Check Your Knowledge 2-3

ⓘ This is a preview of the published version of the quiz

Started: Oct 12 at 7:46am

Quiz Instructions

Complete this ungraded quiz will help you to estimate your mastery of the course material. I can also see which questions students are having trouble with so I can go over the material again in class or in recitation.

Keep in mind

- Practice test is not timed but the midterm and final will be.
- Unlike this test the midterm and final may require you to show your work.
- Multiple attempts are not permitted on the practice test.

Question 1 — 1 pts

Find the differential of the function $f(x) = \sqrt[3]{(x^2+a)^2}$ at $x_0 = 1$ for $a = 3$ and $\mathrm{d}x = 10^{-3}$.

- ○ 8.952×10^{-3}
- ○ 8.4×10^{-4}
- ○ 7.332×10^{-3}
- ○ -6.994×10^{-5}

Question 2

1 pts

Considering the function f with

$$f(x) = \begin{cases} xe^{1/x} + (1+a)\sin(x) + b, & x < 0 \\ 2(a+b), & x = 0 \\ c\sqrt{x^2 - x + 16}, & x > 0\,. \end{cases}$$

Find $a, b, c \in \mathbb{R}$ so that f is differentiable.

- ○ $(a, b, c) = \left(\frac{10}{12}, -\frac{7}{12}, \frac{11}{12}\right)$
- ○ $(a, b, c) = (1, 1, 2)$
- ○ $(a, b, c) = \left(\frac{1}{2}, \frac{2}{5}, -2\right)$
- ○ $(a, b, c) = \left(-\frac{16}{15}, \frac{32}{15}, \frac{8}{15}\right)$

Question 3

1 pts

Suppose the functions f, g are differentiable in $\mathbb{R}$ with

$$\text{i)} \quad \left(\frac{f}{g}\right)(x) = -\left(\frac{g'}{f'}\right)(x)\,,$$

$$\text{ii)} \quad f(2) = 3 \quad \text{and} \quad g(2) = 1\,,$$

$$\text{ii)} \quad \text{the function } (f-g)(x) \text{ is constant}\,.$$

Then, find the expression of the function $(f \cdot g)(x)$.

- ○ $\ln(x+1) + 2x$
- ○ $12x - 1$
- ○ 3
- ○ $x\sqrt{x} + 2$

Question 4

1 pts

Suppose the differential function f with $f(3x+1) = x^4 \quad \forall x \in \mathbb{R}$. Find the derivative of f.

- $\frac{5(x^2-1)}{32}$
- $\frac{4(x-1)^3}{81}$
- $\frac{3(x+3)^2}{22x}$
- $\frac{\ln(x)+x^3}{2x^2+1}$

Question 5

1 pts

Find all the polyonyms $P(x)$ with $P(x) = [3P'(x)]^2 \quad \forall x \in \mathbb{R}$.

- $\frac{1}{36}x^2 + bx + 9b^2\,, \qquad b \in \mathbb{R}$
- $bx^3 + (b-2)x^2 + \frac{1}{3}\,, \qquad b \in (0, +\infty)$
- $x^5 - 2\left(\frac{1}{\sqrt{b}} - 3\right)x^3 + x - 4$
- $2x + \frac{b^3}{4}\,, \qquad b \in \mathbb{R}$

Question 6

1 pts

Find the corner points of the function $f(x) = \ln(x) + |x-1|\sqrt{x}$.

- ○ $x = +\infty$
- ○ $x = 1$
- ○ $x = 0$
- ○ $x = 0, 1$

Question 7

1 pts

If $y = \left(\frac{z^2+3}{2}\right)^4$, $z = \sin(t)$ and $x = e^t$ find the function $\frac{\mathrm{d}y}{\mathrm{d}x}$.

- ○ $\left[\sin^2\left(\ln(x)\right)+3\right]^{3\,\frac{\sin\left(2\ln(x)\right)}{4x}}, \qquad x > 0.$
- ○ $\left[\sin^2\left(x\right)+3\right]^{3\,\frac{\sin\left(\ln(x)\right)\cos\left(\ln(x)\right)}{4x}}, \qquad x > 0.$

- $\left[\sin^2\left(e^x\right)+3\right]^{\frac{4\,2\sin\left(2e^x\right)}{3x^2}}, \qquad x>0.$
- $\left[\cos^2\left(\ln(x)\right)+2\right]^{\frac{2\,\sin\left(\ln(x)\right)}{2x}}, \qquad x>0.$

Question 8

1 pts

Suppose the differentiable and "1-1" function $f:\mathbb{R}\backslash\{-2\}\to\mathbb{R}\backslash\{-2\}$ for which holds $f'(x)=2+f(x)$ for all $x\in\mathbb{R}\backslash\{-2\}$. If $f'\left(f^{-1}(x)\right)\neq 0$ find the derivative of f^{-1}.

- $\frac{x}{3+x}$
- $x+2$
- $\frac{1}{x+2}$
- $\frac{1}{(x+1)^2}$

Question 9

1 pts

Suppose the differentiable and invertible function $f : (0, \infty) \to \mathbb{R}$ with $f(e) = 0$ and $f'(x) = \dfrac{1}{x \ln(x)}$. Find the number $(f^{-1})(0)$.

- ○ e
- ○ 3
- ○ 1
- ○ $1/e$

Not saved Submit Quiz