Name: _____

Calculus I

– Formulas in a Nutshell –

Derivatives

1. $f'(x) = \lim_{h \to 0}$ _____

2. **Equation of Tangent Line to $f(x)$ at $x = a$:** _____

3. **Constant Multiple:**
$\frac{d}{dx}(cf(x)) =$ _____

4. **Sum/Difference Rule:**
$\frac{d}{dx}(f(x) \pm g(x)) =$ _____

5. **Power Rule:**
$\frac{d}{dx}(x^n) =$ _____

6. **Product Rule:**
$\frac{d}{dx}(f(x)g(x)) =$ _____

7. **Quotient Rule:**
$\frac{d}{dx}\left(\frac{f(x)}{g(x)}\right) =$ _____

8. **Chain Rule:**
$\frac{d}{dx}(f(g(x))) =$ _____

9. $\frac{d}{dx}(e^x) =$ _____

10. $\frac{d}{dx}(a^x) =$ _____

11. $\frac{d}{dx}\ln(x) =$ _____

12. $\frac{d}{dx}\sin(x) =$ _____

13. $\frac{d}{dx}\cos(x) =$ _____

14. $\frac{d}{dx}\tan(x) =$ _____

15. $\frac{d}{dx}\sec(x) =$ _____

16. $\frac{d}{dx}\csc(x) =$ _____

17. $\frac{d}{dx}\cot(x) =$ _____

18. $\frac{d}{dx}\arcsin(x) =$ _____

19. $\frac{d}{dx}\arccos(x) =$ _____

20. $\frac{d}{dx}\arctan(x) =$ _____

21. $\frac{d}{dx}\sinh(x) =$ _____

22. $\frac{d}{dx}\cosh(x) =$ _____

23. **L'Hôpital's Rule:**
If f, g are differentiable and $f(a) = g(a) = 0$,
then $\lim_{x \to a} \frac{f(x)}{g(x)} =$ _____

Integrals

1. **Fundamental Theorem of Calculus:**
   If f is continuous on $[a, b]$ and $f(t) = F'(t)$, then $\int_a^b f(t)dt =$ _____

2. $\int_a^b f(x)dx = -\int_{\_}^{\_}$ _____

3. $\int_a^c f(x)dx + \int_c^b f(x)dx =$ _____

4. **Constant Multiple:**
   $\int_a^b cf(x)dx =$ _____

5. **Sum/Difference Rule:**
   $\int_a^b (f(x) \pm g(x))\,dx =$ _____

6. **Average Value of f from a to b:**
   _____

7. **Power Rule:**
   $\int x^n dx =$ _____, if $n \neq$ ___

8. **Constant Multiple:**
   $\int cf(x)dx =$ _____

9. **Sum/Difference Rule:**
   $\int (f(x) \pm g(x))\,dx =$ _____

10. $\int \frac{1}{x}dx =$ _____

11. $\int e^x dx =$ _____

12. $\int \sin(x)dx =$ _____

13. $\int \cos(x)dx =$ _____