

Name:

Math 231 - Derivative Practice

1. Find $f'(x)$ for $f(x) = \sqrt[5]{x} + e^x + \frac{1}{e}$.

$$f'(x) = \frac{1}{5} x^{-5/5} + e^x + 0$$

2. Find $f'(x)$ for $f(x) = e^{2x} + 2^x$. Hint: Be careful here!

don't have the tools to complete
problem at this point

3. Find the equation of the tangent line to $f(x) = x^\pi + 10x^{-1}$ at $x = 1$.

$$f'(x) = \pi x^{\pi-1} - 10x^{-2}$$

$$\begin{aligned} f'(1) &= \pi(1)^{\pi-1} - 10(1)^{-2} \\ &= \pi - 10 \end{aligned}$$

$$y = (\pi - 10)(x - 1) + 11$$

4. Find $h'(x)$ for $h(x) = \sqrt{x}(x-1)$. $= x^{3/2} - x^{1/2}$

$$h'(x) = \frac{3}{2} x^{1/2} - \frac{1}{2} x^{-1/2}$$

5. Find $\frac{dy}{dx}|_{x=2}$ for $y = -5x + 2 + e^x$.

$$y' = -5 + e^x$$

$$y' \text{ at } 2 : -5 + e^2$$

6. Where (i.e. what x-value(s)) does $g(x) = 10x^2 - 5x$ have a horizontal tangent line?

$$g'(x) = 20x - 5$$

$$0 = 20x - 5$$

$$5 = 20x$$

$$x = \frac{1}{4}$$