Preview for AP Calculus AB & BC 2026-2027

The optional summer assignment may be completed over the summer, but it will be officially assigned on the first day of class and due by **Friday, August 7th, 2026**. You may work on it over the summer and tweak it during the first week of class when we will answer questions. **You will have a test covering this material Tuesday, August 11th, 2025.**

Welcome to AP Calculus!

Calculus is a fantastic class where you will learn a LOT about slope and area under a curve. You will learn math that ties together algebra, precalculus, and geometry all at once. It is a wonderful class that will have you ready for that AP exam at the end of the year! This packet is meant to review the algebra and precalculus skills that you have learned over the last few years. These skills will help when you start at AP Calculus Parkview in the fall. These concepts will help you to focus on the calculus and not have to worry as much about the basics. Please make sure to show your work and feel free to use additional paper if necessary. Please try your best to do these problems without a calculator. We will review this material during the first week to prepare you for the test. You are welcome to use khan academy if you have any questions or send us an email if you need any hints.

We also wanted to give you a head start on materials needed for the fall. You will need:

1. 3 ring binder for math only.
2. Notebook paper
3. Pencils
4. Colored Pencils/Pens or highlighters
5. Texas Instruments Graphing Calculator (such as a TI-84). This calculator will be an investment and should take you through college. These may also be rented from the school.

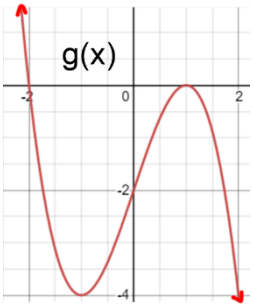
We are very excited to meet you in the fall and look forward to working with you as a panther at the best high school in the nation. If you have any questions, please e-mail us at Laura.Kimbro@gcpsk12.org (AP Calculus BC) or Deborah.Eckstein@gcpsk12.org (AP Calculus AB). We are going to have a fantastic year ahead!

See you in August,
Mrs. Tremblay and Ms. Kimbro



You should be able to complete this entire packet WITHOUT a CALCULATOR

1)



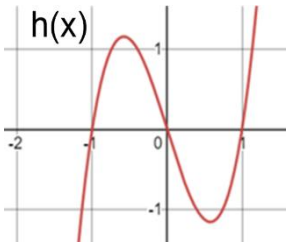
Interval(s) of increase: _____ Where is g(x) > 0? _____

Interval(s) of decrease: _____ Where is g(x) < 0? _____

Zero(s): _____ g(-1) = _____ $g^{-1}(-4)$ = _____ and _____

g(x) is _____ (odd/even/neither) because _____

2)



Interval(s) of increase: _____ Concave Up? _____

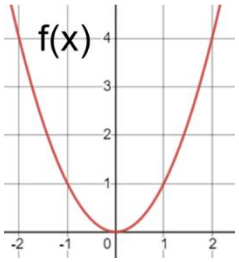
Interval(s) of decrease: _____ Concave Down? _____

Zero(s): _____ h(-1) = _____

h(x) is _____ (odd/even/neither) because _____

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3)



Interval(s) of increase: _____ Concave up or down? _____

Interval(s) of decrease: _____ Where is f(x) < 0? _____

Zero(s): _____ f(2) = _____ f(1) = _____

f(x) is _____ (odd/even/neither) because _____

Use the graphs from questions 1 – 3 for questions 4 – 7

4) (f + g)(1) 5) (f o g)(0) 6) g(h(0)) 7) $(g \cdot f)(-1)$

What transformations would the following expressions have?

8) f(x – 2) + 1 9) $-f(x+4)-3$ 10) $2f(-x-3)$

Let $\boldsymbol{f(x)=3x^3}$ and $\boldsymbol{g(x)=\frac{x-9}{x+1}, x\neq -1}$ to find the following:

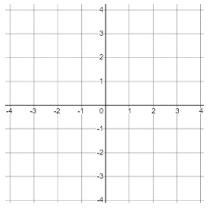
11a)Domain of f(x):
Zero(s) of f(x):

b)Domain of g(x):
Zero(s) of g(x):

c) Find (f o g)(1) d) Find g((f(1)) e) Find f(x + 2) f) Find $f^{-1}(x)$

12) Graph the piecewise function

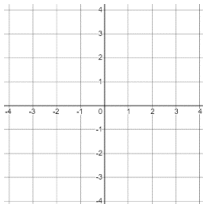
$$f(x)=\begin{cases} x+2 & x>1 \\ 0 & x=1 \\ -x+4 & x<1 \end{cases}$$



f(1) = _____ f(3) = _____

Is f(x) continuous at x = 1?

