}{2}$

c. $\log_2 x = 3$

d. $\ln e^x = 4$

e. $\log_3 x + \log_3(x-2) = 1$

18. Without a calculator, evaluate the following:

1. $\sin 60^\circ$

2. $\tan 90^\circ$

3. $\sin \pi$

4. $\tan\left(\frac{\pi}{3}\right)$

5. $\cos\left(\frac{7\pi}{6}\right)$

6. $\cos(-45^\circ)$

7. $\tan 135^\circ$

8. $\cos 300^\circ$

9. $\sin\left(\frac{4\pi}{3}\right)$