Trinity Catholic High School

Advanced Placement Summer Work

AP Calculus AB

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AP Calculus AB

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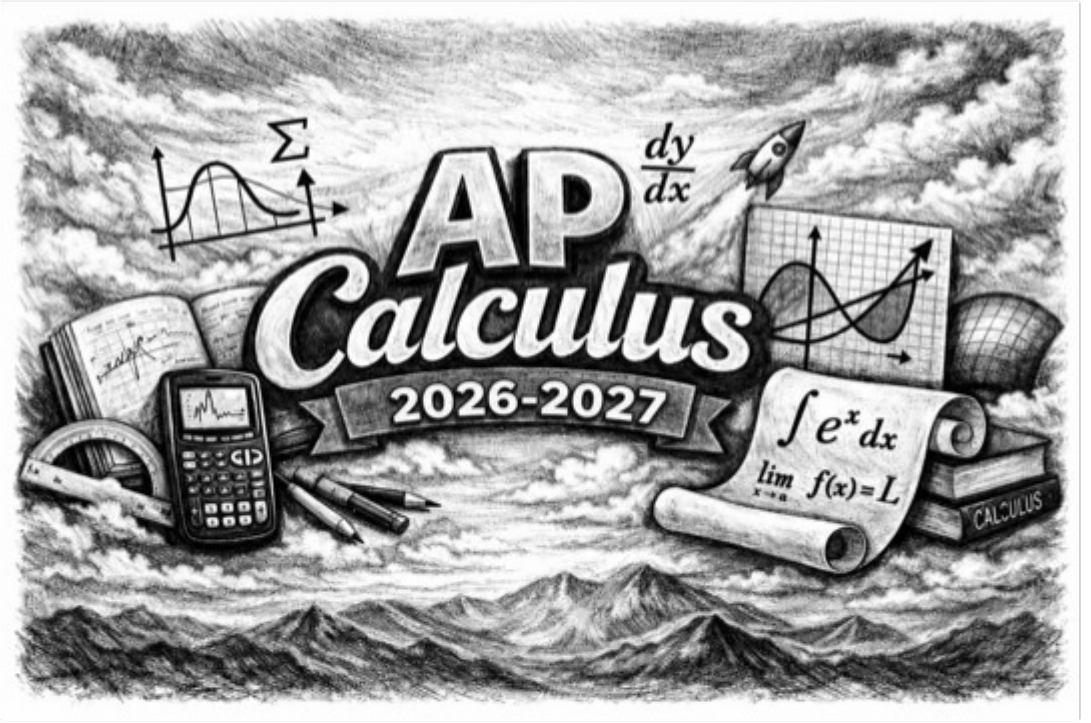


Summer Readiness Assignment

Due: Wednesday, August 12th, 2026

Summative Quiz: Friday, August 14th, 2026

Contact: Mrs. Alotta dalotta@tchs.us

PLEASE READ!!

This summer assignment is designed to help you refresh the prerequisite algebra and precalculus skills needed for success in AP Calculus.

Please use notes, videos, calculators, AI tools, or online resources to support you and <u>check your answers</u>.

THE GOAL IS READINESS, NOT PERFECTION.

Module 1 – Function Thinking

Essential Skills: · Function notation · Difference quotients · Composition of functions · Domain restrictions

1. A. The amount of money in a saving account:

x (weeks)	5	10	15	20	25	30
$f(x)$ (amount)	0	4	6	21	49	70

Find the average rate of change over the interval $5 \leq x \leq 30$

B. What does this AROC tell us about the savings habits?

C. If we maintained this savings habit, how much money would be in the account after 50 weeks?

D. What algebra mistake is most common in finding AROC?

Confidence Rating (circle one): 1 2 3

2. A. Given $f(x) = \dfrac{x-4}{x^2-16}$

Determine the domain of $f(x)$

B. Why is $x = 4$ and $x = -4$ excluded?

C. What algebra skill helps identify restrictions?

D. Would the graph have a hole or asymptote?

Confidence Rating (circle one): 1 2 3

3. A. Given $f(x) = 2x + 1$ and $g(x) = x^2 - 4$
Find $f(g(x))$ and simplify.

B. What does "composition" mean?

C. Does order matter? Would $g(f(x))$ produce the same?

D. For $f(g(x)) = (x+2)^2 + 4(x+2) - 5$, identify each function:
$f(x) =$ $g(x) =$

Confidence Rating (circle one): 1 2 3

4. A. Given $f(x) = \begin{cases} x+1, & x < 0 \\ x^2, & x \geq 0 \end{cases}$

Find: $f(-2)$ Find: $f(3)$

B. How do you decide which equation to use?

C. Why is the inequality symbol important?

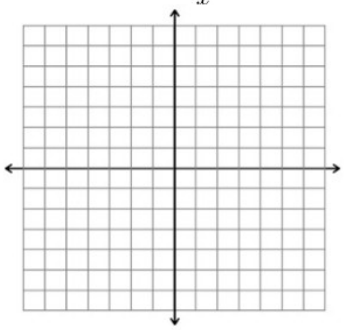
D. What mistake is most common with piecewise functions?

Confidence Rating (circle one): 1 2 3

Module 2 – Graphs & Transformations

Essential Skills: · Parent functions · Transformations · Asymptotes · End behavior

1. A. Sketch the graph of $y = \frac{1}{x}$



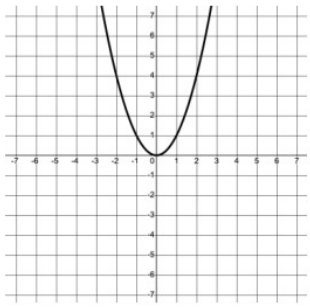
B. What are the asymptotes?

