

AP Calculus Summer Assignment (for both AB & BC Calculus)

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/xvpWOywkGfEj5Knd2>

Part 2. Graphing Review, DUE July 31, 2016

This part of your assignment is a graphing assignment – the basic knowledge of various graph of importance. Even though you have a graphing calculator, you should have a readily available image of many basic parent functions.

Sketch each graph neatly on a separate sheet of paper. You should know how to sketch each graph WITHOUT your graphing calculator. However, for this assignment, check your graphs with your calculator before submitting the assignment.

You may drop off your finished graphs in my mailbox at the high school office by July 31, or you may email a scanned document to your teacher. Please make sure that your name is on the paper assignment or the scanned document.

AB Calculus: Mrs. Oakes, oakest@eastonsd.org

BC Calculus: Mrs. Charnley, charnleyc@eastonsd.org

Part 3. AP Calculus Packet, DUE the first day of school

AP Calculus BC 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 your teacher. Good luck and we look forward to working with each of you next year!

Part 2. Graphing Review

This part of your assignment is a graphing assignment – the basic knowledge of various graph of importance. Even though you have a graphing calculator, you should have a readily available image of many basic parent functions. This is a review of the graphs that you must know for this course. You will be making a library of graphs for this assignment. You will be responsible for knowing these functions without the use of your graphing calculator, but please check with your calculator before making your final sketch.

You may drop off your finished graphs in my mailbox at the high school office by July 31, or you may email a scanned document to your teacher. Please make sure that your name is on the paper assignment or the scanned document.

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You must include ALL of the following for each graph:

- Each graph is to be placed on a separate coordinate plane
 - (you may use the attached graph paper, or your own)
- Equation of the graph written next to the graph
- At least three coordinates of your choosing (round to 3 decimal places)

