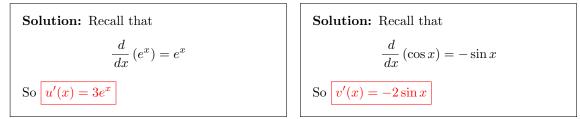
Please show **all** your work! Answers without supporting work will not be given credit. Write answers in spaces provided.

Name:_

- 1. Find the derivative of the following functions:
 - (a) **[2 pts]** $u(x) = 3e^x$

(b) **[2 pts]**
$$v(x) = 2\cos(x)$$



(c) **[2 pts]**
$$w(x) = \frac{2}{x^2} + 4x^2 + 6x + 1$$

Solution: Rewrite w(x) to not have any fractions. i.e. $w(x) = 2x^{-2} + 4x^2 + 6x + 1$ By Power Rule, $w'(x) = -4x^{-3} + 8x + 6 = \frac{-4}{x^3} + 8x + 6$

2. [4 points] Let $h(x) = u(x) \cdot w(x)$. Find h'(x). (Don't Simplify.)

Solution: Recall that when $h(x) = u(x) \cdot w(x)$, we use Product Rule, which states

$$h^\prime(x) = u^\prime(x) w(x) + u(x) w^\prime(x)$$

Using part (a) and (c), we get

$$h'(x) = 3e^x \left(\frac{2}{x^2} + 4x^2 + 6x + 1\right) + 3e^x \left(\frac{-4}{x^3} + 8x + 6\right)$$
$$= 3e^x \left(\frac{2}{x^2} + 4x^2 + 6x + 1 + \frac{-4}{x^3} + 8x + 6\right)$$
$$= 3e^x \left(\frac{-4}{x^3} + \frac{2}{x^2} + 4x^2 + 14x + 7\right)$$