

Investigate negative powers of ten

H

1 Complete the table.

Power of 10	Calculation	Answer
10^6	$10 \times 10 \times 10 \times 10 \times 10 \times 10$	1,000,000
10^5	$10 \times 10 \times 10 \times 10 \times 10$	100,000
10^4	$10 \times 10 \times 10 \times 10$	10,000
10^3	$10 \times 10 \times 10$	1,000
10^2	10×10	100
10^1	10	10
10^{-1}	$1 \div 10$	0.1
10^{-2}	$1 \div 10 \div 10$	0.01
10^{-3}	$1 \div 10 \div 10 \div 10$	0.001
10^{-4}	$1 \div 10 \div 10 \div 10 \div 10$	0.0001
10^{-5}	$1 \div 10 \div 10 \div 10 \div 10 \div 10$	0.00001

What patterns can you see?

When the power increases/decreases by 1 the answer is ten times greater/smaller.

2 Write these numbers in the form 10^n

- a) $0.0001 = 1 \times 10^{-4}$
- b) $0.1 = 1 \times 10^{-1}$
- c) $0.000\ 01 = 1 \times 10^{-5}$
- d) $0.000\ 001 = 1 \times 10^{-6}$
- e) $0.000\ 000\ 000\ 01 = 1 \times 10^{-11}$
- f) one ten thousandth = 1×10^{-4}

3 Write these powers of 10 as ordinary numbers.

- a) $10^{-2} = 0.01$
- b) $10^{-5} = 0.00001$
- c) $10^{-8} = 0.00000001$

4



10^{-4} is greater than 10^2 as 4 is greater than 2

Is Whitney correct? NO

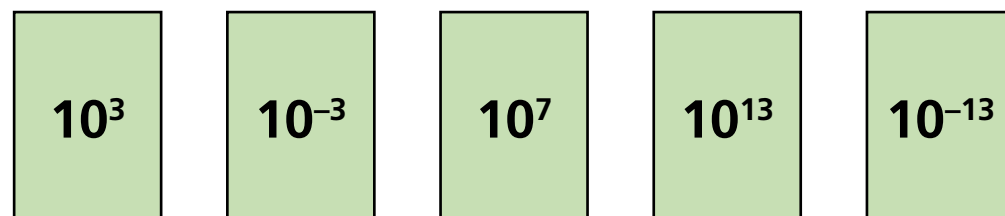
Explain your answer.

$10^{-4} = 0.0001$ $10^2 = 100$
 $0.0001 < 100$

5 Write < or > to make these statements correct.

- a) $10^{-2} < 10^2$
- b) $10^7 > 10^4$
- c) $10^{-8} < 10^{-6}$
- d) $10^8 > 10^6$
- e) $10^{-7} < 10$
- f) $10^5 = 10^5$
- g) $10^{-14} < 10^{-13}$
- h) $10^{-236} < 10^1$

6 What is the median of this set of numbers?



The median is 10^3

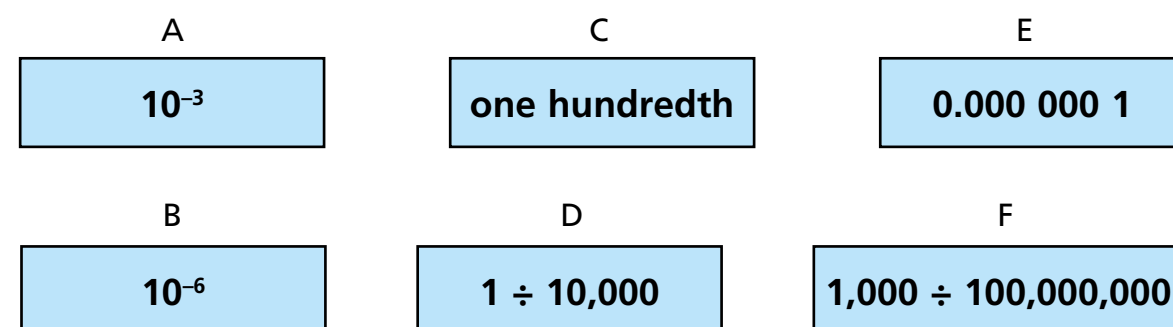
7 a) A millionth is the number formed by dividing 1 by a million.
Write a millionth as a power of 10

10^{-6}

b) A quintillionth can be written as 0.000000000000000001
Write a quintillionth as a power of 10

10^{-18}

8 Here are some number cards.



Put the number cards in ascending order.

E, B, F, D, A, C

9 a) What is the value of 10 hundredths as a power of 10?

10^{-1}

b) What is the value of 1,000 tenths as a power of 10?

10^2

10 Solve the equation.
Write your answer as a power of 10

$7x - 200,000 = 500,000$

10^5