Calculus Quiz 1 Date: 2018/10/24 13:20-15:00 100 minutes Total: 102

1. Find the slope of the curve at the given P, and an equation of the tangent line at P.

   (12 points)

   $y = x^3 - 3x^2 + 4$, P (2,0)

2. Find the limit of quotient. (12 points)

   $$\lim_{x\to 4} \frac{4-x}{5-\sqrt{x^2+9}}$$

3. Find $L = \lim_{x\to c} f(x)$. Then find a number $\delta > 0$ such that for all x. (12 points)

   $0 < |x-c| < \delta \Rightarrow |f(x) - L| < \epsilon.$

   $f(x) = \frac{x^2-4}{x-2}$, $c = 2$, $\epsilon = 0.05$

4. Find the limit of $\lim_{h\to 0} \frac{\sin(\sin h)}{\sin h}$ (10 points)

5. For what values of a and b is

   $$g(x) = \begin{cases} ax + 2b, & x \le 0 \\ x^2 + 3a - b, & 0 < x \le 2 \\ 3x - 5, & x > 2 \end{cases}$$

   continuous at every x? (12 points)

6. Find the asymptote equation of the function. (12 points)

   $$y = \frac{x^3+1}{x^2}$$

7. Find the slope of the function's graph at the given point. Then find an equation for the line tangent to the graph there. (10 points)

   $h(t) = t^3 + 3t$, (1,4)

8. Find the value of the derivative. (12 points)

   $\left.\frac{dr}{d\theta}\right|_{\theta=0}$ if $r = \frac{2}{\sqrt{4-\theta}}$

9. Find the derivative of the function. (10 points)

   $$v = \frac{1+x-4\sqrt{x}}{x}$$