

# Honors Calculus Summer Assignment 2016

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## **Part I. Online Quiz/Review, DUE June 30, 2016**

This is a quick review of some material from Pre-Calculus and other math courses. Use the link below to see the questions and submit your solutions. It is a Google doc form. It might be a good idea to print the page first, try the problems, then go back to submit your final solutions.

<http://goo.gl/forms/TSDQ2pLPlx>

## **Part 2. Honors Calculus Packet, DUE the first day of class**

Honors Calculus packet - This part of your assignment will be completing a 31 question review packet. This is the most time consuming part of your assignment. You should not wait until the end of the summer to start it.

You should expect a quiz/test on this material within the first week of school. If you have ANY questions while you are doing these assignments, please email Mrs. Zayaitz Ruhf at [zayaitzruhfm@eastonsd.org](mailto:zayaitzruhfm@eastonsd.org) or Mrs. Charnley at [charnleyc@eastonsd.org](mailto:charnleyc@eastonsd.org) or Good luck and we look forward to working with each of you next year!



Name \_\_\_\_\_

## Honors Calculus Summer Assignment

### Part 2. Honors Calculus Packet

Honors Calculus packet - This part of your assignment will be completing a 31 question review packet. This is the most time consuming part of your assignment. You should not wait until the end of the summer to start it. Complete the following. Show and attach all work in a clear manner. Do NOT do any work on this sheet – all work must be separate. Clearly indicate your final answer on the answer sheet provided. Have this assignment completed and ready to turn in on the first day of school.

#### Required Skills for Functions:

1. If  $f(x) = x^2 - 2$ , describe in words what the following would do the graph of  $f(x)$ .

- $f(x) - 4$
- $f(x - 4)$
- $-f(x + 1)$
- $3f(x) + 1$
- $f(2x)$
- $|f(x)|$

2. Graph the equation  $y = x^3 - x$  and answer the following questions:

- Is the point (3, 2) on the graph?
- Is the point (2, 6) on the graph?
- Is the function even, odd, or neither?
- What is the  $y$ -intercept?
- Find the  $x$ -intercepts.

3. Are the following statements true? If not, explain in words why not.

- $\frac{2k}{2x+h} = \frac{k}{x+h}$
- $\frac{1}{p+q} = \frac{1}{p} + \frac{1}{q}$
- $\frac{x+y}{2} = \frac{x}{2} + \frac{y}{2}$
- $3\frac{a}{b} = \frac{3a}{3b}$
- $3\frac{a}{b} = \frac{3a}{b}$
- $3\frac{a+b}{c} = \frac{3a+b}{c}$

4. Simplify the following:

- $\frac{\frac{x}{3}}{\frac{x}{8}}$
- $a \div \frac{(a+b)}{a}$
- $\frac{\sqrt{x-3} + \frac{4}{\sqrt{x-3}}}{x-3}$

5. Write as a single fraction with the denominator in factored form:  $\frac{7x^2 + 5x}{x^2 + 1} - \frac{5x}{x^2 - 6} = 0$

6. Show work to determine if the relation is even, odd, or neither:

- $f(x) = 3x^2 - 6$
- $f(x) = -2x^3 - 7x$
- $f(x) = 3x^2 - 3x + 3$

7. Find the domain for each of the following functions:

- $f(x) = \frac{1}{4x^3 - 4x^2 - 24x}$
- $g(x) = \sqrt{x^2 - 2x - 48}$
- $y = \ln(4x - 6)$

### Required Skills for Unit 1: Limits

8. Find the value of each function for  $f(x) = 5x + 3$
- $f(x) =$
  - $f(0) =$
  - $f(7) =$
  - $f(4 + 3) =$
  - $f(4 + h) =$
  - $f(x + h) =$
9. Find the value of each function for  $f(x) = x^2 + x$
- $f(x) =$
  - $f(0) =$
  - $f(7) =$
  - $f(4 + 3) =$
  - $f(4 + h) =$
  - $f(x + h) =$
10. Given  $f(x) = |6 - x| - 3$  find  $f(4) - f(8)$
11. Given  $f(x) = x^2 - x - 6$  find  $f(x+1) - f(3)$
12. Simplify completely:  $\frac{5(x+h)+3-(5x+3)}{h}$
13. Simplify completely:  $\frac{(x+h)^2+(x+h)-(x^2+x)}{h}$
14. Simplify completely:  $\frac{\frac{2}{x+h} - \frac{2}{x}}{h}$

