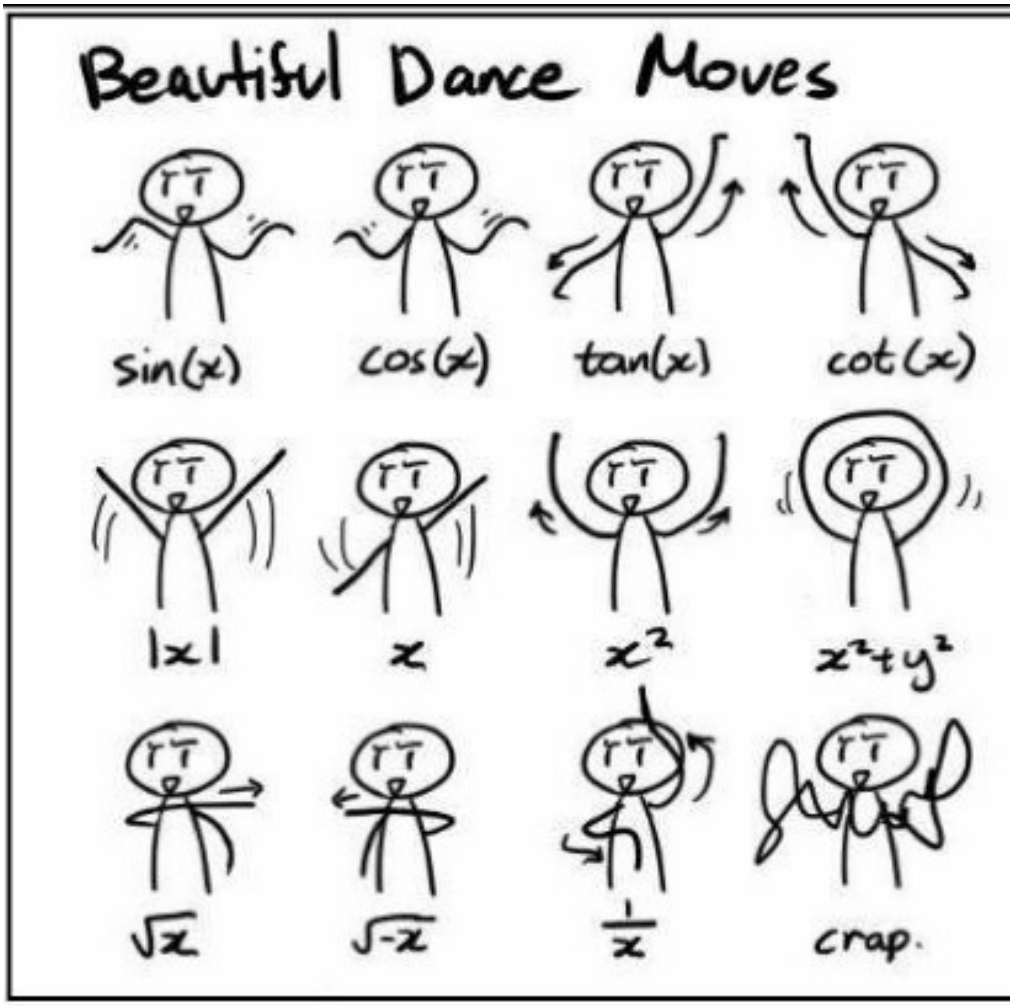
Name: _____

AP Calculus Summer Review Assignment

1. This packet is to be handed in to your Calculus teacher on the first day of the school year.
2. All work must be shown in the packet OR on separate paper attached to the packet.



Dear AP Calculus Students,

I am looking forward to teaching you AP Calculus this fall! You will find that Calculus is a combination of many of the previous math classes you have taken. This summer packet is designed to help you review old skills before we build on them during the school year.

Be sure to follow the key information below when completing this packet:

- The packet is due when you return to school in August.
- Every problem must be completed. None left blank. Try everything! Look up the concepts in YouTube for instructional videos if you need to.
- The packet will be collected and graded during the first week of classes.
  Work must be shown to receive credit – no work, no points. Final answers must be circled.
- You MUST have the unit circle and the chart memorized. There will be a quiz over the unit circle.

Use any resources available to you: Internet, Text Books, etc.

I hope that you have a great summer! See you in Calculus class!

