

Continuity review: 3 conditions for continuity at a point:

1) $f(c)$ is defined

2) $\lim_{x \rightarrow c} f(x)$ exists $\left(\text{This means that } \lim_{x \rightarrow c^-} f(x) = \lim_{x \rightarrow c^+} f(x) \right)$

3) $\lim_{x \rightarrow c} f(x) = f(c)$

1. Find the constant a such that the function is continuous at the given point.

a)

$$g(x) = \begin{cases} \frac{7 \sin(2x)}{4x}, & x > 0 \\ a - 2x, & x \leq 0 \end{cases}$$

b)
$$g(x) = \begin{cases} \frac{1 - \cos(2x)}{2x} - a, & x > 0 \\ \cos x + a, & x \leq 0 \end{cases}$$

c)
$$g(x) = \begin{cases} \tan \frac{x}{4}, & x > \pi \\ -2 \sec x + a, & x \leq \pi \end{cases}$$

2. Determine whether Rolle's Theorem can be applied to $f(x) = \sec x$ on the interval $\left[-\frac{\pi}{4}, \frac{\pi}{4}\right]$. If so, find all values of c in the interval such that $f'(c) = 0$.

3. Apply the Mean Value Theorem to $f(x) = 2 \sin x + \sin 2x$ on the interval $[0, \pi]$. Find all values of c in the interval $(0, \pi)$.

4. An object's position is given by the $F(t) = 2 \sec^3\left(\frac{t}{6}\right)$, is continuous and differentiable in domain $0 \leq t < 3\pi$ seconds. $F(t)$ is given in meters.

a. Find the average velocity (avg. rate of change) from $t = 0$ to $t = 2\pi$ (Include Units)

b. At what point in time does the instantaneous velocity equal the average velocity from part (a)? (Set up equation but do not solve) Use MVT.

c. What is the instantaneous velocity of the object when $t = \pi$ seconds? (Include Units)

d. What is the instantaneous velocity of the object when $t = 2\pi$ seconds? (Include Units)

e. Find the equation of the tangent line to the graph at $t = 2\pi$

AP Calculus AB Trig Unit Test Review WS #2

Name _____

1. Solve for x : $\cos(2x) = 1$ for $0 < x < 2\pi$

2. Solve for x : $\tan(4x) = 1$ for $0 < x < \pi$

3. Find the critical points for the function $e^{x + \sin 2x}$ in the domain $0 < x < 2\pi$

4. Find the equation of the line tangent to the graph at $(3, -1)$ for the equation $\sin(\pi x) + \cos(\pi y) = x^2 y$

AP Calculus AB Trig Unit Test Review WS #3

Name _____

1. Suppose a bird is flying horizontally 40 ft above your head at 20 ft/sec (flying away from you). How fast is the angle of elevation changing when your horizontal distance from the bird is 30 ft?
2. Find dy/dx for the equation $xe^{\sin(2y)} + 4x = \ln y$
3. Find the equation of the tangent line to function $f(x) = x \arccos(x^2)$ to the graph at the point $(0, 2\pi)$ in the given domain $[0, \pi]$
4. Find equation of the tangent line to the graph $\arctan(x + y) = y^2 + \frac{\pi}{4}$ at the point $(1, 0)$

5. Sketch the graph of function $f(x) = \sin(2x)$ on interval $[0, \pi]$. Find all ordered pairs of absolute and relative extrema, intervals increase/decrease, intervals of concavity up/down, and POI.

a) the relative extrema min: _____ max: _____

b) the point(s) of inflection: _____

c) concavity intervals up: _____

down: _____

d) Absolute extrema: Absolute min: _____ Absolute max: _____

d) Sketch the graph

6. Sketch the graph of function $f(x) = \frac{1}{2}x - \cos x$ on interval $[-\pi, \pi]$. Find all ordered pairs of absolute and relative extrema, intervals increase/decrease, intervals of concavity up/down, and POI.

a) the relative extrema min: _____ max: _____

b) the point(s) of inflection: _____

c) concavity intervals up: _____

down: _____

d) Absolute extrema: Absolute min: _____ Absolute max: _____

d) Sketch the graph