

Spotswood High School Mathematics Department

AP Calculus Summer Assignment

Welcome to AP Calculus! AP Calculus is not a course to be taken lightly. It requires many hours of work and studying, but I am sure you are up for the challenge. To assure that you are prepared for a successful year in AP Calculus, you are being asked to complete two assignments over the summer.

Summer Assignment

Due Date: The First Day of School

Part I

- 30 Questions that review important topics from previous math courses
- Show all of your work neatly and clearly in the space provided.
- **This assignment will be graded.** Please do your best to answer each question completely.
- **Make a photocopy of your completed work before handing it in.** We will be answering questions on the assignment before the project is returned to you.

Part II

- Read Section 1.1, 1.2, 1.3, 1.5, 1.6 in your Calculus textbook
- Answer Summer Work Multiple Choice Questions.
- **This assignment will be graded.**
- Know the six trigonometric functions for the basic angles, in radians, without a calculator. Be familiar with the graphs of all six trigonometric functions
- **Make a photocopy of your completed work before handing it in.** We will be answering questions on the assignment before the project is returned to you.

Calculators

Graphing calculators will be used extensively throughout this course and are a tremendous aid in understanding the material. I strongly recommend that students purchase their own graphing calculator for completing material at home. However, there will be numerous occasions when calculators will not be permitted much like portions of the AP exam.

Notebooks

Students are expected to keep an organized notebook. Included in the notebook should be all class notes, homework assignments, worksheets, etc. A three ring binder with loose leaf is recommended, but a 5-subject spiral notebook with a folder is acceptable.

Some Final Thoughts

Use your new Calculus textbook, previous notebooks and the internet to help you solve any problems.

Email me amikulak@spsd.us if you really need help! I will check my email occasionally during the summer.

Calculus AB Exam Date: Tuesday, May 15, 2018 @ 8AM

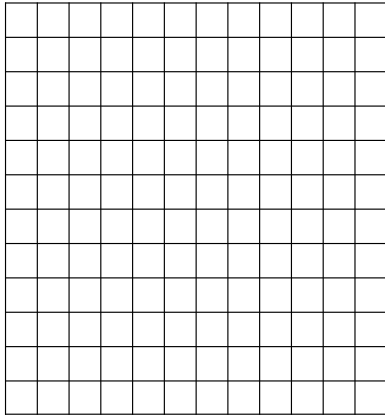
Good luck and have a great summer!

Mrs. Mikulak

AP CALCULUS
SUMMER ASSIGNMENT
PART I

Name: _____

1. Write the equation in point-slope form of a line passing through the point (3, 1) and perpendicular to $2x = -2 - \frac{1}{2}y$. Then draw the graph of the line.



2. Consider the equations: $4x + 14y = -28$ and $2x + ky = 21$.

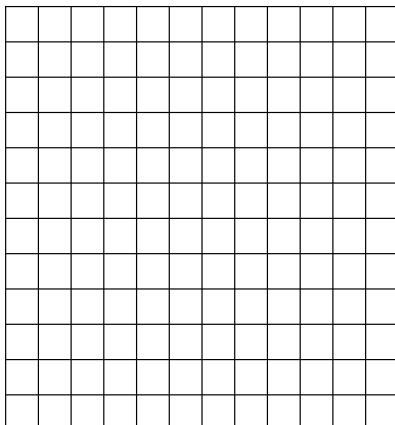
In order for the lines to be parallel, $k =$ _____

In order for the lines to be perpendicular, $k =$ _____

Confirm with your graphing utility.

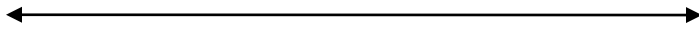
3. Solve the logarithmic equation $5\log_x 2 - \log_x 16 = 2 - \log_x 2$

4. Graph $g(x) = -\sqrt{6x - x^2}$



5. Solve $x^3 \leq x^2 - x + 1$ and state your answer in interval notation.

6. Solve the inequality $|x+1| \geq 1$. Write your answer in interval notation and then sketch your solution on a number line.



