Math 100. Quiz 3. 2017-10-20 (Friday Q3-F-s) **Time 25min**

Section ..... Instructor name .....

Your email .....

- **For each computation of limits in this test, if the limit does not exist, indicate whether it diverges to $-\infty$ or $+\infty$.**
- Simplify all your answers as much as possible and express answers in terms of fractions or constants such as $\frac{1}{100}$, $\sqrt{e}$ or $\ln(4)$ rather than decimals.

1. Each part of this question is worth 1 mark, and the correct answer will get the full mark.

(a) **(1pt)** Compute $f'(t)$ for $f(t) = \left(e^{2t} + t\right)^2$

(b) **(1pt)** If $x^3y^2 + y = e^x$, compute $\dfrac{dy}{dx}$ at $(x, y) = (0, 1)$.

2. Each part of this question is worth 2 marks. **You have to show all your work in order to get credit.**

(a) **(2pt)** Suppose $f(x)$ is a differentiable function such that $f(1) = 1$ and $f'(1) = 3$. Compute $g'(1)$ where

$$g(x) = f((f(x))^3)$$

(b) **(2pt)** Find all possible values for the constant C such that the tangent line to $y = \arcsin(Cx)$ at $x = 1$ is parallel to the line $2y - x = 7$.

3. This question is worth 4 marks. **You have to show all your work in order to get credit.**

Consider the following equation

$$\frac{x}{y-1} = x^{y+1}$$

Compute $\dfrac{dy}{dx}$ at the point $(x, y) = (1, 2)$.

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1. Each part of this question is worth 1 mark, and the correct answer will get the full mark.

(a) **(1pt)** Compute $f'(x)$ for $f(x) = \sqrt{1 + \cos(2\pi x)}$

(b) **(1pt)** If $xy + y^2x + 1 = x^2$, compute $\dfrac{dy}{dx}$ at $(x, y) = (1, 0)$.

2. Each part of this question is worth 2 marks. **You have to show all your work in order to get credit.**

(a) **(2pt)** Suppose $f(x)$ is a differentiable function such that $f(1) = 1$ and $f'(1) = 2$. Compute $g'(1)$ where

$$g(x) = f(f(x^3))$$

(b) **(2pt)** Find all possible values for the constant C such that the tangent line to $y = C\arctan(Cx)$ at $x = 1$ is parallel to the line $3y - x = 1$.

3. This question is worth 4 marks. **You have to show all your work in order to get credit.**

Consider the following equation

$$4xy = (x^2 + 1)^{y+1}$$

Compute $\dfrac{dy}{dx}$ at the point $(x, y) = (1, 1)$.