

Math 172 - Quiz 3

September 6, 2017

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (4 points) Let $f(x) = x^5 + 7x + 2$. Compute $(f^{-1})'(10)$.

$$(f^{-1})'(10) = \frac{1}{f'(f^{-1}(10))} = \frac{1}{f'(1)} = \boxed{\frac{1}{12}}$$

$$f'(x) = 5x^4 + 7$$

$$f^{-1}(10) = u$$

$$\Leftrightarrow f(u) = 10 \Leftrightarrow u^5 + 7u + 2 = 10 \Leftrightarrow u = 1$$

2. (3 points) Determine the slope of the line tangent to the graph of $f(x) = xe^{x^3-2x}$ at the point where $x = 1$.

$$f'(x) = e^{x^3-2x} + x e^{x^3-2x} (3x^2-2)$$

$$f'(1) = e^{-1} + (1)e^{-1}(1) = \boxed{2e^{-1} \approx 0.736}$$

3. (3 points) Integrate: $\int \frac{5e^{1/x}}{x^2} dx = -5 \int e^u du$

$$u = \frac{1}{x}$$

$$du = -\frac{1}{x^2} dx$$

$$-du = \frac{1}{x^2} dx$$

$$= -5e^u + C$$

$$= \boxed{-5e^{1/x} + C}$$