Quiz 5

Name: SOLUTIONS

1. Let $f(x) = 3x^3 - 4x^2 + x - 7$.

(a) Compute $f'(x)$.

$f'(x) = 9x^2 - 8x + 1$

(b) What is the slope of $f(x)$ when $x = 1$? What does that tell you?

$f'(1) = 9 - 8 + 1 = 2 > 0 \Rightarrow f$ increasing @ $x = 1$

2. Let $f(x) = 3^x + \dfrac{3}{\sqrt[3]{x^2}}$. $\Rightarrow f(x) = 3^x + 3x^{-2/3}$

(a) Compute $f'(x)$.

$f'(x) = (\ln 3)\cdot 3^x + 3\left(-\frac{2}{3}\right)x^{-5/3}$

$= (\ln 3)\cdot 3^x - 2x^{-5/3}$

(b) What is the slope of $f(x)$ when $x = 1$? What does that tell you?

$f'(1) = (\ln 3)\cdot 3 - 2 > 0 \Rightarrow f$ increasing when $x = 1$

(NOTE: $\ln 3 > 1$, so $3\ln 3 > 3$ and $3\ln 3 - 2 > 0$.)

3. Let $f(x) = e^x - x^e$.

(a) Compute $f'(x)$.

$f'(x) = e^x - ex^{e-1}$

(b) What is the slope of $f(x)$ when $x = 1$? What does that tell you?

$f'(1) = e - e = 0 \Rightarrow f$ neither increasing nor decreasing when $x = 1$.