Student Activity: To investigate $a^p \div a^q$

Use in connection with the interactive file, '$a^p \div a^q$', on the Student's CD.

1.

a. Write 2 x 2 x 2 x 2 x 2 in the form 2^n.

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b. Write 2 x 2 in the form 2^m.

_____

c. Using your answers from parts a and b, write $\frac{2^n}{2^m}$ and cancel where appropriate. How many 2 s are there now?

_____

d. Do you notice any relationship between the number of 2 s there are in part c and the number of 2 s there were in parts a and b of this question?

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2.

a. Write 2 x 2 x 2 x 2 x 2 x 2 in the form 2^a.

_____

b. Write 2 x 2 x 2 x 2 x 2 in the form 2^b.

_____

c. Using your answers from parts a and b, write $2^a \div 2^b$ as $\frac{2^a}{2^b}$ and cancel where appropriate. How many 2 s are there now?

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d. Using your answers from parts a and b, do you notice any relationship between the number of 2 s there are in part c of this question and the number of 2 s there were in parts a and b in this question?

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3.

a. Write $3^2 \div 3^3$ in the form 3^n. Explain how you got your answer.

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b. Write $4^2 \div 4^3$ in the form 4^n. Explain how you got your answer.

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c. Write $a^6 \div a^4$ in the form a^m. Explain how you got your answer.

_____

4. Can the above rule be applied to the following situation $2^p \div 3^q$. Explain your answer.

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5.

a. If $3^p \div 3^4 = 3^7$, find the value of p.

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b. If $a^6 \div a^4 = 2^2$, find the value of a.

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c. Is $a^6 \div a^4 = a^2$ for all values of a? Try different values of a, to enable you to come to your conclusion.

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d. For what value of q is $a^{12} \div a^q = a^{10}$, $q \in \mathbb{Z}$?

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6. In the expression 3^6, what name is given to the 6?

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7. When is $a^p \div a^4 = a^9$? Are there any other values of q for which the statement is true?

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8. Why does $5^0 \div a^p$ always equal a^{-p}?

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9. Write $\sqrt{2}$ in the form $2^{n.}$

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10. Write $\frac{1}{\sqrt{2}}$ in the form $2^{b.}$

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11. State in your own words a rule for dividing numbers written in index form.

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