13) Graph $y=|x-2|+1$



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(Questions 14 – 19) Find the domain of each function.

14) f(x) = ln(x + 3) – 2
(can only take a log of positive number)

15) $g(x) = \frac{x^2-4}{2x+4}$
(denominator can't equal 0)

16) $h(x) = \frac{x^2-5x-6}{x^2-3x-18}$
(denominator can't equal 0)

17) $j(x) = \frac{e^{2-x}}{x}$
(denominator can't equal 0)

18) $k(x) = \sqrt{x-3}$
(radicand ≥ 0)

19) $y = \frac{\sqrt{2x-9}}{2x+9}$
(radicand ≥ 0)

(Questions 20 – 22) Find the vertical and horizontal asymptotes Use your rules. Watch out for holes!

20) $f(x) = \frac{x}{x-3}$ VA: HA:

21) $g(x) = \frac{x+4}{x^2-1}$ VA: HA:

22) $f(x) = \frac{x^2-9}{x^3-3x^2-18x}$ VA: HA:

(Question 23-24) Slope: $\boldsymbol{m = \frac{y_2-y_1}{x_2-x_1}}$ and Point slope formula: $\boldsymbol{y - y_1 = m(x - x_1)}$

23) a)Write the equation of the line passing through the points (2, 3) and (5, 6)

b) Write the equation of the line parallel to the line in part (a) passing through the point (1, 1)

24) a) Write the equation of the line passing through the points (12, 1) and (5, 0).

b) Write the equation of the line perpendicular to the line in part (a) passing through the point (2, 4)

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25) Write out and evaluate the following sigma notation for the first four terms

$$\sum_{n=0}^{\infty} 4(2^{n-1})$$

(Questions 26 – 29) Simplify

26) $\frac{x-3}{x^2-9}$

27) $\frac{\frac{1}{x}}{x-\frac{1}{2}}$ (clear the fractions)

28) $e^x(2x+1)^3 + e^{2x}(2x+1)^2$ (factor out GCF)

29) $x^3 - xy^2 + x^2y - y^3$ (factor by grouping)

(Questions 30 – 44) Evaluate the following without a calculator

30) $\log_2 8 =$____

31) $\log_4 \frac{1}{64} =$____

32) $\log 10 =$____

33) $5^{\log_5 7} =$____

34) $\ln e =$____

35) $\log 1 =$____

36) $\ln 1 =$____

37) $\log_5 1 =$____

38) $16^{3/4} =$ _____

39) $32^{-2/5} =$ _____

40) $64^{2/3} =$ _____

41) $125^{-1/3} =$ _____

42) $27^{4/3} =$ _____

43) $\left(\frac{1}{4}\right)^{3/2} =$ _____

44) $100^{-5/2} =$ _____

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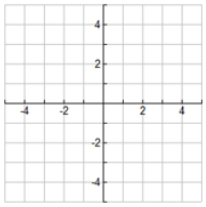
(Questions 45 – 53) Solve each of the following for x.

45) $x^2 - 9 = 0$ 46) $6x^2 - 5x - 4 = 0$ 47) $3x^2 + 10x + 3 = 0$ 48) $x^2 - 5x - 24 = 0$

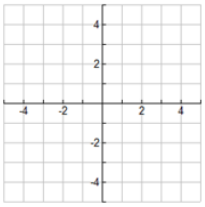
49) $x^4 + 11x^2 - 80 = 0$ 50) $x - 10\sqrt{x} + 9 = 0$ 51) $\ln(x + 4) = 0$ 52) $\ln(x) = 1$ 53) $e^{x+1} = 2$