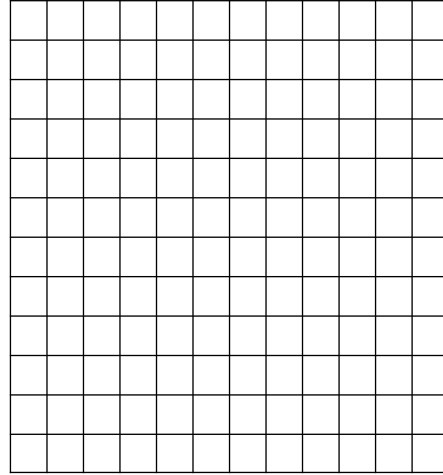
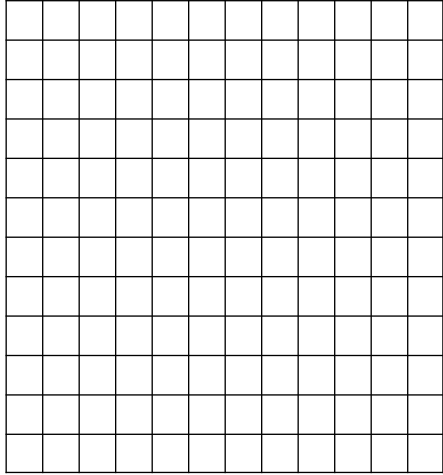
7. Solve $|2x-3|=5$

8. Describe how the graph of $y=x^2+4x+3$ can be obtained from the graph of $y=x^2$. Also, where is the vertex of this graph located and how can you determine that without actually graphing the function?

9. Graph the specified functions:

$$f(x) = 2^{-x}$$

$$g(x) = \log_2(-x)$$



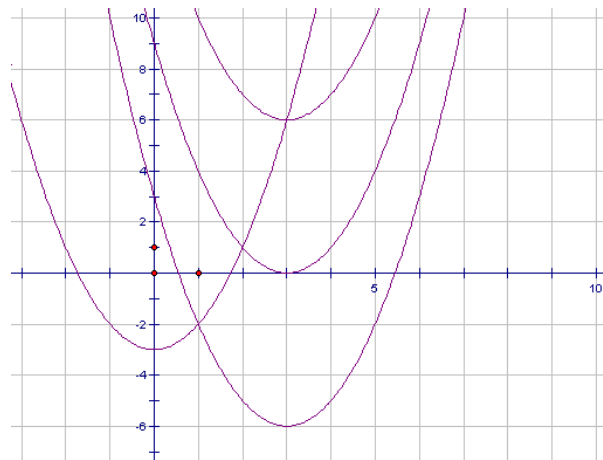
10. The figure below shows the graph of $y = x^2$ shifted to four new positions. Label each graph with its correct equation chosen from A – D below:

A. $y = (x-3)^2 - 6$

B. $y = (x-3)^2$

C. $y = x^2 - 3$

D. $y = (x-3)^2 + 6$

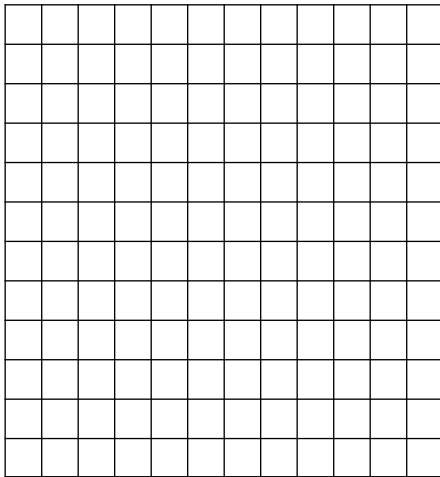


[-3, 10] by [-7, 10]

11. Graph $y = \frac{1}{2}|x-3|+7$ and determine the domain and range of the function. Support your answers with your graph.

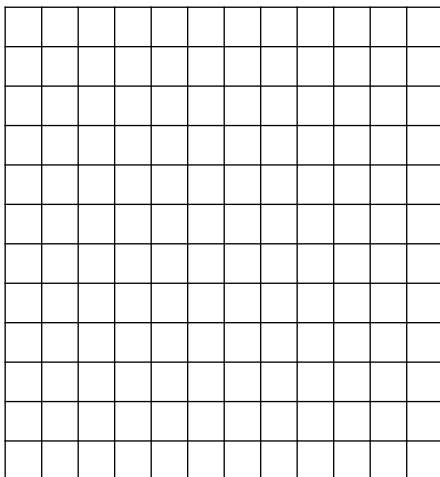
Domain = _____

Range = _____



12. Graph: $y = x^3 - 5x + 6$

Use your graphing calculator to estimate the intercepts and the coordinates of any local maximum/minimums.



