

2026-2027 AP Calculus AB Summer Math Assignment KEY

NAME: _____ DATE: _____ BLOCK: _____
AP CALCULUS AB SUMMER MATH PACKET 2026

THIS ASSIGNMENT IS DUE THE FIRST DAY OF SCHOOL BY 3:45 PM. NO LATE ASSIGNMENTS WILL BE ACCEPTED. FEEL FREE TO TURN IT IN EARLY BY EMAILING IT TO ME AT VONDA.BAKER@DARLINGTON.K12.SC.US.

A test on this material will be given during the first week of school. This test will be the first grade of the course in the first nine weeks for 2026-2026 school year.

- A] Refer to your pre-calculus notebook, the internet, or the sheet provided for assistance.
- B] Do not wait until the last minute to complete this assignment.
- C] Write neatly and in pencil on your own paper. Number all work.
- D] Show your work (step-by-step solutions) . Circle your final answers.
- E] Round decimal answers to the nearest thousandth.
- F] This is a review of concepts that you have been previously taught. Please be sure to do your own work or your own research of topics.
- G] When graphing functions, use graph paper and plot at least 5 points.
- H] Use the given links for review. Print a copy and keep them in your notebook.

Google any concepts you had trouble with during the assignment.

https://www.purplemath.com/	https://www.khanacademy.org/math/ap-calculus-ab
https://www.coolmath.com/algebra	https://www.khanacademy.org/math/prec-calculus
https://www.analyzemath.com/	http://tutorial.math.lamar.edu/pdf/Trig_Cheat_Sheet.pdf
http://www.mathbits.com/MathBits/TeacherResources/PreCalculus/Formula%20Sheet2.pdf	

****When the answer key is made available, please correct your assignment with a red pen.**

[1] Difference quotient: Using function notation to write difference quotients is an important skill. If $f(x) = 3x^2 + 4x$, what is ...?

[a] $\frac{f(4)-f(1)}{4-1}$ [b] $\frac{f(x)-f(1)}{x-1}$ [c] $f(x + h)$ [d] $\frac{f(x+h)-f(x)}{h}$

a. 7

b. $3x + 7$

c. $3(x + h)^2 + 4(x + h) = 3x^2 + 6xh + 3h^2 + 4x + 4h$

d. $6x + 3h + 4$

[2] Factor Polynomials: [a] $x^6 - 16x^4$ [b] $4x^3 - 8x^2 - 25x + 50$ [c] $8x^3 + 27$

[d] $x^4 - 1$

$$[e] x^3 - 1$$

(a) $x^4(x-4)(x+4)$ (b) $(x-2)(2x-5)(2x+5)$ (c) $(2x+3)(4x^2-6x+9)$ (d) $(x-1)(x+1)(x^2+1)$

$$[e] (x - 1)(x^2 + x + 1)$$

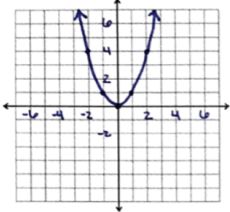
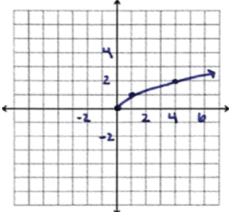
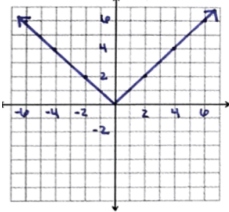
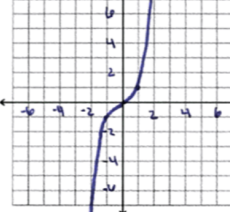
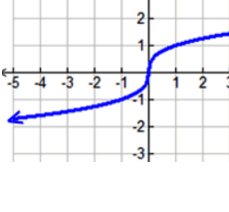
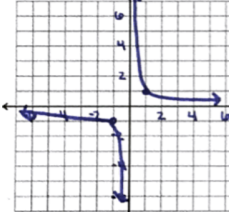
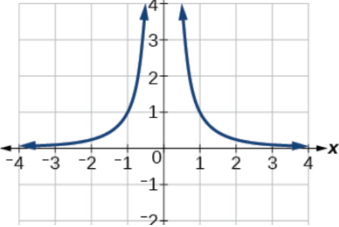
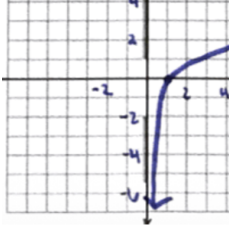
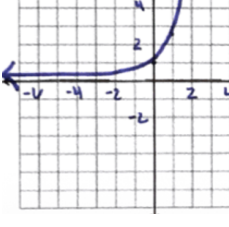
[3] Pascal's triangle:

