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An **exponent** tells how many times a number, the base, is a factor multiplied by itself. Exponents can be **positive** or **negative**. A positive exponent tells how many times to multiply the base by itself.

$$x^5 = x \cdot x \cdot x \cdot x \cdot x$$

$$3^5 = 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 = 243$$

A negative exponent tells how many times to divide by the base.

$$x^{-n} = \frac{1}{x^n}$$

$$3^{-5} = \frac{1}{3 \cdot 3 \cdot 3 \cdot 3 \cdot 3} = \frac{1}{243}$$

Base $\rightarrow 7^3 \leftarrow$ Exponent

The number 7^3 is read as “7 raised to the third power” or “7 to the third power” or “7 cubed.”

The symbol \cdot indicates multiplication.

Read each problem. Circle the letter of the best answer.

1 What is the value of 5^4 ?

- A 20
- B 54
- C 625
- D 1,024

The number 5^4 means 5 is multiplied by itself 4 times: $5 \times 5 \times 5 \times 5 = 625$. The correct answer is C.

2 Which expression is equal to 2^6 ?

- A 2×6
- B 6×6
- C $2 + 2 + 2 + 2 + 2 + 2$
- D $2 \times 2 \times 2 \times 2 \times 2 \times 2$

3 What is the value of 3^{-2} ?

- A -9
- B -6
- C $\frac{1}{6}$
- D $\frac{1}{9}$

4 Which fraction is equivalent to 10^{-5} ?

- A $\frac{1}{100,000}$
- B $\frac{1}{10,000}$
- C $\frac{1}{50,000}$
- D $\frac{1}{500,000}$

Read each problem. Write your answers.

5 Look at the expression below.

$$5^2 + 5^{-2}$$

A What is the value of this expression?

Answer: _____

B Explain how you found your answer.

6 Look at the expression below.

$$\frac{1}{2 \cdot 2 \cdot 2 \cdot 2}$$

A Rewrite this expression using a positive exponent and a negative exponent.

Answer: _____

B What is the value of this expression?

Answer: _____

C Explain how you know your answer is correct.
