Name ______________________ Date Answer Key

QUOTIENT OF POWERS

You can divide powers using the **Quotient of Powers Property**. It states that when you are dividing powers with the same base, you can keep the base and subtract the exponents.

$$\frac{x^n}{x^m} = x^{n-m}$$

Let's try it! Simplify $\frac{5^6}{5^4}$ using the Quotient of Powers Property.

$$\frac{5^6}{5^4} = 5^{6-4} = 5^2$$

You can see why this property works by expanding each power and simplifying.

$$\frac{5^6}{5^4} = \frac{5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5}{5 \cdot 5 \cdot 5 \cdot 5} = \frac{5 \cdot 5 \cdot \cancel{5} \cdot \cancel{5} \cdot \cancel{5} \cdot \cancel{5}}{\cancel{5} \cdot \cancel{5} \cdot \cancel{5} \cdot \cancel{5}} = \frac{5 \cdot 5}{1} = 5^2$$

Try it yourself! Divide. Express each quotient as a power.

$\frac{9^5}{9^2} = 9^3$	$\frac{2^7}{2^3} = 2^4$	$\frac{10^{10}}{10^6} = 10^4$
$\frac{3^{10}}{3^5} = 3^5$	$\frac{12^8}{12^1} = 12^7$	$\frac{3^9}{3^2} = 3^7$
$\frac{7^{12}}{7^3} = 7^9$	$\frac{4^{15}}{4^4} = 4^{11}$	$\frac{11^9}{11^1} = 11^8$
$\frac{3^{19}}{3^{17}} = 3^2$	$\frac{8^{15}}{8^8} = 8^7$	$\frac{6^{21}}{6^{16}} = 6^5$
$\frac{15^{20}}{15^9} = 15^{11}$	$\frac{9^{17}}{9^{16}} = 9^1$	$\frac{24^{30}}{24^{14}} = 24^{16}$