x – intercepts = _____ y – intercepts = _____

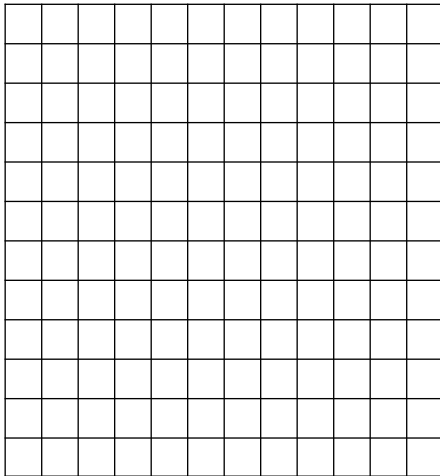
local maximum(s) = _____ local minimum(s) = _____

13. Solve using the sign graph technique. State your answer in interval form.

$$8 - x^2 \geq 7x$$

14. Find the domain and range of $f(x) = \sqrt{\frac{x+5}{x-1}}$

15. Graph Problem 14.



16. Let $f(x) = \sqrt{x-5}$ and $g(x) = \sqrt{x}$, find:

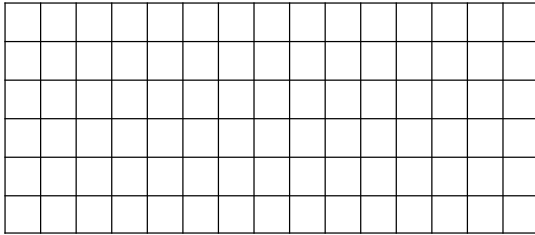
a) $(f \circ g)(x)$

b) the domain of $(f \circ g)(x)$

c) $(g \circ f)(x)$

d) the domain of $(g \circ f)(x)$

17. Graph $y=2+\sin x$

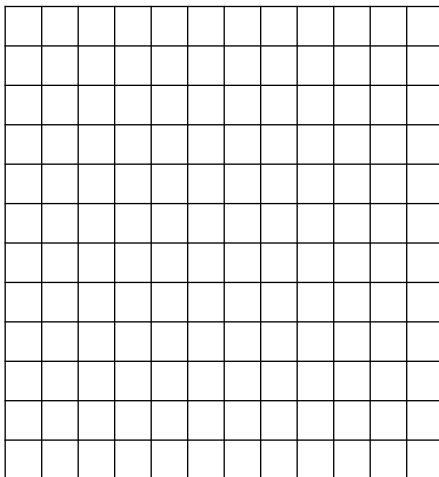


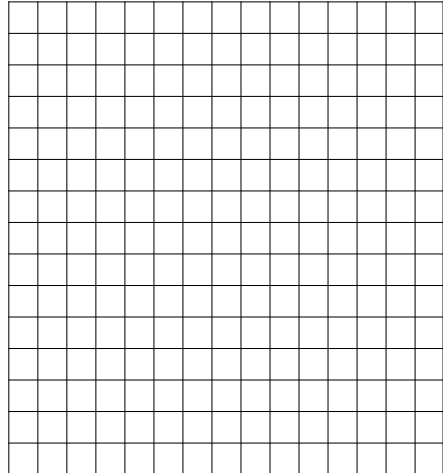
18. Let $f(x)=2x-3$ and $g(x)=-5x+1$ Find

