Name: _____   **Class (circle):   Sync.   Async.**

- There are 12 points possible on this proficiency: **One point per problem. No partial credit.**

- A passing score is 10/12.

- You have 60 minutes to complete this proficiency.

- No aids (book, calculator, etc.) are permitted.

- You do **not** need to simplify your expressions.

- Your final answers **must start with** $f'(x) =$, $dy/dx =$, or similar.

- Circle your final answer.

Compute the derivatives of the following functions.

1. $f(x) = \dfrac{x^2 - \pi^2}{3}$

2. $y = (\ln x)^3 + 2x$

3. $r(\theta) = \dfrac{\cos(\theta)}{\sin(\theta)}$

4. $h(x) = x^a + e^{-ax}$, where a is a fixed constant

5. $w(s) = \dfrac{se^s}{s+1}$

6. $y(t) = e^{\sec(t^2)}$

7. $g(x) = \left(4x^{-2/3} + \sqrt{2}\right) \cdot \ln(x)$

8. $k(x) = \dfrac{2}{x} + \dfrac{4}{3} - 2x + 4x^3$

9. $y = \tan(2x)e^x \sin(3x)$

10. $s(t) = \sqrt{5t} - \dfrac{t}{4} + \ln(2)$

11. $y = e^{(3x+1)} \cdot \arctan(x^2)$

12. Compute dy/dx if $4x^2 - 9xy + y^2 = 36.$ You must solve for dy/dx.