NAME:_____
DATE:_____

DERIVATIVE AND INTEGRAL PRACTICE
POLYNOMIALS

$f(x)=\sum Cx^n$, $\quad slope=\sum nCx^{n-1}$ $\quad area=\int f(x)\,dx=\frac{1}{n+1}Cx^{n+1}$

Calculate the (1) slope and (2) area under the graph.

1. $f(x)=-3x$

   $f'(x)=-3(1)x^0=-3$

   $\int f(x)\,dx=-\frac{3}{2}x^2$

2. $f(x)=-4x^3$

   $f'(x)=-4(3)x^2=-12x^2$

   $\int f(x)\,dx=-\frac{4}{4}x^4=-x^4$

3. $f(x)=-x^6$

   $f'(x)=-6x^5$

   $\int f(x)\,dx=-\frac{1}{7}x^7$

4. $f(x)=-x^6-4x^3-3x$

   $f'(x)=-6x^5-12x^2-3$

   $\int f(x)\,dx=-\frac{1}{7}x^7-x^4-\frac{3}{2}x^2$

5. $f(x)=5x^3-2x^2+10x-15$

   $f'(x)=15x^2-4x+10$

   $\int f(x)\,dx=\frac{5}{4}x^4-\frac{2}{3}x^3+5x^2-15x$

6. $f(x)=4x^3-2x^5$

   $f'(x)=12x^2-10x^4$

   $\int f(x)\,dx=x^4-\frac{1}{3}x^6$

7. $f(x)=x+\frac{1}{2}x^4-\frac{3}{4}x^3+10$

   $f'(x)=1+2x^3-\frac{9}{4}x^2$

   $\int f(x)\,dx=\frac{1}{2}x^2+\frac{1}{10}x^5-\frac{3}{16}x^4+10x$

8. $f(x) = \pi x^4 + \sqrt{6}$

$f'(x) = 4\pi x^3$

$\int f(x)\,dx = \frac{\pi}{5}x^5 + \sqrt{6}x$

9. $f(x) = 7x - \sqrt{3} + \pi x^2$

$f'(x) = 7 + 2\pi x$

$\int f(x)\,dx = \frac{7}{2}x^2 - \sqrt{3}x + \frac{\pi}{3}x^3$

10. $f(x) = x^5 + \frac{1}{2}x^{1/2} - \frac{3}{4}x^{-1/4} + x^{-2} + 10x^{-9}$

$f'(x) = 5x^4 + \frac{1}{4}x^{-1/2} + \frac{3}{16}x^{-5/4} - 2x^{-3} - 90x^{-10}$

$\int f(x)\,dx = \frac{1}{6}x^6 + \frac{1}{3}x^{3/2} - x^{3/4} - x^{-1} - \frac{5}{4}x^{-8}$