MATH 101- QUIZ QUESTIONS SAMPLE: ENJOY!

Sr. Num.:　　　　ID. Num.:　　　　Name:　　　　　　　　　　　Sec. Num.:

Q 1. The line $y = 2x + 5$ is normal (perpendicular) to the tangent of the curve

$$f(x) = a \; cos(tan^{-1}(x^2))$$

at $x = 1$. Find the value of a. **Answer**: $a = \frac{\sqrt{2}}{2}$. **Hint**: study Example 5, page 173.

Q 2: Find

$$\lim_{x \to 1} \frac{-2^{cos(\frac{\pi x}{2})} + 1}{x^2 - 1}.$$

Answer: $\frac{\pi ln2}{4}$. **Hint**: after factoring the denominator, this limit can be expressed as a derivative of a function.

Q 3: Let g be a differentiable function that is implicitly expressed as

$$g(x) + x \sin g(x) = x^2 + 3x + \frac{\pi}{2}.$$

Find $g'(0)$. **Answer**: $g'(0) = 2$. **Hint**: use the above equation to find $g(0)$.

Q 4: At which point $P(a, b)$ does the curve $y = ln(3x)$ have a tangent that passes through the origin. **Answer**: $P(\frac{e}{3}, 1)$. **Hint**: study Example 5, page 139.

Q 5: If
$$\frac{y'}{y} = \frac{\sqrt{x+y}}{x(1+y)^2},$$
then find y'' at the point $P(1,1)$. **Answer**: $\frac{1-6\sqrt{2}}{32}$. **Hint**: use logarithmic differentiation.

Q 6: Let
$$T(w) = sin^4\left(\frac{\pi w}{8}\right) - cos^4\left(\frac{\pi w}{8}\right).$$
Find the third derivative of T at $w = 6$. **Answer**: $\frac{\pi^3}{64}$. **Hint**: factor first.