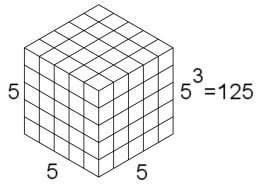
Name & Surname: _____ Class: _____ Date: _____

# Whole-Number Exponents

Write and evaluate powers with confidence.

About 45 minutes Level ★★★☆☆




## What Is an Exponent?

A power like 4^3 has a **base** and an **exponent**. The exponent tells how many times to multiply the base by itself: 4^3 = 4 × 4 × 4 = 64.

- Example: in 5^2, the base is 5 and the exponent is 2, so 5^2 = 5 × 5 = 25.
- Write the expanded form first, then multiply to **evaluate**.
- Do exponents before × and ÷ unless parentheses come first.
- For a non-zero base, a power of 1 is the base itself and a power of 0 is 1.

## Task A

/10

**Find the missing outputs and inputs by working forward, then backward.**

1 IN → × 3 → OUT

| In | Out |
|---|---|
| 2 | |
| 3 | |
| 5 | |
| | 48 |
| | 147 |

2 IN → − 1 → OUT

| In | Out |
|---|---|
| 2 | |
| 3 | |
| 4 | |
| | 124 |
| | 342 |



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# Write and Evaluate

Practice writing expanded form and finding values of powers.

## Key words

**base:** the large number that is multiplied again and again

**exponent:** the small number that tells how many times to multiply

**power:** a base with an exponent, like 3^4

**expanded form:** the base written out with ×, like 3 × 3 × 3 × 3

**evaluate:** multiply to find the value

**Task B** /12

**Complete to build fluency with powers of whole numbers.**

### WARM UP

1. Work out 3^2.

Answer: _____

2. Work out 2^5.

Answer: _____

3. Work out 10^3.

Answer: _____

4. Work out 1^9.

Answer: _____

### PRACTICE

5. Work out 2^3 × 3.

Answer: _____

6. Work out (4 + 2)^2.

Answer: _____

7. Work out 5^2 + 2^3.

Answer: _____

8. Work out 10^2 ÷ 2^2.

Answer: _____

### PROBLEM SOLVING

9. A square rug is 9 ft on each side. Area = side^2. Work out 9^2 to find the area in square feet.

Answer: _____

10. A storage cube is 4 in. on each edge. Volume = edge^3. Work out 4^3 to find the volume in cubic inches.

Answer: _____

11. Explain how you know that 3^3 is not 9. Use **expanded form** in your answer.

Answer: _____

12. Order from least to greatest: 2^4, 4^2, 3^3. Write the **values** in order.

Answer: _____



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# Find the Mistake

Spot the wrong step in each solution and fix it.

**Task C** /6

**Find the first wrong step in each solution and correct it.**



**Student A**

Work out 4^3.

1. 4^3
2. = 4 × 3
3. = 12
4. So the answer is 12

**The mistake is in step:** _____

**What went wrong?**

.....

**Correct answer:** _____



**Student B**

Work out 2 × 3^2.

1. 2 × 3^2
2. = 6^2
3. = 36
4. So the answer is 36

**The mistake is in step:** _____

**What went wrong?**

.....

**Correct answer:** _____



**Student C**

Work out (2 + 3)^2.

1. (2 + 3)^2
2. = 2^2 + 3^2
3. = 4 + 9
4. = 13, so the answer is 13

**The mistake is in step:** _____

**What went wrong?**

.....

**Correct answer:** _____



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# Use Order Carefully

Evaluate expressions with exponents, parentheses, and zero and one powers.

**Task D** /12

**Use order of operations and exponents to find each value.**

## WARM UP

1. Work out 6^1.

Answer: _____

2. Work out 8^0.

Answer: _____

3. Work out 10^4.

Answer: _____

4. Work out 2^6.

Answer: _____

## PRACTICE

5. Work out 3^2 + 4 × 2.

Answer: _____

6. Work out 24 ÷ 2^3 + 1.

Answer: _____

7. Work out 2 × 5^2 - 10.

Answer: _____

8. Write 2 × 2 × 2 × 2 × 2 as a power and work out its value.

Answer: _____

## PROBLEM SOLVING

9. A bookcase has 5 shelves. Each shelf holds 5 stacks. Each stack has 5 books. Work out 5^3 to find how many books there are.

