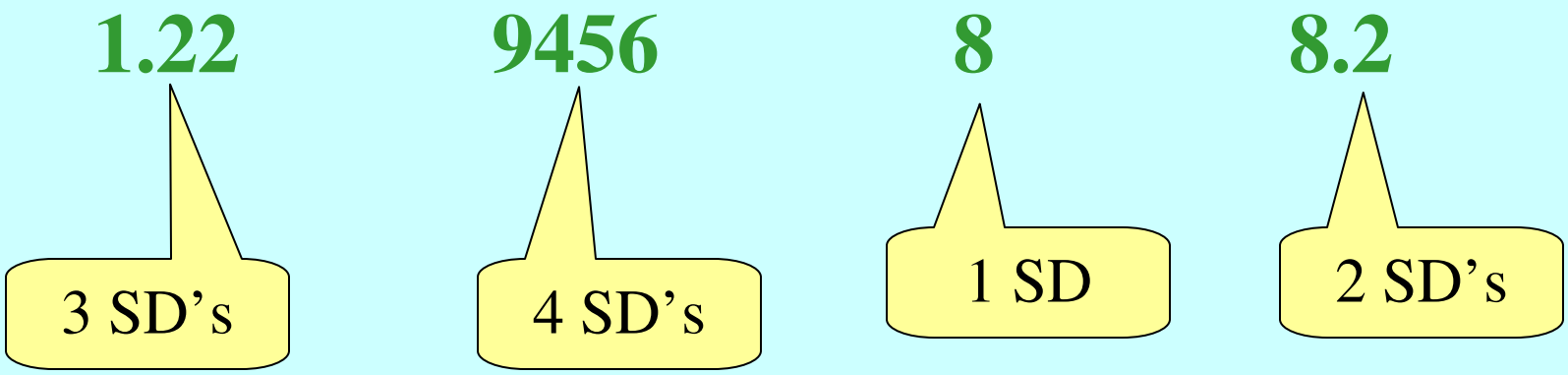
Significant Digits

Rules:

1. All non-zero digits are significant



2. Zero's between non-zero digits are significant

eg. **2005** (_ SD's) **3.06** (_ SD's) **900.0035** (_ SD's)

3. All zero's to the LEFT of the 1st non-zero digit are NOT significant. (called leading zero's)

eg. **0.005** (_ SD) **0.00000506** (_ SD)

2. Zero's between non-zero digits are significant

eg. **2005** (4 SD's) **3.06** (3 SD's) **900.0035** (7 SD's)

3. All zero's to the LEFT of the 1st non-zero digit are NOT significant. (called leading zero's)

eg. **0.005** (_ SD) **0.00000506** (_ SD's)

2. Zero's between non-zero digits are significant

eg. **2005** (4 SD's) **3.06** (3 SD's) **900.0035** (7 SD's)

3. All zero's to the LEFT of the 1st non-zero digit are NOT significant. (called leading zero's)

eg. **0.005** (1 SD) **0.00000506** (3 SD's)

4. **Zero's to the RIGHT of the last non-zero digit (trailing zero's) ARE significant IF the decimal point is SHOWN.**

Eg. **4.00** _SD's

300.000 _ SD's

4000. _ SD's

0.0560 _ SD's

0.0050600 _ SD's

4. Zero's to the RIGHT of the last non-zero digit (trailing zero's) ARE significant IF the decimal point is SHOWN.

Eg. **4.00** (3 SD's)

