Honors Brief Calculus Name_____
Unit 14 4$^{\text{th}}$ Groupwork

1. Approximate the definite integral by using a partition in which each subinterval is of length 2. Choose u_i as the midpoint of each subinterval. Leave your answer in exact form.

$$\int_0^8 \left[x^2 + 2x \right] dx$$

Evaluate the indefinite integrals:

2. $\int \left(e^{4t} - 2e^{2t} \right) dt$

3. $\int \left(x^5 + 2x^3 - 3x^2 - 8 \right) dx$

4. $\int \frac{4 + 3\sqrt[3]{x}}{\sqrt[3]{x}} \, dx$

5. Integrate by parts.

$\int 6x^2 \, e^{2x} dx$

6. Integrate by substitution.

$\int x \sqrt{x-3} \, dx$

7. Find $h(x)$ if $h''(x) = 40x^3 - 36x^2$, $h'(1) = -2$, *and* $h(0) = 7$

Evaluate the definite integrals (leave answers in exact form):

8. $\int_2^4 \left[x^2 - \dfrac{2}{x} \right] dx$

9. $\int_0^2 4x^2 \left(x^3 - 1 \right) dx$

10. Solve the differential equation below with the boundary condition that $y = 14$ and $x = 1$.

$$\frac{dy}{dx} = 10x^4 + 12x^3 - 3x^2 + 2x + 4$$

11. Sketch the graph of the functions, then find the area enclosed by the graphs of the given functions. Leave answer in exact form.

$$f(x) = -x^2 + 2x \quad \text{and} \quad g(x) = x^2$$