(Questions 54 – 64) Graph the following equations

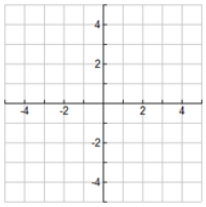
54) $y = x^2$



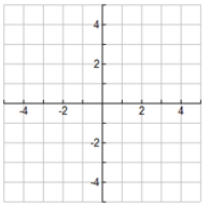
55) $y = x^3$



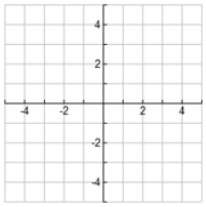
56) $y = |x|$



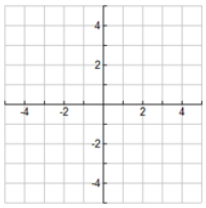
57) $y = \frac{|x|}{x}$



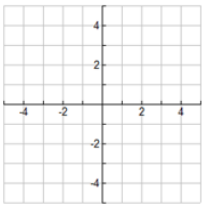
58) $y = \sqrt{9 - x^2}$



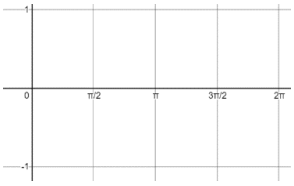
59) y = lnx



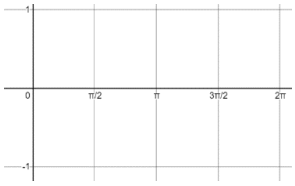
60) $y = e^x$



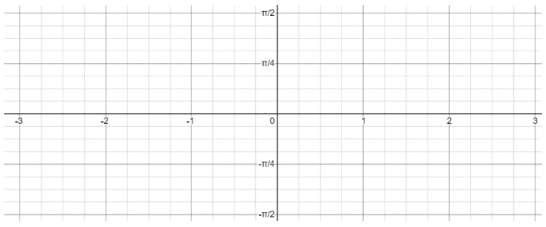
61) y = sinx



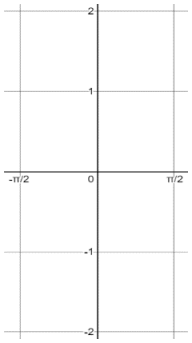
62) y = cosx



63) y = arctanx

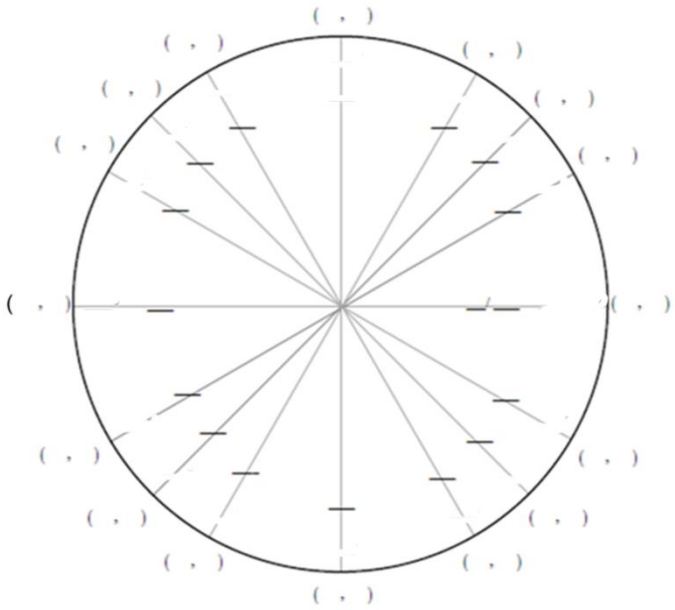


64) y = tanx



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Fill in the blanks on the unit circle and evaluate the following using the unit circle and NOT the calculator. Note: only radians matter in calculus!!



65) $cos\pi =$ _____ 66) $sin\frac{\pi}{6} =$ _____ 67) $sec\frac{7\pi}{6} =$ _____

68) $tan\frac{\pi}{2} =$ _____ 69) $csc\left(-\frac{11\pi}{6}\right) =$ _____ 70) $csc\frac{3\pi}{2} =$ ___

71) cos 0 = _____ 72) $cot\frac{5\pi}{2} =$ _____ 73) $sin\frac{5\pi}{3} =$ _____

(74 – 79) Solve for the principal values only

74) $sin^{-1}\left(-\frac{1}{2}\right) =$ _____ 75) $cos^{-1}\left(-\frac{\sqrt{3}}{2}\right) =$ _____

76) $\tan^{-1}(-1) =$ _____ 77) $arcsin\frac{\sqrt{2}}{2} =$ _____

78) $\arctan(-\sqrt{3}) =$ _____ 79) $arcsec\left(\frac{2\sqrt{3}}{3}\right) =$ _____

(Questions 80 – 85) Solve the following over the interval $[\mathbf{0}, \mathbf{2\pi})$

80) $\frac{1}{cscx} = \frac{1}{2}$ 81) $\frac{1}{cotx} = 1$ 82) $cos^2x = \frac{1}{4}$

83) $2\sin^2x + \sin x = 1$ 84) $\sin(2x) = 0$ 85) $5\cos(3x) + 2 = 2$