1) $y = x$

2) $y = x^2$

3) $y = x^3$

4) $y = |x|$

5) $y = \sqrt{x}$

6) $y = \sqrt[3]{x}$

7) $y = \frac{1}{x}$

8) $y = \frac{1}{x^2}$

9) $y = \frac{1}{\sqrt{x}}$

10) $y = \cos x$

11) $y = \sin x$

12) $y = \tan x$

13) $y = 10^x$

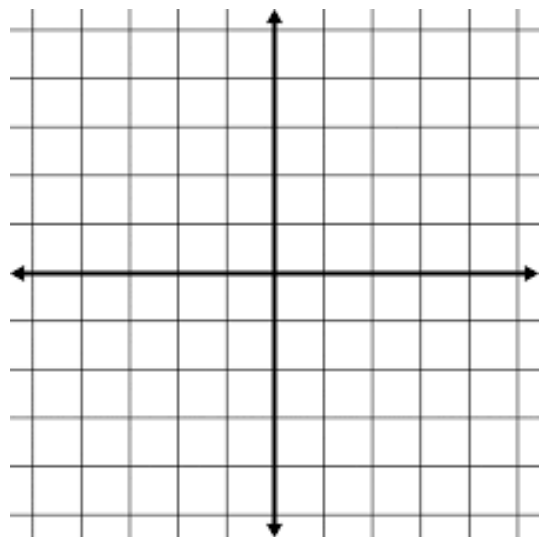
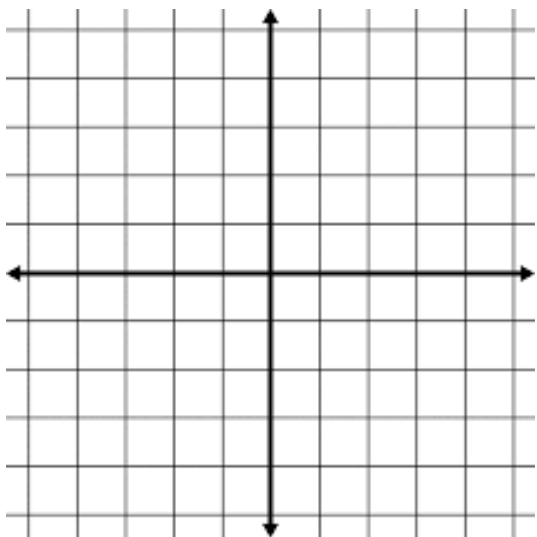
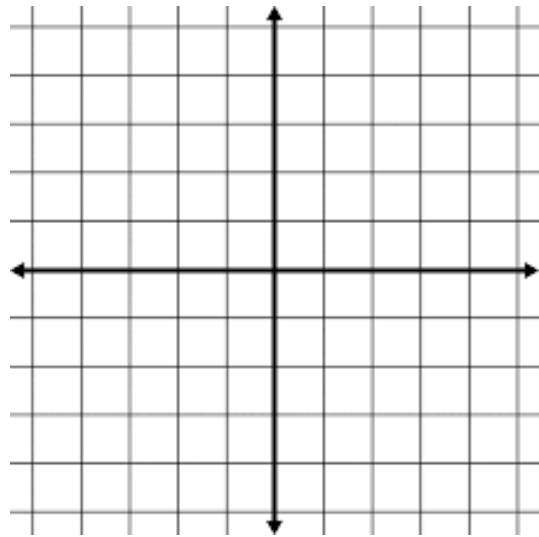
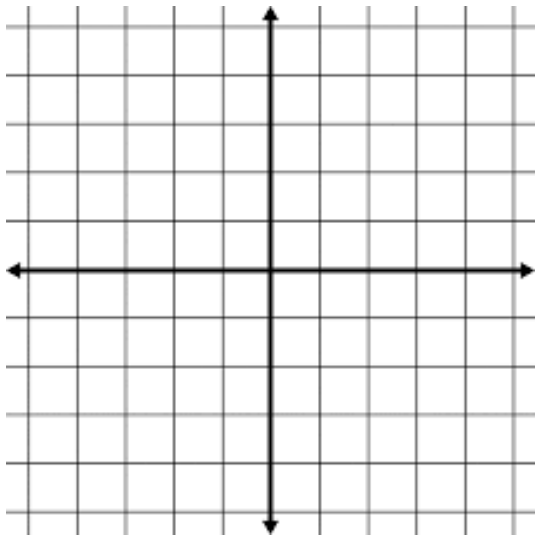
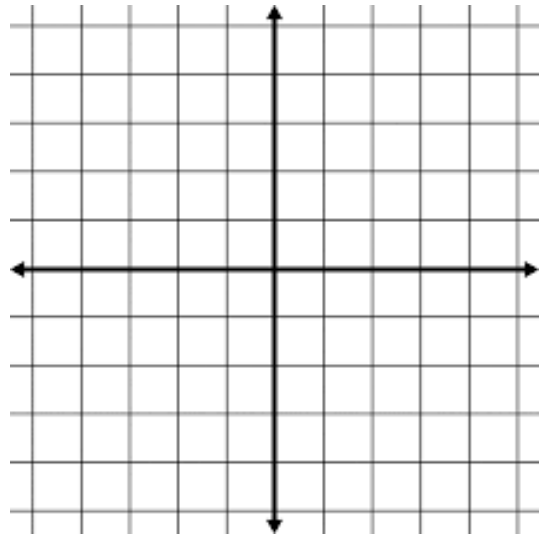
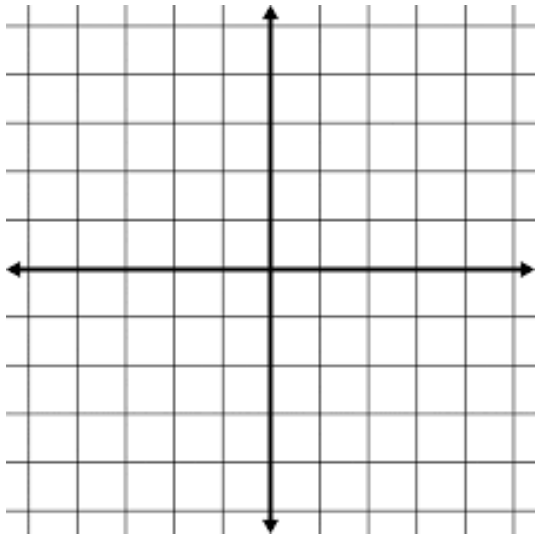
14) $y = \log x$