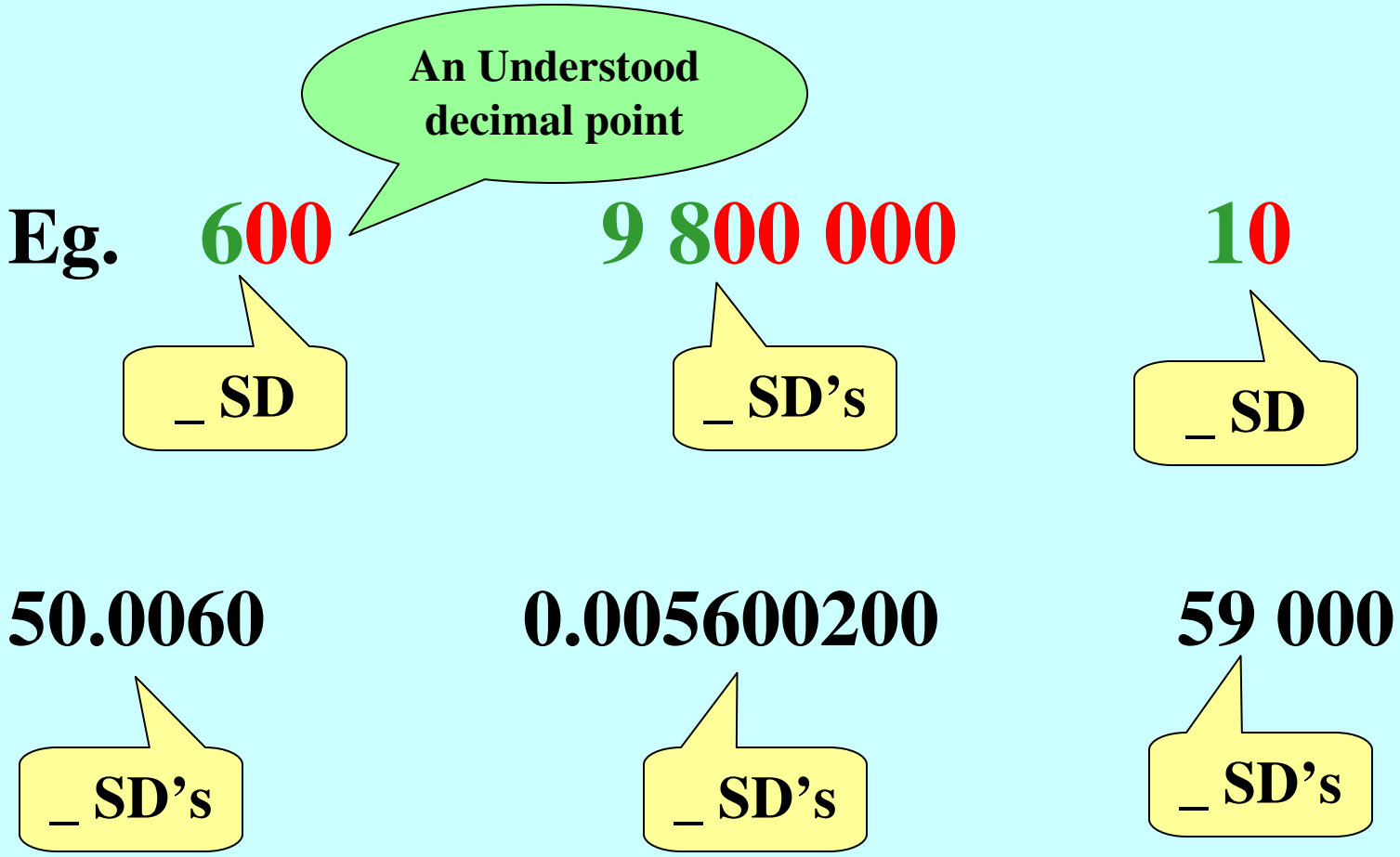
300.000 (6 SD's)

4000. (4 SD's)

0.0560 (3 SD's)

0.0050600 (5 SD's)

5. Zero's to the RIGHT of the last non-zero digit (trailing zero's) ARE NOT significant if there is an UNDERSTOOD decimal point.



