



# Calculation of geometric mean

## Guidance document

### Problem

Find the geometric mean of the following fecal coliform results:

450, 175, 0, <20

1. Convert all single digit zeros to 1. Example: 0 becomes 1  
450 175 1 <20
2. Drop all < symbols. For any "TNTC" (too numerous to count) results, contact lab for actual value.  
Example: < 20 becomes 20  
450 175 1 20

3. Multiply all numbers:  $450 \times 175 \times 1 \times 20 = 1,575,000$

4. Using a calculator with a  $y^x$  or  $x^y$  key

(\*\*Note: Some calculators may not follow this procedure. Consult your manual for specific instructions).

- a. Push the  $y^x$  or  $x^y$  key
- b. Enter inverse of numbers used in step #3, multiplied 4 numbers; inverse of 4 is  $\frac{1}{4}$  or 0.25
- c. Push  $=$  key
- d. Answer displayed is 35.43

5. If you only have a square root key  $\sqrt{\phantom{x}}$ 
  - a. In that you multiplied four numbers, push the square root key **twice**.
  - b. If you multiplied only two numbers, push the square root key **once**.
  - c. The square root key will only work for either two or four numbers.

### Conversion of numbers multiplied to its' inverse

Numbers multiplied	Inverse
2	0.500
3	0.333
4	0.250
5	0.200
6	0.167
7	0.143
8	0.125
9	0.111
10	0.100
11	0.091
12	0.083
13	0.077
14	0.071
15	0.067

### What is the geometric mean for the following fecal coliform results?

a. < 10 250 1250 0

Answer: 42.04

b. 10 400

Answer: 63.24

c. 80 130 100

Answer: 100.84 (if you used 0.333 as the inverse of 1/3)