Exponents

1. What value for **x** makes the sentence true?

$$5^{x} = 5$$

Write your response here:
(show your work)

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2. Simplify: 4^{0}

Write your response here:
(show your work)

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3. Simplify: 5^{3}

Write your response here:
(show your work)

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4. What expression is equal to the following?

5 × 5 × 5 × 5

Write your response here:
(show your work)

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5. What expression is equal to the following?

8 × 8 × 8 × 8 × 8 × 8 × 8

Write your response here:
(show your work)

Answers

1. 1
2. 1
3. 125
4. 5^4
5. 8^7

Explanations

1. If $5^{\mathbf{x}} = 5$, then **x** = 1 since any number raised to the 1^{st} power is itself. i.e. $5^1 = 5$.

2. Base **b** raised to the $\mathbf{n^{th}}$ power is

$$b^n = \underbrace{b \times b \times \cdots \times b}_{n \text{ - times}}$$

   However $4^0 = 1$ since any nonzero number raised to the 0 power is **1**.

3. Base **b** raised to the $\mathbf{n^{th}}$ power is

$$b^n = \underbrace{b \times b \times \cdots \times b}_{n \text{ - times}}$$

   Therefore, $5^3 = 5 \times 5 \times 5 = \mathbf{125}$

4. Base **b** raised to the $\mathbf{n^{th}}$ power is

$$b^n = \underbrace{b \times b \times \cdots \times b}_{n \text{ - times}}$$

   Therefore, $5 \times 5 \times 5 \times 5 = \mathbf{5^4}$.

5. Base **b** raised to the $\mathbf{n^{th}}$ power is

$$b^n = \underbrace{b \times b \times \cdots \times b}_{n \text{ - times}}$$

   Therefore, $8 \times 8 \times 8 \times 8 \times 8 \times 8 \times 8 = \mathbf{8^7}$.