PACE
Brookdale Community College
Calculus II Quiz

Name_____

1) Given the equation $y\left(\sqrt{x}\right)^4 + y^2 = 3x^2$. Find $\dfrac{dy}{dx}$ and determine the slope of the line tangent to its graph at the point (2, 2).

2) Find the slope of the line tangent to the graph of the equation $x^2 \cos y = \sin(xy)$ at the point $(4, \dfrac{\pi}{3})$.

3) Given $y(x) = x^{\ln x}$, find $\dfrac{dy}{dx}$ at the points (10, 10), (100, 20), (1000,100), and (0,10). How does $\dfrac{dy}{dx}$ behave when $y = 0$, $y = \infty$.

4) For $g(x) = x^{\left(x^{x}\right)}$, find $\dfrac{dg}{dx}$ at the points (10,10) and (2,16).

5) Does the fundamental theorem of calculus support the following calculation? Is the calculation correct? Why or why not? Please, provide sufficient detail to justify your answer.

Dr. J. Batista
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$$\int_{-2}^{5}\frac{1}{x^4}\,dx=\frac{x^{-3}}{-3}\bigg|_{-2}^{5}=\frac{-1}{375}-\frac{1}{24}=\frac{-399}{9,000}$$

6) Given $h(x)=(\text{Cos }x)^{\text{Sin}x},\,0<x<\pi.$ Find $h'(x)$.

7) Find $P'(x)$ given $P(x) = \int_0^{x^3} t^3 \{\operatorname{Sin} t\} dt$. Hint: apply the fundamental theorem of calculus.

8) Evaluate the following integral and check the result by differentiation.
$$\int \frac{\operatorname{Sin} x}{1 - \operatorname{Sin}^2 x} dx$$

9) Find the general antiderivative and check your answer.
$$\int \{2x+1\} e^{x^2} e^x dx$$

10) Solve $\dfrac{dy}{dx} = \dfrac{-x}{y}$.