### Required Skills for Unit 2: Derivatives 1 & Unit 6: Integrals

15. What is the equation of the line that passes through  $(-2, 4)$  and  $(3, -5)$ ? What are the coordinates of the point at which this line intersects the  $y$ -axis?
16. Find the equation of the straight line that passes through the point  $(3, 7)$  and is parallel to the line  $3x + 2y - 8 = 0$ .
17. Find the equation of the straight line that is perpendicular to the line  $3x + 2y - 8 = 0$  at the point  $(3, -\frac{1}{2})$ .
18. The line with the slope 4 that passes through the point  $(-3, 7)$  intersects the  $x$ -axis at a point. What are the coordinates of this point?
19. Which of the following expressions are identical?  $\cos^2 x$ ;  $(\cos x)^2$ ;  $\cos x^2$
20. Which of the following expressions are identical?
- $(\sin x)^{-1}$
  - $\arcsin x$
  - $\sin x^{-1}$
  - $\frac{1}{\sin x}$
21. Evaluate. Answer must be in radians.
- $\cos 0$
  - $\sin 0$
  - $\tan \frac{\pi}{2}$
  - $\cos \frac{\pi}{4}$
  - $\sin^{-1}\left(-\frac{\sqrt{2}}{2}\right)$
  - $\sin \pi$
  - $\arccos \frac{\sqrt{3}}{2}$
  - $\tan^{-1} 1$
  - $\sin^{-1}\left(-\frac{\sqrt{2}}{2}\right)$

22. Given  $f(x) = x + 2$  and  $g(x) = \sqrt{x}$  complete each of the following:

p.  $f(g(x)) =$

q.  $g(f(x)) =$

r.  $f(f(x)) =$

23. Given  $f(x) = \frac{1}{x-1}$  and  $g(x) = x^2 - 2$  complete each of the following:

s.  $f(g(7)) =$

t.  $g(f(u)) =$

u.  $g(g(x)) =$

### Required Skills for Unit 3: Derivatives 2

24. Solve for  $y'$ :  $xy' + 5 = y + y'$

25. Evaluate. Solve for  $x$ .

v.  $\ln e^3 = x$

w.  $\ln e^x = 5$

x.  $\ln x + \ln x = 0$

y.  $e^{\ln 7} = x$

z.  $\ln 1 - \ln e = x$

aa.  $\ln 3 + \ln x - \ln 5 = 8$

26. Let  $f(x) = \frac{1}{2}x - 3$ . Complete the following.

bb. Sketch the graph of  $f(x)$ .

cc. Determine whether  $f$  has an inverse function.

dd. Sketch the graph of  $f^{-1}(x)$

ee. Give the equation for  $f^{-1}(x)$

27. A nine foot ladder, leaning against a wall, touches the wall  $h$  feet above the ground. Write an expression (in terms of  $x$ ) for the distance from the foot of the latter to the base of the wall.

### Required Skills for Unit 4: Curve Sketching

28. Solve the quadratic equations, factor or use the quadratic formula where appropriate:

ff.  $4x^2 - 21x - 18 = 0$

gg.  $2x^2 - 3x + 3 = 0$

hh.  $x^4 - 9x^2 + 8 = 0$

### Required Skills for Unit 5: Optimization, L'Hopital's Rule & Antiderivatives

29. Find the surface area of a box of height  $h$  whose base dimensions are  $l$  and  $w$  that satisfies the following condition:

ii. The box is closed.

jj. The box has an open top.

kk. The box has an open top and a square base with side length  $x$ .

30. A piece of string 8 inches long is to be cut into two pieces. One piece is  $x$  inches long and is to be bent into the shape of a square. The other piece is to be bent into the shape of a circle. Find and expression for the total area made up by the square and the circle as a function of  $x$ .

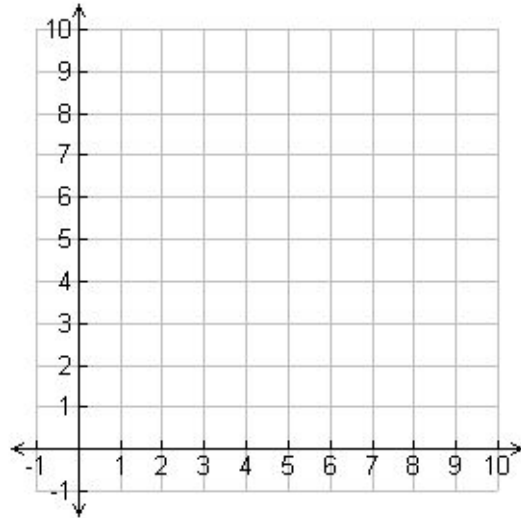
### Required Skills for Unit 7: Volume

31. Region  $R$  is the area bounded by the following three graphs.

$$y = \frac{2}{3}x + 4$$

$$y = 8$$

$$x = 0$$



- Sketch the region on the above plane.
- Find the area of region  $R$ .
- If region  $R$  is revolved about the  $y$ -axis, what is the volume (think: what shape would it create)?