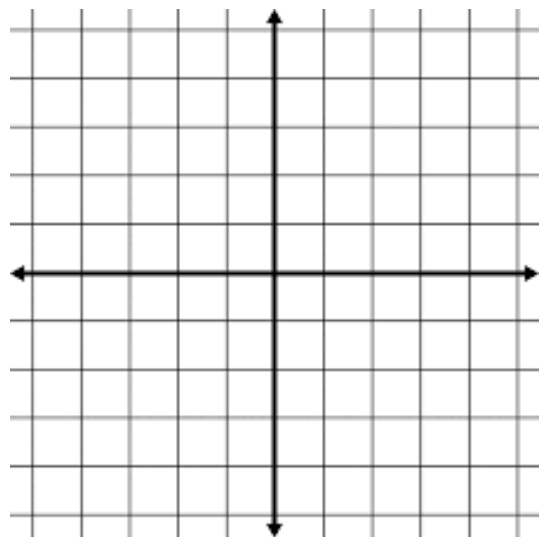
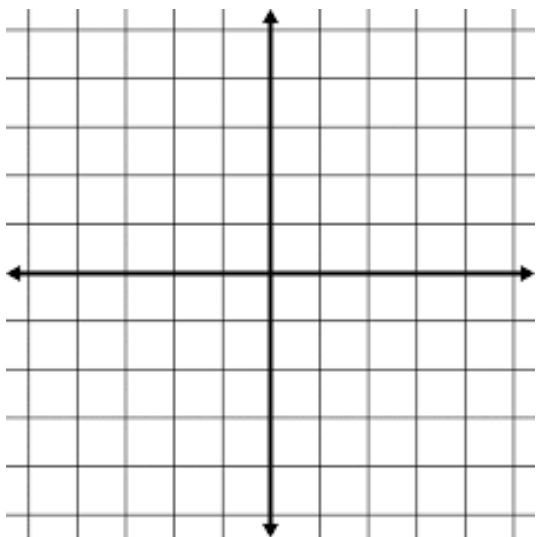
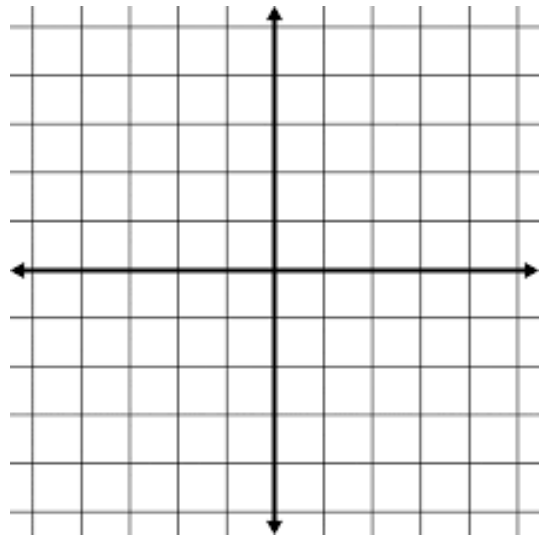
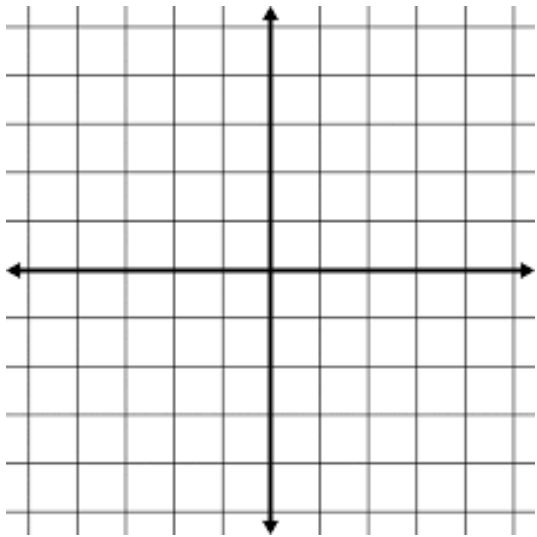
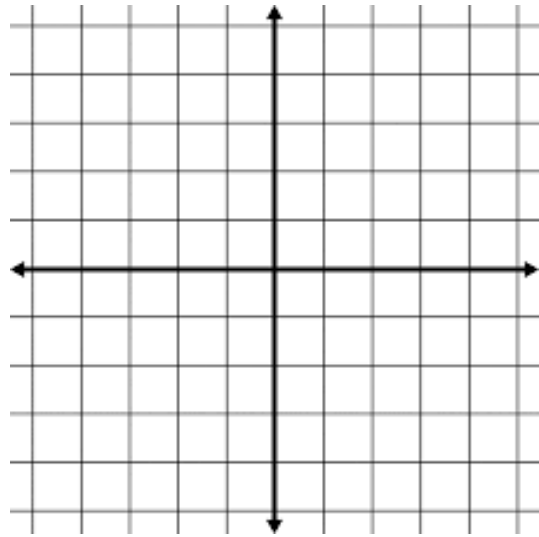
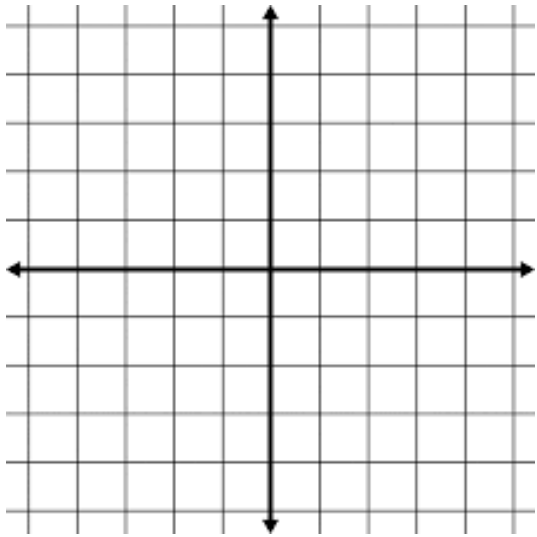
15) $y = \sqrt{a^2 - x^2}$

