

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

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

1.

- a. Write $2 \times 2 \times 2 \times 2 \times 2$ in the form 2^n .

- b. Write $2 \times 2 \times 2 \times 2$ in the form 2^m .

- c. Using your answers from part a and b, write $2^n \times 2^m$ as $2 \times 2 \times 2$ etc. How many 2 s are there now?

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

2.

- a. Write $2 \times 2 \times 2 \times 2 \times 2 \times 2$ in the form 2^a .

- b. Write $2 \times 2 \times 2 \times 2 \times 2$ in the form 2^b .

- c. Using your answers from part a and b, write $2^a \times 2^b$ as $2 \times 2 \times 2$ etc. How many 2 s are there now?

- d. Using your answers from part 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?

3.

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

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

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

d. Under what circumstances can the above rule apply to $a^6 \times b^4$?

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

5.

a. If $3^p \times 3^4 = 3^7$, find p.

b. If $a^6 \times a^4 = 2^{10}$, find a.

6.

a. For what values of a is $a^6 \times a^4 = a^{10}$?

b. For what value of q is $a^6 \times a^q = a^{10}$, $q \in \mathbb{Z}$?

7. When examining 2^6 , is it 2 or 6 that is the index?

8. Why in general is $a^p + a^4 \neq a^7$?

9. Why does $5^0 \times a^p$ always equal to a^p ?

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

11. If $m = 2^{\frac{1}{2}}$, what is m^2 ?

12. Given $(1+x)^4 = 16$. Calculate the value of x.

13. Given $(1+x)^4 = 81$. Calculate the value of x.