Sincerely,

Mrs Springer
springerdi@pcsb.org

FORMULA SHEET

Reciprocal Identities: $\sin x = \frac{1}{\csc x}$ $\cos x = \frac{1}{\sec x}$ $\tan x = \frac{1}{\cot x}$

$\csc x = \frac{1}{\sin x}$ $\sec x = \frac{1}{\cos x}$ $\cot x = \frac{1}{\tan x}$

Quotient Identities: $\tan x = \frac{\sin x}{\cos x}$ $\cot x = \frac{\cos x}{\sin x}$

Pythagorean Identities: $sin^2 x + cos^2 x = 1$ $tan^2 x + 1 = sec^2 x$

$1 + cot^2 x = csc^2 x$

Double-Angle Identities: $\sin 2x = 2 \sin x \cos x$ $\cos 2x = cos^2 x - sin^2 x$
$= 1 - 2sin^2 x$
$= 2cos^2 x - 1$

Logarithms

$y = \log_a x$ **is equivalent to** $x = a^y$

Product Property: $\log_b mn = \log_b m + \log_b n$

Quotient Property: $\log_b \frac{m}{n} = \log_b m - \log_b n$

Power Property: $\log_b m^p = p \cdot \log_b m$

Line Formulas

Slope-Intercept: $y = mx + b$

Point-Slope: $y - y_1 = m(x - x_1)$

Standard Form: $Ax + By = C$

Exponent Rules

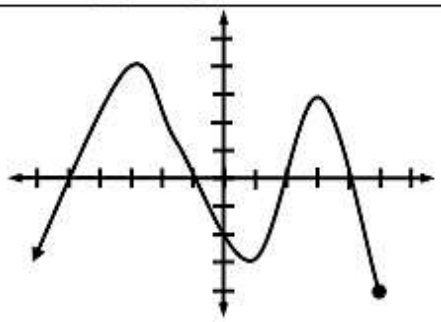
Multiplying with Like Bases:
$(x^a)(x^b) = x^{a+b}$

Dividing with Like Bases:
$\frac{x^a}{x^b} = x^{a-b}$

Power to a Power:
$(x^a y^b)^c = x^{ac} y^{bc}$

On this assignment, you may use your calculator, internet resources, and notes/books from previous mathematics courses. You <u>may not</u> work together or get help from another person. I will be available at school to answer questions before the assignment is due. Also, you can email me over the summer at

1. Use the graph of g(x) to answer the following questions.



a) What is the domain of g(x)?

b) What is the range of g(x)?

c) Is g(-4) positive or negative?

d) For what values of x does g(x) = -3?

e) What are the x-intercepts?

f) What is the y-intercept?

g) On which interval(s) is g(x) increasing?

h) On which interval(s) is g(x) decreasing?

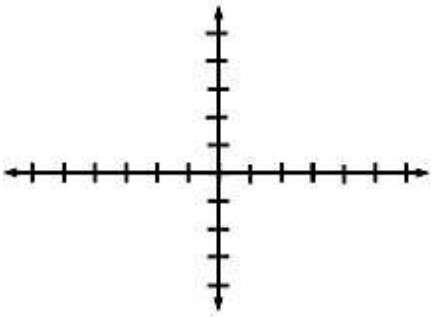
i) For which interval(s) is g(x) > 0?

j) For which interval(s) is g(x) < 0?

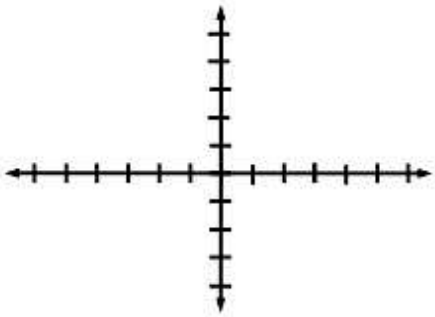
k) How many times does y = 2 intersect g(x)?

l) What are the local maxima?

m) Graph -g(x) – 3.



n) Graph g(2x).



True or False: Decide if the following statements are true or false. If the statement is false, change the right side of the equation to make it true. Also, write an explanation of why the statement is false. Show your work.

2. $(4b)^3 = 4b^3$	3. $\sqrt{-j} \cdot \sqrt{-k} = -\sqrt{jk}$
4. $(y+5)^3 = y^3 + 125$	5. $\frac{c}{d} + \frac{s}{t} = \frac{c+s}{d+t}$

Find the asymptotes and holes in the graph of each function, if any.