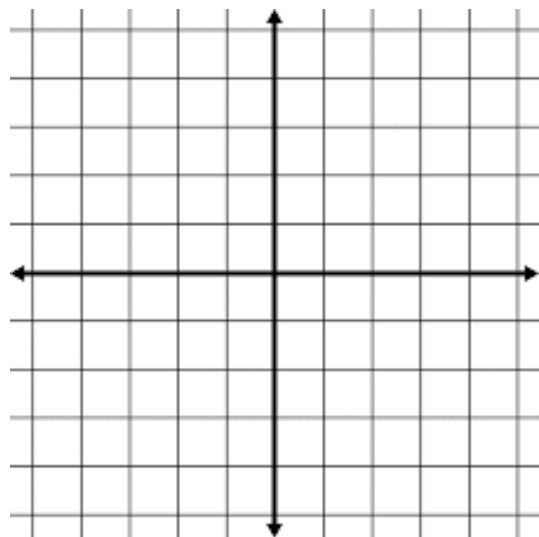
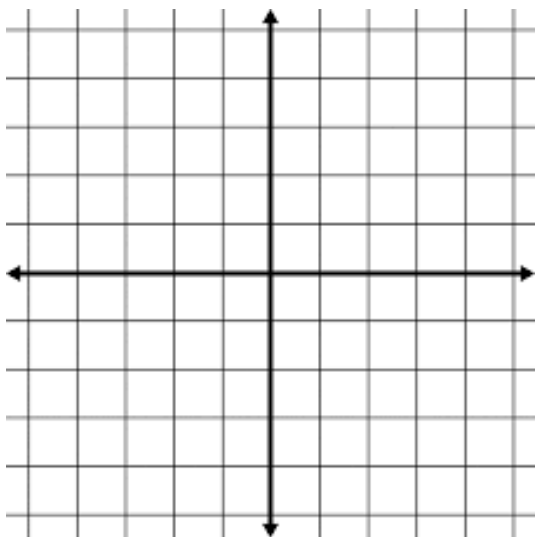
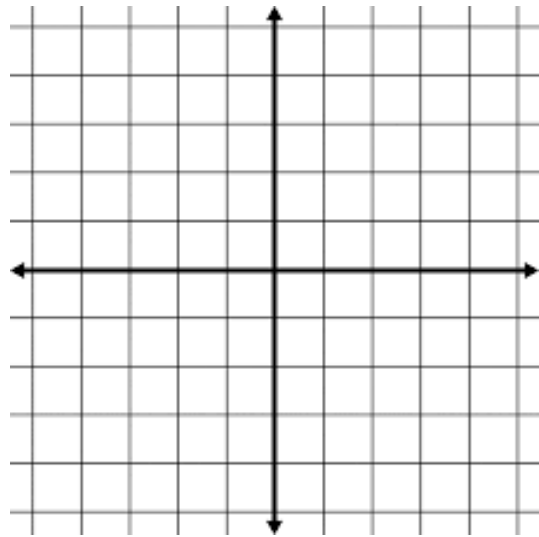
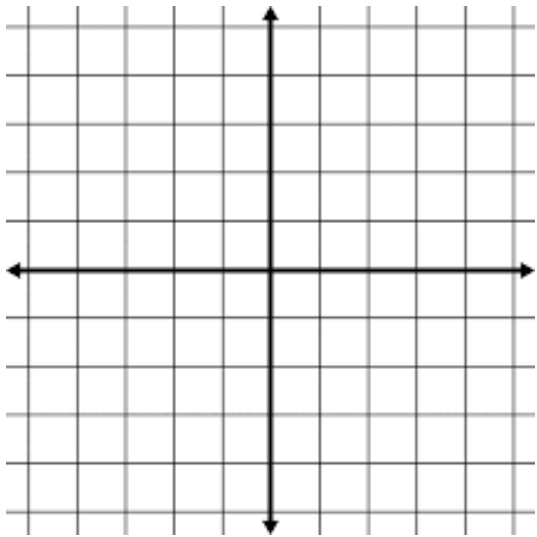
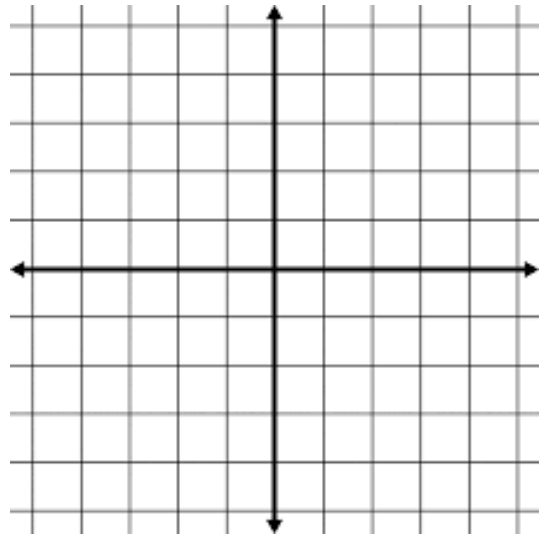
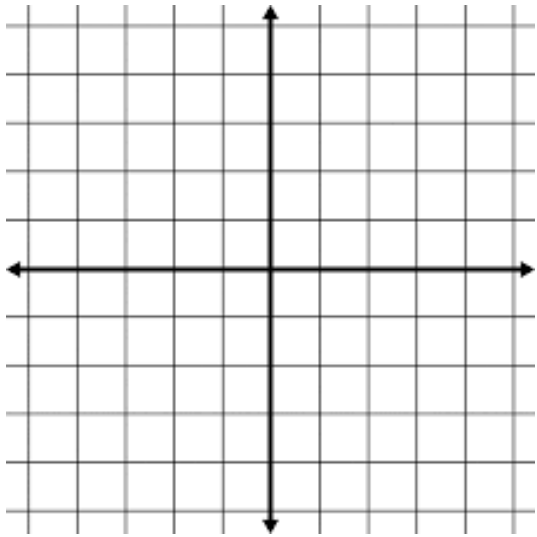
16) $y = \ln x$

