

Grade 6 - Exponents and Order of Operations - Answer Key

Common Core 6.EE.A.1, 6.EE.A.2c · maths-pdf.fr/en/

Check your work here. Each solution evaluates powers first, shows each operation in order, and gives a final answer in bold. Figures illustrate squares, cubes, and tables of powers.

Grade 6 · Common Core State Standards: **6.EE.A.1**, **6.EE.A.2c**

Exercise 1 - Write as a power

The factor 5 is used 4 times.

5^4 ; **base 5, exponent 4**

Exercise 2 - Expand a power

$$2^5 = 2 \times 2 \times 2 \times 2 \times 2$$

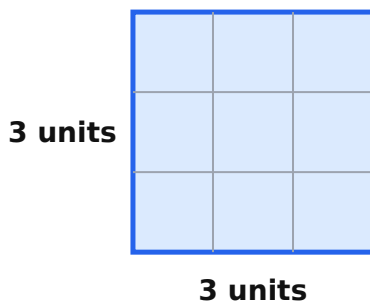
$$2 \times 2 = 4, 4 \times 2 = 8, 8 \times 2 = 16, 16 \times 2 = 32.$$

32

Exercise 3 - Square arrangement

Area = side times side = $3 \times 3 = 3^2$.

$3^2 = 9$ **square units**



Nine unit squares: 3 squared is 9.

Exercise 4 - Evaluate a power

$$3^4 = 3 \times 3 \times 3 \times 3 = 9 \times 9 = 81$$

81

Exercise 5 - Powers of ten

The exponent tells how many zeros follow the 1.

$$10^3 = 1,000 \text{ and } 10^6 = 1,000,000.$$

1,000 and 1,000,000

Exercise 6 - Power plus a number

Evaluate the power first: $4^2 = 16$.

$$16 + 3 = 19$$

19

Exercise 7 - Fraction base

$$\left(\frac{1}{2}\right)^3 = \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$$

$$\frac{1}{8}$$

Exercise 8 - Decimal base

$$0.5 \times 0.5 = 0.25$$

$$0.25$$

Exercise 9 - Multiplication before subtraction

Multiply first: $2 \times 5 = 10$.

$$18 - 10 = 8$$

8

Exercise 10 - Division, addition, and exponent

Exponent: $3^2 = 9$. Division: $24 \div 4 = 6$.

$$6 + 9 = 15$$

15

Exercise 11 - Parentheses

Parentheses first: $8 - 3 = 5$.

Multiply: $2 \times 5 = 10$. Add: $5 + 10 = 15$.

15

Exercise 12 - Exponent before multiplication

$4^2 = 16$. $3 \times 16 = 48$. $48 - 10 = 38$.

38

Exercise 13 - Grouping with an exponent

Parentheses: $6 + 4 = 10$. Exponent: $10^2 = 100$.

$$100 \div 5 = 20$$

20

Exercise 14 - Substitute a value

Replace x with 4: $3 \times 4 + 5$.

$$12 + 5 = 17$$

17

Exercise 15 - Substitute into a power

$$6^2 - 3 = 36 - 3 = 33$$

33

Exercise 16 - Two variables

$$2(3+5) = 2 \times 8 = 16$$

16

Exercise 17 - Volume of a cube

$$V = 4^3 = 4 \times 4 \times 4$$

$$4 \times 4 = 16, 16 \times 4 = 64.$$

$$64 \text{ in}^3$$

Exercise 18 - Perimeter formula

$$P = 2 \times 12 + 2 \times 7 = 24 + 14 = 38$$

38 ft

Exercise 19 - Area of a square

$$2.5^2 = 2.5 \times 2.5 = 6.25$$

$$6.25 \text{ m}^2$$

Exercise 20 - Doubling bacteria

$$2^6 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 64$$

64 bacteria

Hour	1	2	3	4	5	6
Bacteria	2	4	8	16	32	64

Each hour is twice the last: $2^6 = 64$.

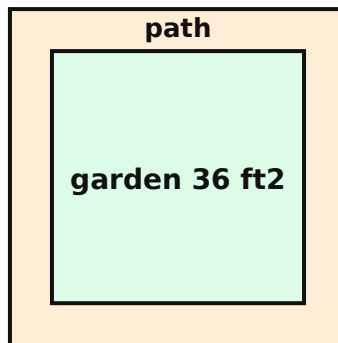
Exercise 21 - Garden plan

$$(6+2)^2 - 6^2$$

$$8^2 = 64 \text{ and } 6^2 = 36.$$

$$64 - 36 = 28$$

$$28 \text{ ft}^2$$



$$8 \text{ ft by } 8 \text{ ft} = 64 \text{ ft}^2$$

The big square is 64 square feet and the garden is 36, so the path is 28 square feet.