Name: _____

Basic Differentiation Rules

1) Complete the table below:

Given $f(x)$, Find $f'(x)$ Write answers with positive exponents

1. $f(x) = x^6$

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

3. $f(x) = x^{-5}$

4. $f(x) = x^{-1}$

5. $f(x) = x^{-1/2}$

6. $f(x) = x^{4/5}$

7. $f(x) = x^{8/3}$

8. $f(x) = x^{-3/4}$

2) Complete the table below:

Given f(x)	Rewrite f(x) using laws of exponents	Find $f'(x)$ Write answers with positive exponents
1. $f(x)=\sqrt[5]{x^3}$		
2. $f(x)=\sqrt{x}$		
3. $f(x)=\frac{1}{x^8}$		
4. $f(x)=\frac{1}{\sqrt{x}}$		

3) Find each of the following derivatives using the product rule. Leave your answer in simplified form.

1) $f(x)=(3x-2)(2x+7)$

2) $f(x)=(x^2-5x)(2x-9)$

3) $f(x)=(5x^2-7)(2x^2+3x-1)$

4) $f(x)=5x^4(9x^2-7x-6)$

5) $f(x)=2x^{-3}(x^4-5x^2)$

6) $f(x)=10x$

7) $f(x)=(2x^{-1}-3x)(-4x^{-2}+5x^2)$

8) $f(x)=(5x+4)^2$

4) Write each of the following quotients as a product and then use the product rule to find $f'(x)$.

1. $f(x)=\frac{x^2-2x-3}{\sqrt{x}}$

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