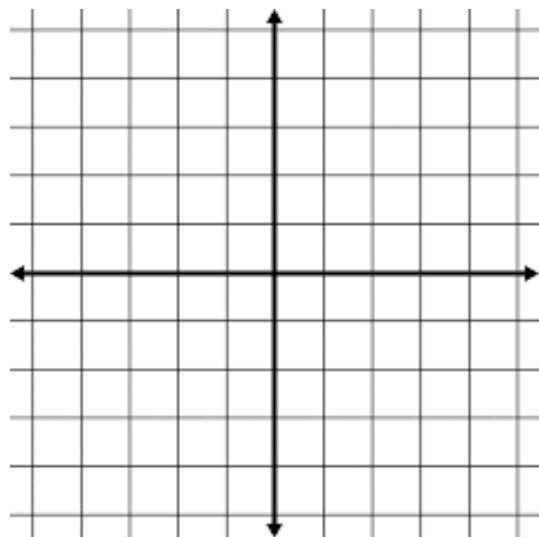
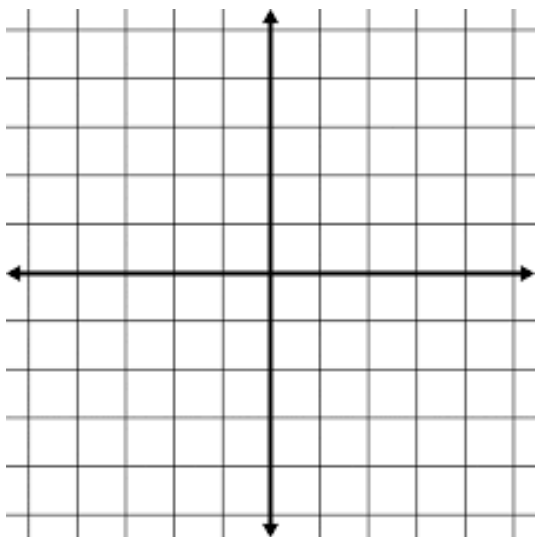
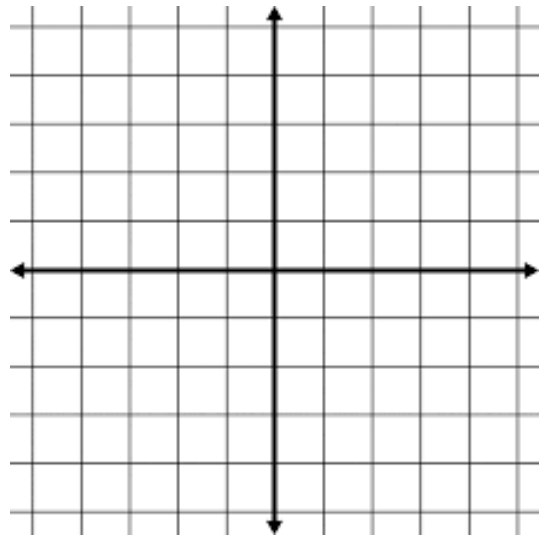
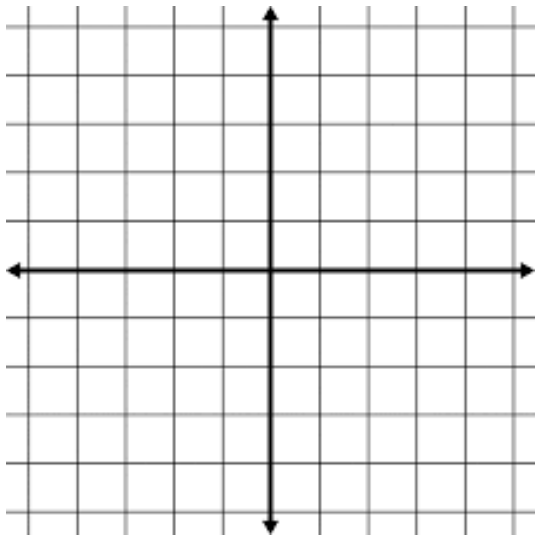
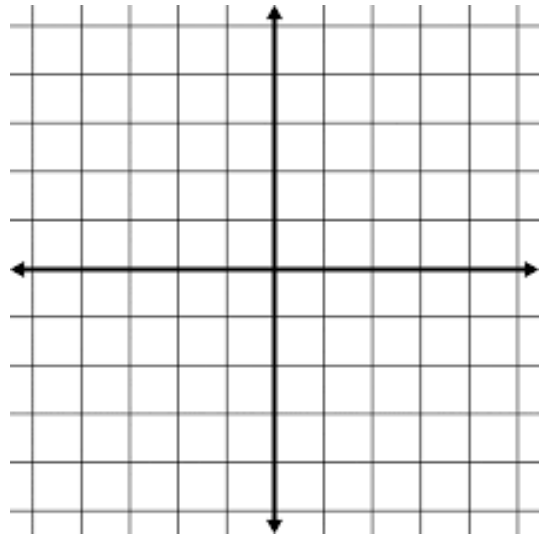
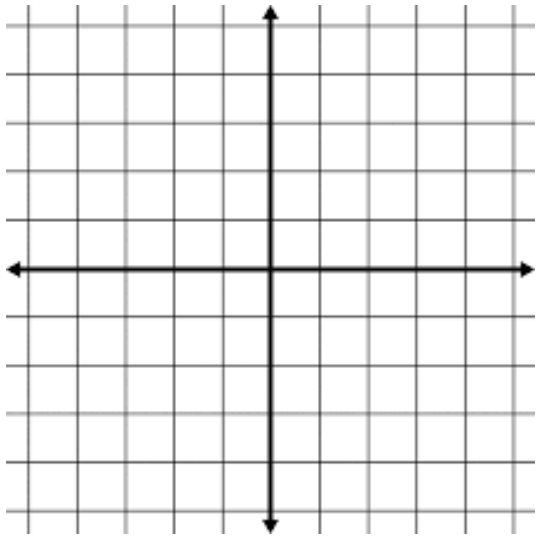
17) $y = e^x$

