Honors Calculus
Summer Assignment 2020

Welcome to Honors Calculus! I hope this course proves to be a challenging, yet also rewarding endeavor for you in the upcoming year. Calculus is unlike any other topic you have studied and it will rely heavily on all of the topics from your previous courses.

There are two main topics that will be addressed in the Calculus course. They involve slope and area. Much of the work we will be doing in this class revolves around basic algebra skills, precalculus, and solving all types of equations. This summer assignment will focus on those skills necessary to be successful in Honors Calculus.

This packet is to be turned in on the first full day of school for a grade. You will then have an assessment on the material from the packet during the following week. All answers are to be written on the spaces provided in the packet. Work can be done on the packet, but if you would like to use extra paper, please include that when you turn the assignment in.

If you have any questions over the summer regarding the questions, or the material, please feel free to email Mrs. May kmay@gmahs.org.

Enjoy your summer!

The Mathematics Department

Name: _____

Honor Code:

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Find the following values. Give exact answers only, no decimals.

1. $\sin 30^\circ =$ _____ 2. $\tan 45^\circ =$ _____ 3. $\sec 135^\circ =$ _____

4. $\csc(-120^\circ) =$ _____ 5. $\cos 240^\circ =$ _____ 6. $\cot 300^\circ =$ _____

7. $\csc \frac{5\pi}{6} =$ _____ 8. $\sin\left(-\frac{5\pi}{4}\right) =$ _____ 9. $\cot \frac{11\pi}{6} =$ _____

10. $\tan \frac{\pi}{3} =$ _____ 11. $\cos 5\pi =$ _____ 12. $\sec \frac{7\pi}{4} =$ _____

Simplify the following expressions:

13. $\frac{4}{\sqrt{3}} =$ _____ 14. $\frac{6}{\sqrt{2}} =$ _____ 15. $\frac{8}{5\sqrt{2}} =$ _____

16. $\frac{7}{6+\sqrt{3}} =$ _____ 17. $\frac{8}{\sqrt{10}-4} =$ _____ 18. $\frac{2}{\sqrt{3}+\sqrt{2}} =$ _____

19. $\frac{3}{2\imath} =$ _____ 20. $\frac{4}{5+\imath} =$ _____ 21. $\frac{-7}{4-3\imath} =$ _____

Simplify the following statements.

22. $\log_2(8x) - 3 =$ _____

23. $\log_4(64y^4) =$ _____

24. $2\ln x + 3\ln y =$ _____

25. $\frac{1}{2}\log_3 x - \log_3 y =$ _____

Find all of the zeroes of the following polynomials. Round answers to 3 decimal places.(You may use Desmos or some other graphing feature)

26. $f(x) = x^4 - 4x^3 + 6x^2 - 4x + 1$

27. $f(x) = 8x^4 + 66x^3 - 285x^2 - 461x + 132$

26. _____

27. _____

28. $f(x) = x^5 + 7x^4 - 29x^3 - 107x^2 - 13x - 540$

29. $f(x) = x^4 - 26x^2 + 160$

28. _____

29. _____

Solve the following equations. Round answers to 3 decimal places when necessary.

30. $2^x = 8^3$

30. _____

31. $e^x - 5 = 5$

31. _____

32. $6e^{5x-6} - 4 = 50$

32. _____

33. $x - 5 = \sqrt{x+1}$

33. _____

34. $-3 + \sqrt{x+59} = x$

34. _____

35. $4 + \sqrt{-3x+10} = x$

35. _____

36. $\frac{1}{6x^2} + \frac{1}{6x} = \frac{1}{x^2}$

36. _____

37. $\frac{25}{x} = 10 - x$

37. _____

38. $\frac{x-3}{2} = \frac{1}{x-4}$

38. _____

39. $\log(4x-5) = \log(2x-1)$ 40. $\ln(x-3) - \ln(x-5) = \ln 5$ 41. $\log_9(x+6) - \log_9 x = \log_9 2$

39. _____ 40. _____ 41. _____

Solve the following trig equations on the interval $0 < x < 2\pi$. Give exact radian answers.

42. $\cos^3 x = \cos x$ 43. $\cos^2 x = 1 - \sin x$ 44. $\cos\frac{x}{2} = \frac{\sqrt{2}}{2}$

42. _____ 43. _____ 44. _____

Use your calculator to find the coordinates of the local maximum and minimum values for the following functions. If more than one local max or min exists, give all of them. Round answers to 3 decimal places.

45. $f(x) = x^3 - 3x^2 - 2x + 3$ 46. $f(x) = -3x^3 - 4x^2 + 3x - 2$

Max: _____ Max: _____

Min: _____ Min: _____

48. $f(x) = 2x^4 - 2x^3 - 2x^2 + x + 1$

Max: _____

Min: _____

49. $f(x) = -3x^4 - 5x^3 + 2x + 4$

Max: _____

Min: _____

Solve the following word problems.

50. You want to enclose a rectangular garden using 125ft of fencing. Find a function that describes the area of the garden, then use the function to find the dimensions of the garden and the maximum are the fence encloses.

A(x) = _____

Dimensions _____

Maximum Area _____

51. Suppose you start driving away from Gwynedd Valley in a car at 12:00 noon. At any time x hours after your trip starts, your distance away from Gwynedd Valley (in miles) is given by the function $f(x) = -x^5 + 12x^4 - 54x^3 + 95x^2$. You drive for 5 hours.

a) Draw a graph of this function. Use window $0 \leq x \leq 6$ and $-50 \leq y \leq 200$.

b) Create a table, including all integer values of x from 0 to 6.

x	0	1	2	3	4	5	6
f(x)							

c) Find f(2). Give units for the answer and interpret in terms of the problem.

_____

d) Find f(4.5). Give units for the answer and interpret in terms of the problem.

_____

e) Find the average rate of change of f(x) from 1 to 2.5. Give units for the answer and interpret in terms of the problem.

_____

f) Find the average rate of change of f(x) from 1.5 to 2.5. Give units for the answer and interpret in terms of the problem.

_____

g) Find the average rate of change of f(x) from 1.9 to 2.1. Give units for the answer and interpret in terms of the problem.

_____

h) Find an estimate for the instantaneous rate of change of f(x) at x = 2. Give units for the answer and interpret in terms of the problem.

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