

Who thinks the Houston Texans will win on Sunday? Key

AP Calculus AB: 3.6 Derivatives of Exponential Functions

Find $f'(x)$ of the following functions

1) $f(x) = e^{2x^4}$

$$f'(x) = 8x^3 e^{2x^4}$$

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

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

3) $f(x) = e^{\sqrt{x}}$

$$f'(x) = \frac{1}{2\sqrt{x}} e^{\sqrt{x}} = \frac{e^{\sqrt{x}}}{2\sqrt{x}}$$

4) $f(x) = \sqrt[3]{e^x} = e^{x/3}$

$$f'(x) = \frac{1}{3} e^{x/3} = \frac{e^{x/3}}{3}$$

5) Evaluate $\lim_{h \rightarrow 0} \frac{(x+h)^2 - 3(x+h) + e^{3-(x+h)^2} - (x^2 - 3x + e^{3-x^2})}{h}$

$$2x - 3 - 2x e^{3-x^2}$$

6) If $g(x) = 12 - \frac{1}{e^x}$ and $f(x) = -7 + 5x$ then when at what x-value would the two functions have parallel tangent lines

$$g'(x) = f'(x)$$

$$e^{-x} = 5$$

$$12(e^{-x}) = 15$$

$$-x = \ln(5)$$

$$x = -\ln(5)$$

(Calculator Problem)

7) Find the point when the function $g(x) = \frac{3x}{5} - \sqrt{e^{x+3}}$ has a tangent line with a slope of zero. (round to the correct number of decimals)

$$\text{(Answer: } -2.635) \quad g(-2.635) = -2.781$$

$$g'(x) = 0$$

$$\text{point } (-2.635, -2.781)$$