

Name: _____

Section: _____

You have 15 minutes to complete the quiz. Please **show all work**, and then **write your answer on the line provided**.

1. Let $f(x) = x^2$. Compute $\frac{f(2+h) - f(2)}{h}$ and simplify.

$$\begin{aligned} \frac{f(2+h) - f(2)}{h} &= \frac{(2+h)^2 - (2)^2}{h} \\ &= \frac{\cancel{4} + 4h + h^2 - \cancel{4}}{h} \\ &= \frac{4h + h^2}{h} \\ &= 4 + h \end{aligned}$$

2pb

4+h

2pts

2. Let $f(x) = 2 \cdot e^x + 1$. Find an equation for $f^{-1}(x)$.

$$\begin{aligned} y &= 2 \cdot e^x + 1 \quad 1 \text{ pt} \\ \text{Solve for } x & \\ \# & \\ y - 1 &= 2 \cdot e^x \\ \frac{y-1}{2} &= e^x \quad 1 \text{ pt} \\ \ln\left(\frac{y-1}{2}\right) &= x = f^{-1}(y) \end{aligned}$$

$f^{-1}(x) = \ln\left(\frac{x-1}{2}\right)$

1pt

CONTINUED ON OTHER SIDE

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3. Let $f(x) = \frac{x+1}{x-1}$, $g(x) = \tan(x)$ and $h(x) = x^2$. Write down and simplify $(f \circ g \circ h)(x)$.

$$(f \circ g \circ h)(x) = f(g(h(x)))$$

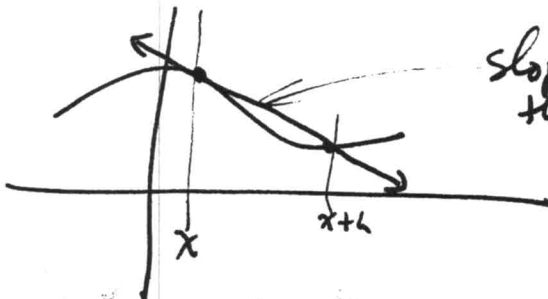
$$= f(g(x^2)) \quad 1 \text{ pt}$$

$$= f(\tan(x^2)) \quad 1 \text{ pt}$$

$$= \frac{\tan(x^2) + 1}{\tan(x^2) - 1} \quad 1 \text{ pt}$$

4. What is the graphical meaning of $\frac{f(x+h) - f(x)}{(x+h) - x}$? Use words and/or label it on a sketch.

It is the slope of the secant line
on f between $(x, f(x))$ and $(x+h, f(x+h))$



$$\text{slope of this line} = \frac{f(x+h) - f(x)}{(x+h) - x}$$