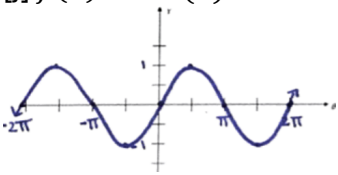
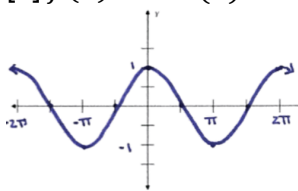
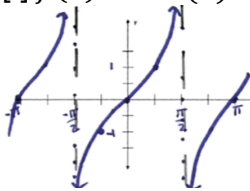
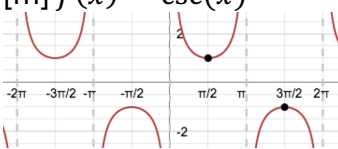
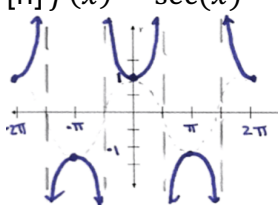
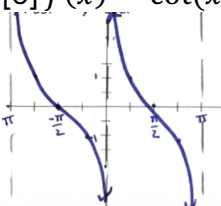
A] At the right, list the first 5 rows of Pascal's triangle.

B] Expand and simplify. $(3x - 2)^4$ $81x^4 - 216x^3 + 216x^2 - 96x + 16$



[4] Parent Functions: Sketch each parent function on graph paper or the handout provided. Plot at least points and important key features. Identify the name of the function, zeros, domain, range and asymptotes, if any.

[a] $f(x) = x^2$ 	[b] $f(x) = \sqrt{x}$ 	[c] $f(x) = x$ 
Name: quadratic Zero(s): 0 Domain: $(-\infty, \infty)$ Range: $[0, \infty)$	Name: square root Zero(s): 0 Domain: $[0, \infty)$ Range: $[0, \infty)$	Name: absolute value Zero(s): 0 Domain: $(-\infty, \infty)$ Range: $[0, \infty)$
[d] $f(x) = x^3$ 	[e] $f(x) = \sqrt[3]{x}$ 	[f] $f(x) = \frac{1}{x}$ 
Name: cubic Zero(s): 0 Domain: $(-\infty, \infty)$ Range: $(-\infty, \infty)$	Name: Cube Root Zero(s): 0 Domain: $(-\infty, \infty)$ Range: $(-\infty, \infty)$	Name: reciprocal Zero(s): none Domain: $(-\infty, 0) \cup (0, \infty)$ Range: $(-\infty, 0) \cup (0, \infty)$ Asymptote: VA: $x = 0$, HA: $y = 0$
[g] $f(x) = \frac{1}{x^2}$ 	[h] $f(x) = \ln(x)$ 	[i] $f(x) = e^x$ 
Name: squared reciprocal Zero(s): none Domain: $(-\infty, 0) \cup (0, \infty)$ Range: $(0, \infty)$ Asymptote: VA: $x = 0$, HA: $y = 0$	Name: natural logarithmic Zero(s): 1 Domain: $(0, \infty)$ Range: $(-\infty, \infty)$ Asymptote: VA: $x = 0$	Name: exponential Zero(s): none Domain: $(-\infty, \infty)$ Range: $(0, \infty)$ Asymptote: HA: $y = 0$

[j] $f(x) = \sin(x)$ 	[k] $f(x) = \cos(x)$ 	[l] $f(x) = \tan(x)$ 
Name: sine Zero(s): $x = n\pi, n = \text{integers}$ Domain: $(-\infty, \infty)$ Range: $[-1, 1]$	Name: cosine Zero(s): $x = n\pi + \frac{\pi}{2}$ Domain: $(-\infty, \infty)$ Range: $[-1, 1]$	Name: tangent Zero(s): $x = n\pi, n = \text{integers}$ Domain: All reals, $x \neq n\pi + \frac{\pi}{2}$ Range: $(-\infty, \infty)$ Asymptote: $x = n\pi + \frac{\pi}{2}$
[m] $f(x) = \csc(x)$ 	[n] $f(x) = \sec(x)$ 	[o] $f(x) = \cot(x)$ 
Name: cosecant Zero(s): none Domain: All reals, $x \neq n\pi$ Range: $(-\infty, -1] \cup [1, \infty)$ Asymptote:	Name: secant Zero(s): none Domain: All reals, $x \neq n\pi + \frac{\pi}{2}$ Range: $(-\infty, -1] \cup [1, \infty)$ Asymptote: $x = n\pi + \frac{\pi}{2}$	Name: cotangent Zero(s): $x = n\pi + \frac{\pi}{2}$ Domain: All reals, $x \neq n\pi$ Range: $(-\infty, \infty)$ Asymptote: $x = n\pi, n = \text{integers}$