a) $g(t+2)$

b) $(f \circ g)(x)$

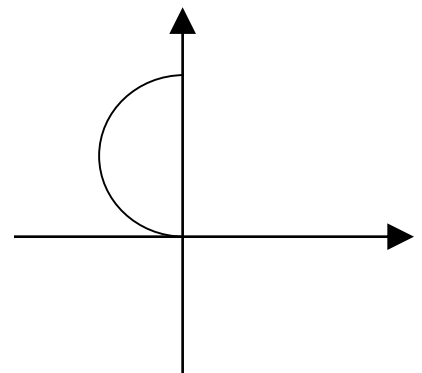
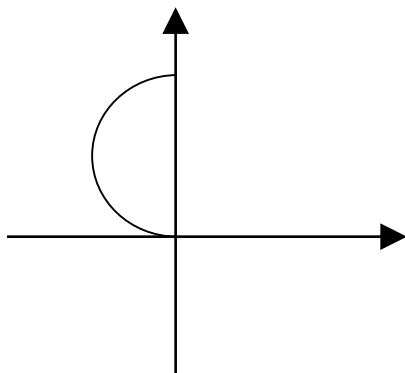
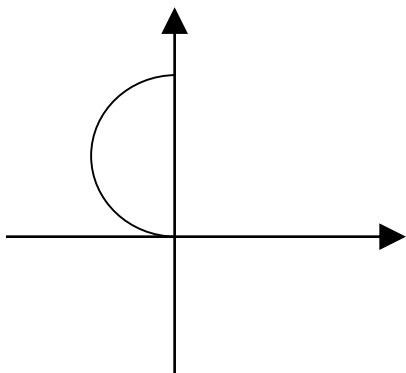
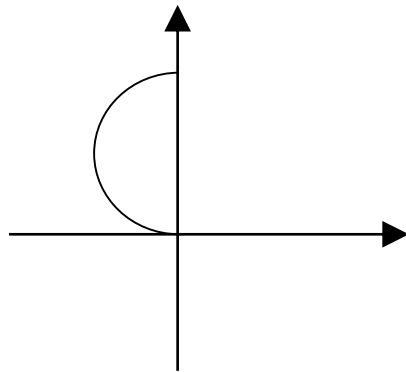
19. Express $f(x)=2-|5x-10|$ in piecewise form without using absolute value. Then graph the function.





20. Graph the piecewise function: $f(x) = \begin{cases} \frac{1}{2}x + \frac{3}{2}, & \text{if } x < 1 \\ x^2 - 1, & \text{if } x \geq 1 \end{cases}$

21. Extend the graph of the figure below so that it is symmetric with respect to:
a) the origin b) the x-axis c) the y-axis

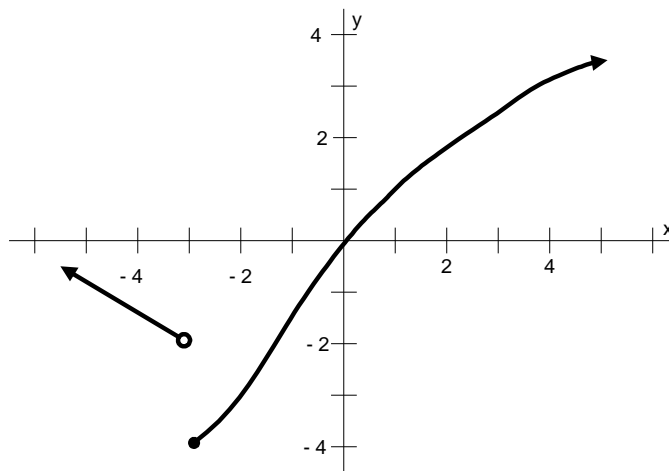


22. Find: $\lim_{x \rightarrow 4} \frac{x^2 + 9}{x^2 - 1}$

23. Find: $\lim_{x \rightarrow 1} \frac{1 - x^2}{x^2 + 5x - 6}$ algebraically

24. Find: $\lim_{x \rightarrow +\infty} \frac{x^3 + 2x}{3x^3 + 4x^2 + 5x}$

25. For the function f graphed below, find:



a) $\lim_{x \rightarrow -3^-} f(x)$

b) $\lim_{x \rightarrow -3^+} f(x)$

c) $\lim_{x \rightarrow -3} f(x)$

d) $f(-3)$

e) $f(0)$

26. Use long division to divide $(6x^4 - 4x^3 + x^2 + 10x - 1) \div (3x + 1)$

27. Use synthetic division to factor the polynomial $f(x) = 2x^3 - 7x^2 + 7x - 2$ given that $x = \frac{1}{2}$ is a zero of the function.

28. Find the horizontal and vertical asymptotes of the rational function: $f(x) = \frac{3x^2 + 2x - 16}{x^2 - 7}$

29. Find the exact value of the function without a calculator. $\tan\left(\cos^{-1}\left(-\frac{\sqrt{2}}{2}\right)\right)$

30. Find the point(s) of intersection algebraically between $y = x - 2$ and $y^2 = 4x$

31. Given $f(x) = x^2 - 2x + 1$, find $\frac{f(x+h) - f(x)}{h}$ (Do not find the limit of this value!)