

## Developing Product Rule and Quotient Rule for Exponents

1. Write  $x^3 \cdot x^5$  in expanded form and simplify:
2. Write  $x^7 \cdot x^2$  in expanded form and simplify:
3. Write  $\frac{x^5}{x^2}$  in expanded form and simplify:
4. Write  $\frac{x^7}{x^5}$  in expanded form and simplify:
5. Write  $\frac{x^2}{x^5}$  in expanded form and simplify:
6. Write  $\frac{x}{x^6}$  in expanded form and simplify:

## Rules for Exponents:

- Anything to the 0 power is equal to 1:  $x^0 = 1$
- Anything to the 1st power is equal to itself:  $x^1 = x$
- Multiplying terms with the same base, keep the base and add the exponents:  $x^a \cdot x^b = x^{a+b}$
- Dividing terms with the same base, keep the base and subtract the exponents (top minus bottom):  $\frac{x^a}{x^b} = x^{a-b}$
- If you end up with a negative exponent, then make it one over the term to change the exponent to positive:  $x^{-a} = \frac{1}{x^a}$

Simplify the following exponent problems. Answers should have one single positive exponent.

1.  $x^6 \cdot x^5 =$

2.  $x^8 \cdot x^{-15} =$

3.  $x^{-4} \cdot x^{10} =$

4.  $x^{-7} \cdot x^4 =$

5.  $x^{-12} \cdot x^{-4} =$

6.  $\frac{x^5}{x^3} =$

7.  $\frac{x^4}{x^{10}} =$

8.  $\frac{x^{-3}}{x^4} =$

9.  $\frac{x^{-2}}{x^{-6}} =$

10.  $\frac{x^8}{x^{-7}} =$

11.  $\frac{x^{-4}}{x^7} =$

12.  $x^{16} \cdot x^{-4} =$

13.  $\frac{x^{15}}{x^{-6}} =$

14.  $x^{-3} \cdot x^9 =$