Negative Exponents and Negative Bases

Name: _____	Date: _____	Score: _____ / 18

Quick Review and Helpful Hints

A negative *exponent* means take the reciprocal: $x^{-n} = \frac{1}{x^n}$. A negative *base* needs care: an *even* exponent gives a positive result, an *odd* exponent gives a negative result. Watch the parentheses: $(-2)^4$ has base -2, but -2^4 means $-(2^4)$.

▷ **Example:** Evaluate $(-2)^{-3}$. **Work:** First handle the negative exponent: $(-2)^{-3} = \frac{1}{(-2)^3}$. Now $(-2)^3 = -8$ (odd power of a negative base is negative). So the value is $\frac{1}{-8} = -\frac{1}{8}$.

★ **Answer:** $-\frac{1}{8}$

Practice Problems

Evaluate each expression. Watch the parentheses carefully.

1. $(-3)^2$ _____
2. $(-3)^3$ _____
3. -2^4 _____
4. $(-2)^4$ _____
5. $(-5)^{-2}$ _____
6. $(-2)^{-3}$ _____
7. $(-1)^7$ _____
8. $(-4)^2$ _____
9. -3^2 _____
10. $(-10)^{-2}$ _____
11. $(-1)^{10}$ _____
12. $(-2)^5$ _____
13. $(-6)^{-1}$ _____
14. $(-3)^{-2}$ _____

Word Problems

15. A temperature change is modeled by $(-2)^3$ degrees. What is its value? _____
16. In a repeating pattern, a term equals $(-1)^{20}$. What is its value? _____
17. A value in a formula is $(-5)^{-2}$. Write it as a fraction. _____
18. A spreadsheet compares two formulas, -4^2 and $(-4)^2$, for a sign-error check. Find both values and explain why they differ. _____

Answer Keys

1. $\boxed{9}$
2. $\boxed{-27}$
3. $\boxed{-16}$
4. $\boxed{16}$
5. $\boxed{\frac{1}{25}}$
6. $\boxed{-\frac{1}{8}}$
7. $\boxed{-1}$
8. $\boxed{16}$
9. $\boxed{-9}$
10. $\boxed{\frac{1}{100}}$
11. $\boxed{1}$
12. $\boxed{-32}$
13. $\boxed{-\frac{1}{6}}$
14. $\boxed{\frac{1}{9}}$
15. $\boxed{-8}$
16. $\boxed{1}$
17. $\boxed{\frac{1}{25}}$
18. $\boxed{-16 \text{ and } 16}$

Step-by-Step Explanations

1. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is An even power makes a negative base positive: $(-3)^2 = (-3)(-3) = 9$. So the final answer is 9.

2. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is An odd power keeps the result negative: $(-3)^3 = -27$. So the final answer is -27.

3. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is No parentheses, so the power touches only the 2: $-2^4 = -(16) = -16$. So the final answer is -16.

4. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is The parentheses include the sign, and an even power is positive: $(-2)^4 = 16$. Notice how this differs from -2^4! So the final answer is 16.

5. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Flip for the negative exponent, then square (even power stays positive): $(-5)^{-2} = \frac{1}{(-5)^2} = \frac{1}{25}$. So the final answer is $\frac{1}{25}$.

6. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Flip, then cube (odd power stays negative): $(-2)^{-3} = \frac{1}{(-2)^3} = \frac{1}{-8} = -\frac{1}{8}$. So the final answer is $-\frac{1}{8}$.

7. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is An odd power of -1 stays -1. So the final answer is -1.

8. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is An even power of a negative base is positive, so $(-4)^2 = 16$. So the final answer is 16.

9. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Without parentheses this means $-(3^2) = -9$ – the sign is not squared. So the final answer is -9.

10. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Flip and square: $(-10)^{-2} = \frac{1}{(-10)^2} = \frac{1}{100}$. So the final answer is $\frac{1}{100}$.

11. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is An even power of -1 is 1. So the final answer is 1.

12. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is An odd power of a negative base is negative: $(-2)^5 = -32$. So the final answer is -32.

13. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is The reciprocal of -6 is $-\frac{1}{6}$, so $(-6)^{-1} = -\frac{1}{6}$. So the final answer is $-\frac{1}{6}$.

14. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Flip and square (even power, positive): $(-3)^{-2} = \frac{1}{(-3)^2} = \frac{1}{9}$. So the final answer is $\frac{1}{9}$.

15. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is An odd power of a negative base is negative, so $(-2)^3 = -8$ degrees. So the final answer is -8.

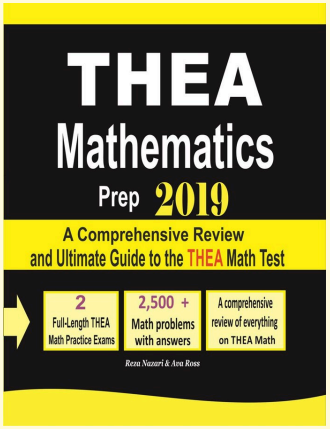
16. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is An even power of -1 is 1, so this pattern term equals 1. So the final answer is 1.

17. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Flip, then square: $(-5)^{-2} = \frac{1}{(-5)^2} = \frac{1}{25}$. So the final answer is $\frac{1}{25}$.

18. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Without parentheses, $-4^2 = -(16) = -16$; with them, $(-4)^2 = 16$. The parentheses decide whether the sign is squared. So the final answer is -16 and 16.

Keep Building THEA Math Skills

Recommended Effortless Math resources



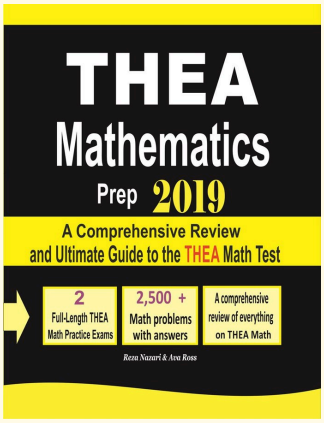
THEA Mathematics Prep

Use the complete THEA Math resource for review, worked examples, extra practice, and test-style questions after each worksheet.

Scan Me

Download Instantly

STUDENT FAVORITE - THEA Mathematics Prep



THEA Mathematics Prep

Step-by-step lessons, topic practice, and full review support for students who want a calm path through THEA Math preparation.

A strong companion for self-study, tutoring, homework, and targeted review.

PDF Edition

Scan Me

Download Instantly

For more THEA Math prep, visit EffortlessMath.com/THEA