Name \_\_\_\_\_

Block \_\_\_\_\_

AP Calculus Summer Assignment

Answer Sheet

1a) \_\_\_\_\_

1b) \_\_\_\_\_

1c) \_\_\_\_\_

1d) \_\_\_\_\_

1e) \_\_\_\_\_

1f) \_\_\_\_\_

2a) \_\_\_\_\_

2b) \_\_\_\_\_

2c) \_\_\_\_\_

2d) \_\_\_\_\_

2e) \_\_\_\_\_

2f) \_\_\_\_\_

3a) \_\_\_\_\_

3b) \_\_\_\_\_

3c) \_\_\_\_\_

3d) \_\_\_\_\_

3e) \_\_\_\_\_

3f) \_\_\_\_\_

4a) \_\_\_\_\_

4b) \_\_\_\_\_

4c) \_\_\_\_\_

6a) \_\_\_\_\_

6b) \_\_\_\_\_

6c) \_\_\_\_\_

7a) \_\_\_\_\_

7b) \_\_\_\_\_

7c) \_\_\_\_\_

8a) \_\_\_\_\_

8b) \_\_\_\_\_

8c) \_\_\_\_\_

8d) \_\_\_\_\_

8e) \_\_\_\_\_

8f) \_\_\_\_\_

9a) \_\_\_\_\_

9b) \_\_\_\_\_

9c) \_\_\_\_\_

9d) \_\_\_\_\_

9e) \_\_\_\_\_

9f) \_\_\_\_\_

10) \_\_\_\_\_

11) \_\_\_\_\_

12) \_\_\_\_\_

13) \_\_\_\_\_

14) \_\_\_\_\_

15) \_\_\_\_\_

16) \_\_\_\_\_

17) \_\_\_\_\_

19) \_\_\_\_\_

20) \_\_\_\_\_

21a) \_\_\_\_\_

21b) \_\_\_\_\_

21c) \_\_\_\_\_

21d) \_\_\_\_\_

21e) \_\_\_\_\_

21f) \_\_\_\_\_

21g) \_\_\_\_\_

21h) \_\_\_\_\_

21i) \_\_\_\_\_

22a) \_\_\_\_\_

22b) \_\_\_\_\_

22c) \_\_\_\_\_

23a) \_\_\_\_\_

23b) \_\_\_\_\_

23c) \_\_\_\_\_

24) \_\_\_\_\_

25a) \_\_\_\_\_

25b) \_\_\_\_\_

25c) \_\_\_\_\_

25d) \_\_\_\_\_

25e) \_\_\_\_\_

25f) \_\_\_\_\_

26a) \_\_\_\_\_

26b) \_\_\_\_\_

26c) \_\_\_\_\_

26d) \_\_\_\_\_

27) \_\_\_\_\_

28a) \_\_\_\_\_

28b) \_\_\_\_\_

28c) \_\_\_\_\_

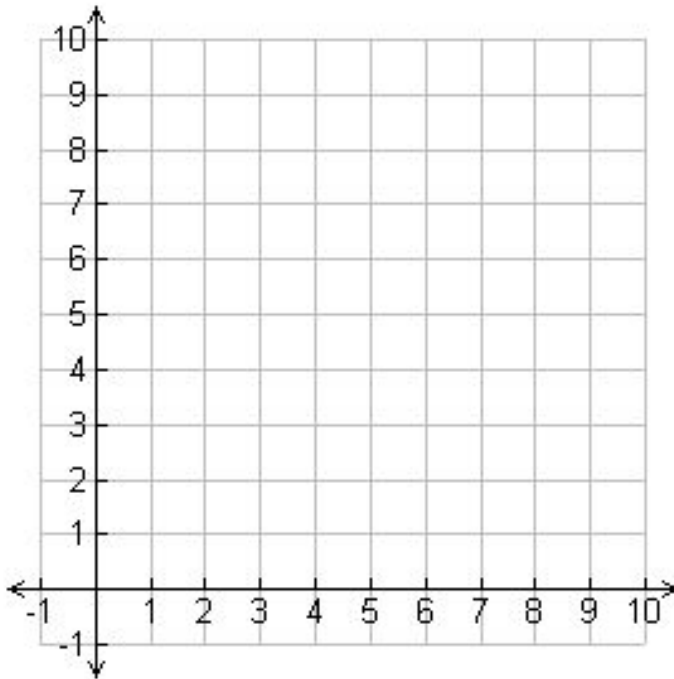
29a) \_\_\_\_\_

29b) \_\_\_\_\_

29c) \_\_\_\_\_

30) \_\_\_\_\_

31)



31a) \_\_\_\_\_

31b) \_\_\_\_\_

31c) \_\_\_\_\_