Dividing Powers
(same base)

Rule:

For all numbers x (not zero) and all integers m and n ,

$$\frac{x^m}{x^n} = x^{m-n}; \quad x \neq 0$$

"This simply means ... when you are dividing, and the bases are the same, you SUBTRACT the exponents."
(top exponent subtract bottom exponent)

Consider:. ..when in doubt, expand terms

$$\frac{x^5}{x^2} = \frac{x \cdot x \cdot x \cdot x \cdot x}{x \cdot x}$$

$$= \frac{\cancel{x} \cdot \cancel{x} \cdot x \cdot x \cdot x}{\cancel{x} \cdot \cancel{x}}$$

$$= x^3$$

Observe this rule at work in the following examples:

1. $\dfrac{2^5}{2^2} = 2^3$

The bases are the same (both 2's), so the exponents are subtracted.

2. $\dfrac{7b^6}{b^4} = 7b^2$

The bases are the same, so the exponents are subtracted. Notice how the numbers in front of the bases (7 and 1) are being divided.

3. $\dfrac{a^4}{a^6} = a^{-2}$ or $\dfrac{1}{a^2}$

The bases are the same (both *a*'s), so the exponents are subtracted.
Remember: top exponent minus bottom exponent.

4. $\dfrac{6x^7}{3x^4} = 2x^3$

The bases are the same, so the exponents are subtracted.
The numbers in front of the bases are divided.

5. $\dfrac{-12s^3t^5}{4s^2t^3} = -3st^2$

The exponents are subtracted for the bases that are the SAME. The numbers in front, the coefficients, are divided.

6. $\dfrac{-25a^2b^6}{5a^2b^4} = -5b^2$

Notice what happened to the bases with the same exponents -- they reduced to the number 1.

7. $\dfrac{28p^3q^2}{7p^2q^3} = 4pq^{-1}$ or $\dfrac{4p}{q}$

Remember: top exponent minus bottom exponent.
Remember: negative exponents can be written as a fraction.