

AP Calculus AB Exam Review

Secant and Tangent Lines

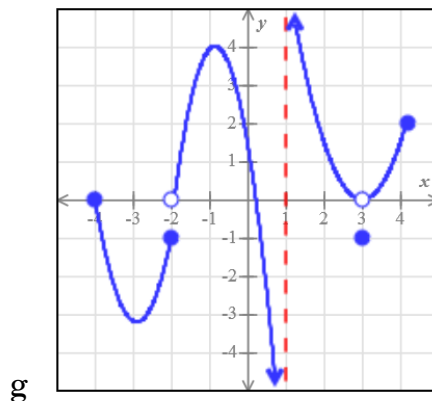
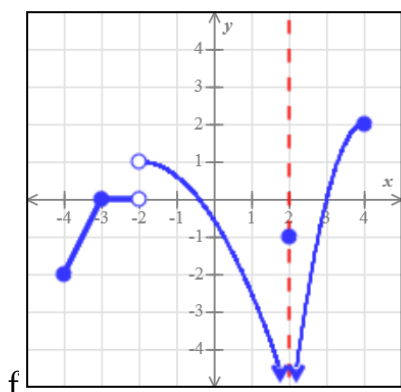
1. Explain the difference between a secant line and a tangent line.
2. For what reason would one want to find the slope of a tangent line at a particular point on a curve? (Hint: use a real world example to help explain)
3. Use the table below to answer the following questions.

t	0	1	5	7	9
$a(t)$	-3	-1	2	8	12

- (a) Approximate the rate of change at $t = 3$.
 - (b) Which two points would create the best approximation and why if one was to approximate the rate of change at $t = 5$.
4. Write the equation to line tangent to the curve $g(x) = \frac{e^x+1}{x-2}$ at the point $(1, g(1))$.

Limits in All Forms

5. When do limits exist? When do limits not exist?
6. When a limit approaches an arbitrary value (a number) what graphical characteristics are possible and how do I recognize it through algebraic limits?
7. Evaluate the limits using the graphs of $f(x)$ and $g(x)$ below



a. $\lim_{x \rightarrow 3} g(x)$

b. $\lim_{x \rightarrow -2^+} f(x)$

c. $\lim_{x \rightarrow -4^-} f(x)$

d. $\lim_{x \rightarrow 1} g(x)$

e. $\lim_{x \rightarrow -2^-} g(x)$

f. $\lim_{x \rightarrow 1} g(x)$

g. $f(2)$

h. $g(3)$

8. Evaluate the following limits given the functions

$$f(x) = \frac{x-4}{\sqrt{x}-2} \quad g(x) = e^{\sin x} \quad h(x) = -x^2 - x \quad j(x) = \sqrt{x} - 1$$

a. $\lim_{x \rightarrow \frac{\pi}{6}} g(x)$

e. $\lim_{x \rightarrow 9} \left(\frac{h}{f}\right)(x)$

b. $\lim_{x \rightarrow 1} 3(f + h)(x)$

f. $\lim_{x \rightarrow 1} \left(\frac{h}{j}\right)(x)$

c. $\lim_{x \rightarrow 4} f(x)$

g. $\lim_{x \rightarrow 1} g(j(x))$

d. $\lim_{x \rightarrow -\pi} f(g(x))$

9. What graphical characteristic is being asked about as x approaches infinity?

10. Distinguish between being asked $\lim_{x \rightarrow \infty} f(x)$ and finding the horizontal asymptote of the function.

11. Show how to solve $\lim_{x \rightarrow \infty} \frac{3x^3 + 4x^2 - x - 5}{x^2 + 3}$ using the three different methods.

12. Explain why so many failed the question find the horizontal asymptotes of $f(x) = \frac{1+5^x}{3-5^x}$

13. Evaluate the following limits:

a. $\lim_{x \rightarrow \infty} \frac{-2x^2 + 5x - 9}{5x^2 - 3x - 100}$

d. $\lim_{x \rightarrow \infty} \frac{x}{\ln(x)}$

b. $\lim_{x \rightarrow -\infty} \frac{-7x + 2}{\sqrt{25x^2 - 10x}}$

e. $\lim_{x \rightarrow \infty} \frac{7x^3 - 4x}{9x^3 + 5x^4}$

c. $\lim_{x \rightarrow -\infty} \frac{\sqrt{x^{10}}}{x}$

14. Identify the horizontal asymptotes of the function, $c(w) = f(g(x))$

where $f(x) = \frac{1-x}{x^2}$ and $g(x) = e^{x-1}$.

Continuity will be covered in class Tuesday