MATH 101- QUIZ 5: ENJOY!

Sr.:   ID: Name: Sec.:

Q 1: Find the equation of the normal line to the curve

$$x^3 + y^3 - 2xy = 0$$

at the point $P(1,1)$.

Q 2: Use the definition of derivative at a point to find the limit

$$\lim_{x \to 1} \frac{\log(10x) - 1}{x - 1}.$$

Hint: $\log 10 = 1$.

Q 3. At $x = 1$, the curve

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

has a tangent that is parallel to the line $4y = -2x + 5$. Find the value of a.
Hint: parallel means same slope.

Q 4: A toy car moves along a straight direction for 12 seconds, where its velocity $[m/sec]$ is given by

$$v(t) = t^2 - 12t + 11.$$

When does the car move forward? What is its maximum speed?

Q 5: If
$$(2x)^y = (2y)^x,$$
then find y' at the point $P(1,2)$. **Hint**: use logarithmic differentiation.

Q 6: A conical cup has a diameter of 6 cm and height of 9 cm. The cup is filled with a fresh Cappuccino at a rate of 5 cm^3/sec. While filling the cup, all the radius, height and volume of the Cappuccino are changing in time. How fast does the radius increase when the height is 4 cm?