MATH 131 Fall, 2017 Quiz 7 Name: ____Solutions________

No Calculator. Show your work in details.

1. (1pt) State the definitions of $f'(x)$.

$f'(x) = \lim_{h\to 0} \dfrac{f(x+h) - f(x)}{h}$ provided the limit exists.

2. (1pt) Let r be a real number. $\dfrac{d}{dx}[x^r] = rx^{r-1}$

3. (8pts) Compute $h'(x)$ (without using the Product Rule and Quotient Rule). It is not required to simply the answers.

(1) $h(x) = x^{2017} + \dfrac{1}{x^{2017}} - 2\sqrt[3]{x} + \dfrac{1}{\sqrt{x}} - e^x + e^3 + \sqrt{2}$

$h(x) = x^{2017} + x^{-2017} - 2\,x^{1/3} + x^{-1/2} - e^x + e^3 + \sqrt{2}$

$h'(x) = 2017x^{2-16} - 2017x^{-2018} - \frac{2}{3}x^{-2/3} - \frac{1}{2}x^{-3/2} + e^x + 0 + 0$

$= 2017x^{2-16} - 2017x^{-2018} - \frac{2}{3}x^{-2/3} - \frac{1}{2}x^{-3/2} + e^x$

(2) $h(x) = (2x^2 - x)(x^3 - 3)$

$h(x) = 2x^5 - x^4 - 6x^2 + 3x$

$h'(x) = 10x^4 - 4x^3 - 12x + 3$

(3) $h(x) = \dfrac{\sqrt{x} + 3 - x}{x^2}$

$h(x) = x^{-3/2} + 3x^{-2} - x^{-1}$

$h'(x) = -\frac{3}{2}x^{-5/2} - 6x^{-3} + x^{-2}$