Worksheet 5

Name: _____

Directions

- This counts as your "attendance" for the day. You must give this to me today to get credit for it.

- You may leave if you finish the packet.

- You may work in groups, and you can ask me for assistance.

- I grade this worksheet based on completion, not accuracy; however, you should strive for completely correct answers in order to make sure you understand the material.

1. Find the derivatives of the functions shown below. [Suggestion: identify how each function is a *composition* of two simpler functions.]

    (a) $h(x) = (2 + 3x)^{35}$

    (b) $F(t) = e^{14t}$

    (c) $r(t) = \sin(\cos(t))$

    (d) $S(x) = \dfrac{1}{\sqrt{1 - x^2}}$

    (e) $T(t) = e^{t^2}$ (Careful: this is not the same as e^{2t}.)

    (f) $F(x) = \sqrt{\cos(e^t)}$

2. A population P of jellyfish can be modeled by the equation $P(t) = 12e^{0.12t}$, where P is measured in thousands of jellyfish and t is in years. Find the instantaneous rate of growth of the population initially and after 3 years.

3. Optimize (find max's and min's) of the functions below on the given intervals using the method outlined in class.

(a) $f(x) = \dfrac{1}{1 + x^2}$, on $[-1, 1]$.

(b) $g(x) = \sqrt{x^3 - 2x + 2}$ on $[-2, 1]$

4. Suppose that $u(x) = f(g(x))$ and $v(x) = g(f(x))$, and $w(x) = g(g(x))$, where $f(x)$ and $g(x)$ are the functions graphed below.

(a) Find $u'(1)$.

(b) Find $v'(1)$.

(c) Find $w'(1)$.