[5] Evaluating trig functions in RADIANS only

[a] Trig Radian	$\sin \theta$	$\cos \theta$	$\tan \theta$	$\csc \theta$	$\sec \theta$	$\cot \theta$
$0, 2\pi$	0	1	0	undefined	1	undefined
$\frac{\pi}{6}$	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$	2	$\frac{2}{\sqrt{3}}$	$\sqrt{3}$
$\frac{\pi}{4}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1	$\sqrt{2}$	$\sqrt{2}$	1
$\frac{\pi}{3}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$	$\frac{2}{\sqrt{3}}$	2	$\frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$
$\frac{\pi}{2}$	1	0	undefined	1	undefined	0
π	0	-1	0	undefined	-1	undefined
$\frac{3\pi}{2}$	-1	0	undefined	-1	undefined	0
$\frac{3\pi}{4}$	$\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{2}}{2}$	-1	$\sqrt{2}$	$-\sqrt{2}$	-1
$\frac{5\pi}{6}$	$\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	$-\frac{1}{\sqrt{3}} = -\frac{\sqrt{3}}{3}$	2	$-\frac{2}{\sqrt{3}}$	$-\sqrt{3}$

Find x where $0 \leq x \leq 2\pi$. **[b]** $\sin x = \frac{1}{2}$

[c] $\tan x = 0$

[d] $\cos x = -1$

[b] $x = \frac{\pi}{6}, \frac{5\pi}{6}$

[c] $x = 0, \pi, 2\pi$

[d] $x = \pi$

[9] Horizontal asymptotes and Vertical asymptotes: Find the horizontal asymptote(s), vertical asymptote(s) and hole(s), if any, of each function.

[a] $y = \frac{1}{x-1} - 7$

[b] $y = \frac{2x^2-7x-4}{6x^2+7x+2}$

[c] $y = \frac{5x^2+20x}{x^3-3x^2-28x}$

[a] HA: $y = -7$, VA: $x = 1$

[b] HA: $y = 1/3$, VA: $x = -2/3$, Hole at $x = -1/2$

CHECK [c] HA: $y = 0$, VA: $x = 0$, $x = 7$, Hole at $x = -4$

[10] Rationalize the Denominator: **[a]** $\frac{2}{\sqrt{3}+\sqrt{2}}$ **[b]** $\frac{4}{a-\sqrt{5}}$ (a) $2(\sqrt{3}-\sqrt{2})$ (b) $-1-\sqrt{5}$

[11] Using Graphing Calculator: Find all roots to the nearest thousandth.

[a] $f(x) = 3 \sin(2x) - 4x + 1$ from $[-2\pi, 2\pi]$ 0.957

[b] $f(x) = x^4 - 8x^2 + 5$ -2.705, -0.827, 0.827, 2.705

[c] Find the coordinates of any points of intersection $f(x)$ and $g(x)$.

$f(x) = x^2 - 5x + 2$ and $g(x) = 3 - 2x$ (-0.303, 3.606) and (3.303, -3.606)

[12] Trigonometric Identities

[a] $\sin^2 x + \cos^2 x = 1$

[b] $1 + \tan^2 x = \sec^2 x$

[c] $\cot^2 x + 1 = \csc^2 x$

[d] $\sin 2x = 2 \sin x \cos x$

[e] $\cos 2x = \cos^2 x - \sin^2 x = 2\cos^2 x - 1 = 1 - 2\sin^2 x$

[13] Domain & Range: Find the domain and range of each function.

[a] $f(x) = \sqrt{x-4}$	[b] $y = \sqrt{4-x^2}$	[c] $g(x) = \frac{x}{\sqrt{14-2x}}$
D: $[4, \infty)$	D: $[-2, 2]$	D: $(-\infty, 7)$
R: $[0, \infty)$	R: $[0, 2]$	R: $(-\infty, \infty)$