18) Piecewise function:
$$\begin{cases} y = 2x + 1 & \text{for } x > 2 \\ y = 3 & \text{for } x \leq 2 \end{cases}$$









Name _____

AP Calculus Summer Assignment

Part 3. AP Calculus Packet

AP Calculus packet - This part of your assignment will be completing a 33 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, and show all work in a clear manner. Use separate paper if necessary. 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 to 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:

- $f(g(x)) =$
- $g(f(x)) =$
- $f(f(x)) =$

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

- $f(g(7)) =$
- $g(f(u)) =$
- $g(g(x)) =$

Required Skills for Unit 3: Derivatives 2

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

25. Evaluate. Solve for x .

- $\ln e^3 = x$
- $\ln e^x = 5$
- $\ln x + \ln x = 0$
- $e^{\ln 7} = x$
- $\ln 1 - \ln e = x$
- $\ln 3 + \ln x - \ln 5 = 8$

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

- Sketch the graph of $f(x)$.
- Determine whether f has an inverse function.
- Sketch the graph of $f^{-1}(x)$
- 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 ladder 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:

- $4x^2 - 21x - 18 = 0$
- $2x^2 - 3x + 3 = 0$
- $x^4 - 9x^2 + 8 = 0$

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:

- The box is closed.
- The box has an open top.
- 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 an expression for the total area made up by the square and the circle as a function of x .

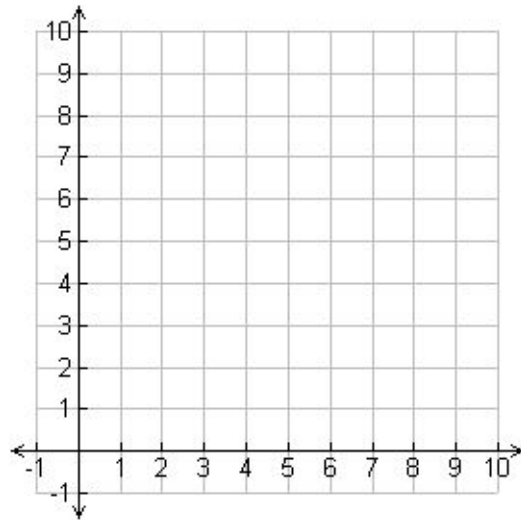
Required Skills for Unit 7: Volume

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, and shade region R .
- 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) _____

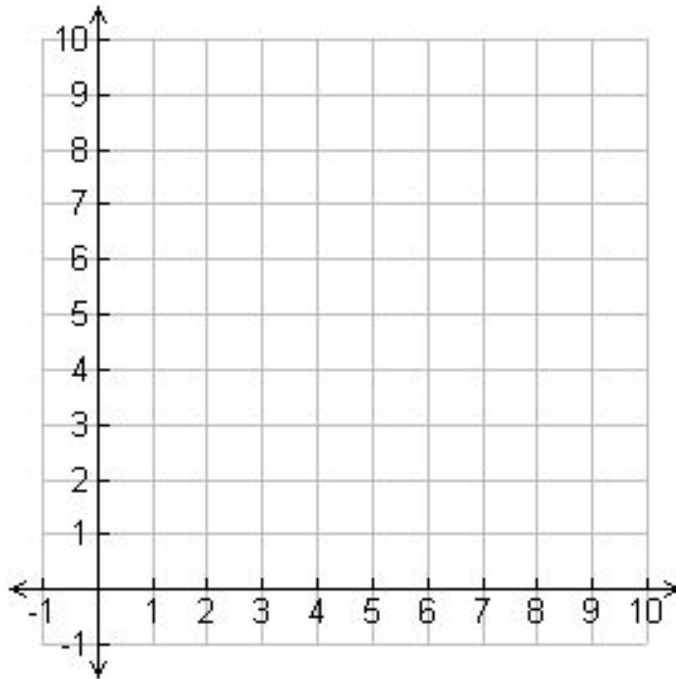
29a) _____

29b) _____

29c) _____

30) _____

31)



31a) _____

31b) _____

31c) _____