C. Why is the function undefined at x = 0?

D. Describe the end behavior with a limit statement.

Confidence Rating (circle one): 1 2 3

2. A. Given the parent function $y = x^2$
Sketch the graph of $y = -(x-2)^2 + 3$



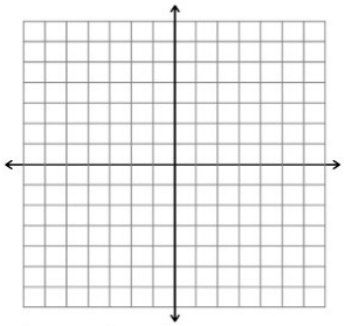
B. Which direction is the graph shifted horizontally?

C. What does the negative sign do?

D. What is the vertex?

Confidence Rating (circle one): 1 2 3

3. A. Sketch the graph of $y = e^x$



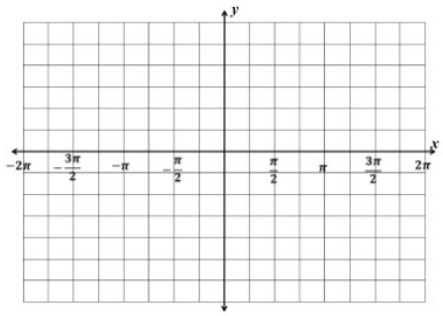
B. What horizontal asymptote exists?

C. Why is the graph always positive?

D. How is exponential growth different from linear growth?

Confidence Rating (circle one): 1 2 3

4. A. Sketch the graph of $y = \sin x$



B. What is the amplitude?

C. What is the period?

D. Why does the graph repeat?

Confidence Rating (circle one): 1 2 3

Module 3 – Algebra for Calculus

Essential Skills: · Factoring · Rational expressions · Complex fractions

1. A. Simplify $\dfrac{x^2-9}{x-3}$

B. What factoring pattern is used?

C. Why can't you cancel anything until after you factor?

D. How can you tell if it's a hole or vertical asymptote?

Confidence Rating (circle one): 1 2 3

2. A. Solve: $\dfrac{\frac{x}{3}}{\frac{5}{3}} = 2$

B. What little trick do we use to simplify the complex fraction?

C. Show one other way to solve this.

D. Show a third way to solve this.

Confidence Rating (circle one): 1 2 3

3. A. Solve $x^2 - 5x + 6 = 0$

B. Why does factoring help solve the equation?

C. How can you verify the solutions?

D. The Fundamental Theorem of Algebra tell us this should have how many zeros/solutions?

Confidence Rating (circle one): 1 2 3

4. A. Make a sign chart for the function:

$$f(x) = x^2(x+2)(x-3)(x-5)$$

B. The fundamental Theorem of Algebra tells us this should have how many zeros/solutions?

C. What do sign charts help us determine?

D. What CAN'T sign charts help us determine?

Confidence Rating (circle one): 1 2 3

Module 4 – Exponentials, Logs & Equations

Essential Skills: · Exponent rules · Logarithms · Solving equations

1. A. Solve: $2^{x+1} = 16$ B. Must you use a logarithm to solve this? C. What exponent rule can be used instead? D. How can you verify your solution? Confidence Rating (circle one): 1 2 3	2. A. Condense: $\log(xy^2) - \log(x)$ B. Which logarithm rule applies? C. How do you know which argument goes in the denominator? D. How is $\log(xy^2) + \log(x)$ different? Confidence Rating (circle one): 1 2 3
3. A. Solve: $\ln(x-3) = 2$ B. What inverse operation removes ln? C. Why must x > 3? D. How can you check the solution? Confidence Rating (circle one): 1 2 3	4. A. Evaluate: $\ln e =$ $\ln 1 =$ B. What is the base on natural log? C. Why does $\ln e^x = x$ D. Why does $e^{\ln x} = x$ Confidence Rating (circle one): 1 2 3

Module 5 – Trigonometry & the Unit Circle

Essential Skills: · Unit circle fluency · Trig identities · Trig equations

1. A. Evaluate: $\sin\left(\frac{2\pi}{3}\right) =$

   B. In a unit circle, which quadrant contains the angle?

   C. Why is the answer positive?

   D. What system do you use to remember your trig values?

   Confidence Rating (circle one): 1 2 3

2. A. Simplify to one trig function: $\frac{1-\sin^2 x}{\cos x}$

   B. Which trig identity applies?

   C. Why is this identity important?

   D. Show an alternative way to simplify this.

   Confidence Rating (circle one): 1 2 3

3. A. Solve: $\sin x = \frac{1}{2}$ on the interval $0 \le x \le 2\pi$

   B. Why are there multiple solutions?

   C. In a unit circle, which quadrants contain solutions?

   D. How many solutions are there for all x?

   Confidence Rating (circle one): 1 2 3

4. A. Evaluate: $2\sin\left(\frac{\pi}{2}\right) + \cos\left(\frac{\pi}{2}\right) =$

   B. Using proper order of operations, what must be evaluated first?

   C. Evaluate: $\cos^2\left(\frac{\pi}{3}\right) =$

   D. Why must you find the cos value before squaring? Show another way to write the expression from part C.

   Confidence Rating (circle one): 1 2 3