Answer: _____

10. A glass cube is 6 in. on each edge. Work out 6^3 to find the volume in cubic inches.

Answer: _____

11. Explain how you know 2^4 and 4^2 are **equivalent**. Show both values.

Answer: _____

12. A game starts with 3 points and doubles 3 times in a row. Points = 3 × 2^3. Work out the total points.

Answer: _____



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# See Powers Grow

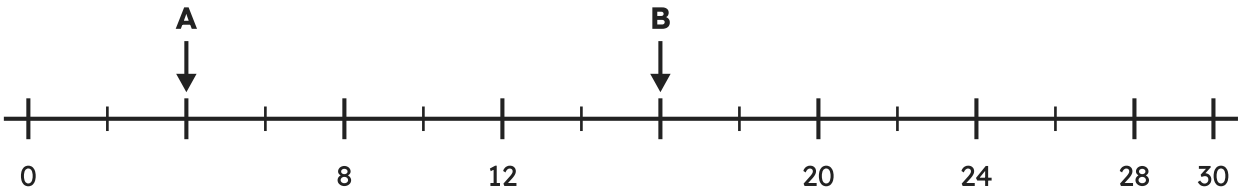
Read powers on number lines and sort expressions by value.

## ↑↓ Task E

/8

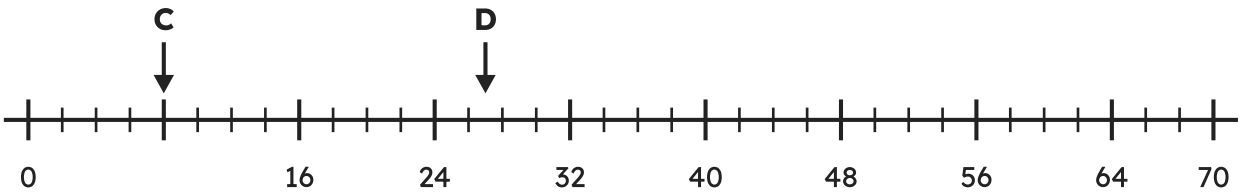
**Read the values marked A and B and mark the missing powers.**

1




A = ☐ B = ☐ Draw an arrow to show: 9, 25

2




C = ☐ D = ☐ Draw an arrow to show: 1, 64

## ↑↓ Task F

Example done for you

/5

**Sort each expression by whether its value equals 64.**

~~8^2~~ | 6^3 | 4 × 8 | 4^3 | 6^2 | 2^6

| Equals 64 | Does not equal 64 |
|---|---|
| 8^2 | |
| | |
| | |
| | |

## How did I do?

Circle a face for each line.

I can write a power in expanded form and evaluate it. ☹ 😐 ☺

I can use order of operations with exponents. ☹ 😐 ☺

I can solve real-life problems with squares and cubes. ☹ 😐 ☺



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# Answer sheet: Whole-Number Exponents

**Task A**

1. 2 → 6; 3 → 9; 5 → 15; 16 → 48; 49 → 147
2. 2 → 1; 3 → 2; 4 → 3; 125 → 124; 343 → 342

---

**Task B**

1. 9
2. 32
3. 1000
4. 1
5. 24
6. 36
7. 33
8. 25
9. 81
10. 64
11. 3^3 = 3 × 3 × 3 = 27, not 9, because the exponent 3 means multiply three 3s.
12. 16, 16, 27 so 2^4 = 4^2 < 3^3

---

**Task C**

1. Step 2 is wrong: They multiplied the base by the exponent. The exponent means multiply the base by itself: 4 × 4 × 4. Correct answer: 64
2. Step 2 is wrong: They multiplied before the power. Do the exponent first: 3^2 = 9, then 2 × 9 = 18. Correct answer: 18
3. Step 2 is wrong: They gave the exponent to each number. Add inside the parentheses first: 5^2 = 25. Correct answer: 25

---

**Task D**

1. 6
2. 1
3. 10000
4. 64
5. 17
6. 4
7. 40
8. 2^5 = 32
9. 125
10. 216
11. Both equal 16 because 2^4 = 2 × 2 × 2 × 2 = 16 and 4^2 = 4 × 4 = 16
12. 24

---

**Task E**

1. A = 4; B = 16; arrows at 9, 25
2. C = 8; D = 27; arrows at 1, 64

---

**Task F**

Equals 64: 8^2, 4^3, 2^6

Does not equal 64: 6^2, 6^3, 4 × 8

---

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