BC chap 1-3 test review (multiple choice!)

Which of these functions are continuous at x = 2?

1. I. $f(x)=\begin{cases}\frac{x^2-4}{x-2} & for\ x<2\\ 2x & for\ x\geq 2\end{cases}$ II. $f(x)=\begin{cases}\frac{x^2-4}{x-2} & for\ x\leq 2\\ 2x & for\ x>2\end{cases}$ III. $f(x)=\begin{cases}\frac{|x-2|}{x-2} & for\ x\neq 2\\ 1 & for\ x=2\end{cases}$

a) I only b) II only c) III only d) I and II e) all three

2. The approximate value of the definite integral of $f(x)=2x^2$ from x=0 to x=9 using the trapezoidal rule with three trapezoids is

a) 756 b) 136 c) 171 d) 408 e) 513

3. $\lim_{h\to 0}\frac{(x+h+1)^4-(x+1)^4}{h}=$ a) $(x+1)^4$ b) 1 c) 4 d) $4(x+1)^3$ e) indeterminate

4. In proving that $\lim_{x\to 7}3x=21$, what is the largest possible choice for δ, given any $\varepsilon>0$?

a) ε b) $\frac{\varepsilon}{2}$ c) $\frac{\varepsilon}{3}$ d) $\frac{\varepsilon}{7}$ e) $\frac{\varepsilon}{21}$

5. If g(x) is a second degree polynomial with g(0)=3, and g'(2)=10 and g''(10)=4, then g(x) =?

a) $3x^2+3$ *b)* x^2+4x+3 *c)* $2x^2+4x+3$ *d)* $2x^2+2x+3$ *e)* x^2+6x+3

6. The equation of a line tangent to $f(x)=6-x^3$ at the point x= -1 is:

a) y=3x+8 b) y=3x+10 c) y= -3x+4 d) y=-3x+2 e) none of these

7. Given $h(x)=\begin{cases}x^2-1 & for\ x<0\\ x-1 & for\ 0\leq x\leq 3\\ x^3 & for\ x>3\end{cases}$ where is the function discontinuous?

a) x=0 only b) x=0 and 3 c) x = 1, -1 d) x= 3 only e) x = 1, -1, 3

8. $\lim_{h\to 0}\frac{(2+h)^6-2^6}{h}=$ a) 0 b) 192 c) 16 d) 64 e) 8

If $y=\sin^2(2x+3)$, *then* $\frac{dy}{dx}=?$

9. *a)* $2\sin(2x+3)$ *b)* $2\cos(2x+3)^2$ *c)* $2\sin(2x+3)\cos(2x+3)$ *d)* $2\sin(4x+6)$ *e)* $4\cos(2x+3)$

hint use a double angle formula you learned from your amazing trig teacher!

10. If w'(x)= sin(x) – cos(x) and w(π) = 4, then w(x)=?

a) cos(x) – sin(x) +5 b) -cos(x) – sin(x) +5 c) cos(x) + sin(x) +3

d) -cos(x) – sin(x) +3 e) -cos(x) + sin(x) +3

Challenge Problems Ch 1,2,3

1. Knowing that $\lim_{x\to 2}\frac{x^3-ax^2+bx-2}{x-2}=-1$ solve for a, b.

2. How many different lines with a slope = -6 are tangent to the function $f(x)=x^3-2x^2-5x+6$? _____ Find the equation of ONE of them.

3. Consider a function that satisfies the following:

At x = 4, the value of the function is 1, and the slope of the function is 1.

a) Let $f(x)=ax^2$, where a is a nonzero constant. Show that it is not possible to find a value for a so that f meets the requirement above.

b) Let $h(x)=\frac{x^n}{k}$ where k is a nonzero constant and n is a positive integer. Find the values of k and n so that h meets the requirement above.

4. Find the equation of a line that is tangent to both $y=x^2+1$ and $y=-(x+1)^2$

From 2009/2010 and 10/11 tests

1. prove $\frac{d}{dx}\frac{1}{x}=\frac{-1}{x^2}$

2. The horizontal position of a particle is given by $x(t)=3\sin(\frac{\pi t}{3})+\frac{t^3}{2}$, where x is measured in feet and t in seconds. With t > 0 [calc needed]

a) What is the acceleration of the particle when it's position is 100 feet? (round to three digits) [6]

3. Given: $g'(x)=\frac{3x^2-2x+\sqrt{x}}{x^4}$ and g(1)=1, find g(x)

not on test ☺

4. Consider the function $f(x)=-3-\frac{4}{x^2+1}$

a) Use deltas, epsilons, D's or E's to prove that $\lim_{x\to+\infty} f(x)=-3$. Write a summary statement recapping why this is a "proof". [5]

5. Find the equation of the line tangent to y = lnx that passes through the point (0, 1). Exact answer please. Draw a sketch of the situation first. [5]

6. Let $y=\sin 2x$ *find* $\frac{d^{97}y}{dx^{97}}$