6. $f(x) = \frac{x^3-27}{x^2+5x-24}$ Asymptotes: _____ Holes: _____	7. $g(x) = \frac{2x^2-11x+12}{x^3-64}$ Asymptotes: _____ Holes: _____

Simplify each rational expression. Find the x-intercept and vertical and horizontal asymptotes.

8. $f(x) = \frac{2x^2-18}{x^2+6x+9}$ Simplified Function: _____ X-intercept: _____ VA: _____ HA: _____	9. $f(x) = \frac{x^2-5x-6}{6x^2-x^3}$ Simplified Function: _____ X-intercept: _____ VA: _____ HA: _____

Simplify each expression.

10. $\sqrt[3]{16r^7s^5t^8}$	11. $\sqrt[3]{24} + \sqrt[3]{192}$
12. $\sqrt[3]{4} \cdot \sqrt[7]{8}$	13. $\sqrt[3]{\frac{192s^{23}t^6}{u^9}}$
14. $2 + \frac{x}{x-5}$	15. $\frac{3}{4+\sqrt{x}}$

Solve each equation

16. $7 + 15e^{1-3x} = 10$	17. $3^{4x-1} = 27^{x+2}$
18. $9\log(1-5x) = 3$	19. $log_3 x + log_3(x-24) = 4$

Evaluate each expression. Leave your answer as an exact value.

20. $sec\frac{\pi}{4}$	21. $cot\frac{7\pi}{6}$	22. $csc\frac{2\pi}{3}$	23. $cos\pi$
24. $sin-\frac{\pi}{3}$	25. $sec\frac{\pi}{2}$	26. $tan\pi$	27. $tan0$

Simplify or Solve each trigonometric expression.

28. $cotx - cos^3 xcscx$	29. 3cosx – 1 = 2	30. $tan^2 x - 1 = 0$

Use $f(x) = \frac{5x}{x^2-9}$ and $g(x) = \frac{7}{x-3}$ to find the following.

31. f(-4)	32. f(-x)
33. g(f(x))	34. f(x) + g(x)

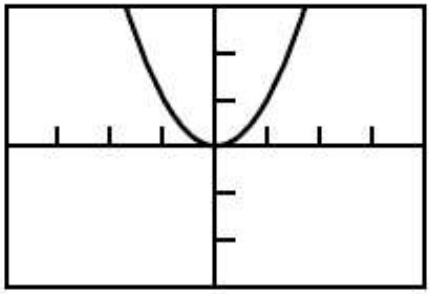
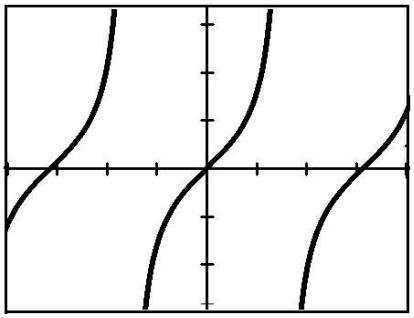
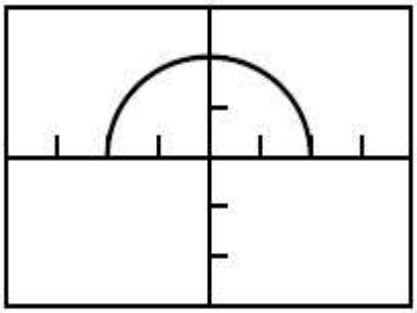
Find the domain of each function.

35. $f(x) = \sqrt{7x - 21}$	36. $g(x) = \frac{5x}{x^2-13x-48}$	37. $h(x) = \sqrt[3]{x + 8}$

Answer each question completely.

38. Name the 3 types of discontinuities and which type is considered “removable.”	39. What is an inflection point? Make a sketch as part of your definition.

Complete the following.

40. $f(x) =$	41. $f(x) =$	42. $f(x) =$
		
Domain:_____ Range: _____ Asymptotes:_____	Domain:_____ Range: _____ Asymptotes:_____	Domain:_____ Range: _____ Asymptotes:_____

Complete each of the following statements.

43. A graph is increasing when the _____ of the graph is positive.
44. The factored form of a function $(x + a)^3$ is _____.
45. The main Pythagorean trigonometric identity is $\sin^2 x +$ _____ = 1.