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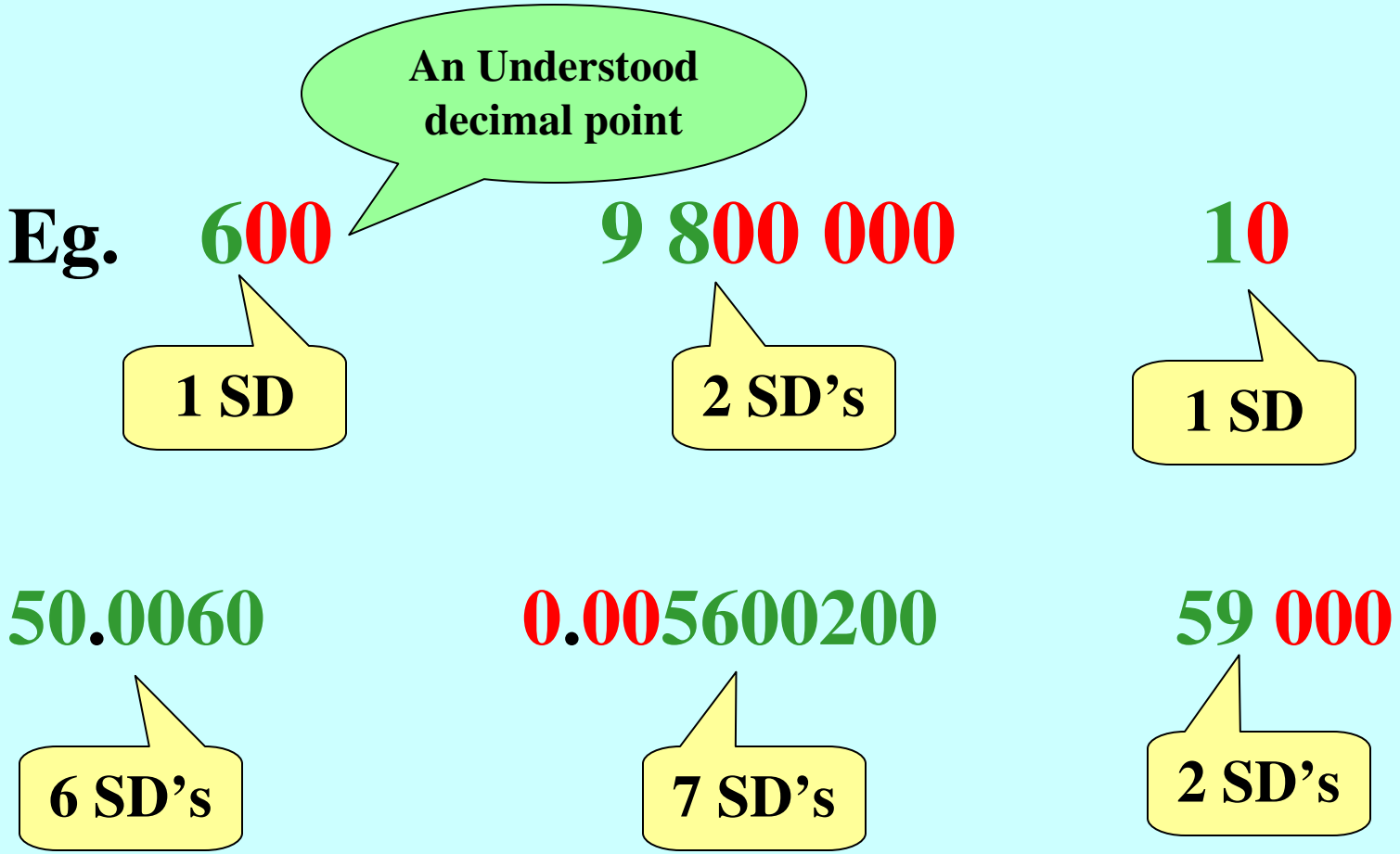


6. In Scientific Notation, the exponent part of the number is NOT significant.

Eg. 3.45×10^{3}

_ SD's

2.000×10^{-14}

_ SD's

4.903×10^{23}

_ SD's

0.05600×10^{6}

_ SD's

6. In Scientific Notation, the exponent part of the number is NOT significant.

Eg. 3.45×10^{3}

3 SD's

2.000×10^{-14}

4 SD's

4.903×10^{23}

4 SD's

0.05600×10^{6}

4 SD's

Find the number of significant digits in each of the following measurements:

0.002060 _____

98 000 _____

200.003 _____

5678.94 _____

0.0000012 _____

3.500×10^{-4} _____

876 000. _____

3.2×10^{46} _____

1.000000 _____

0.002×10^{4} _____

Find the number of significant digits in each of the following measurements:

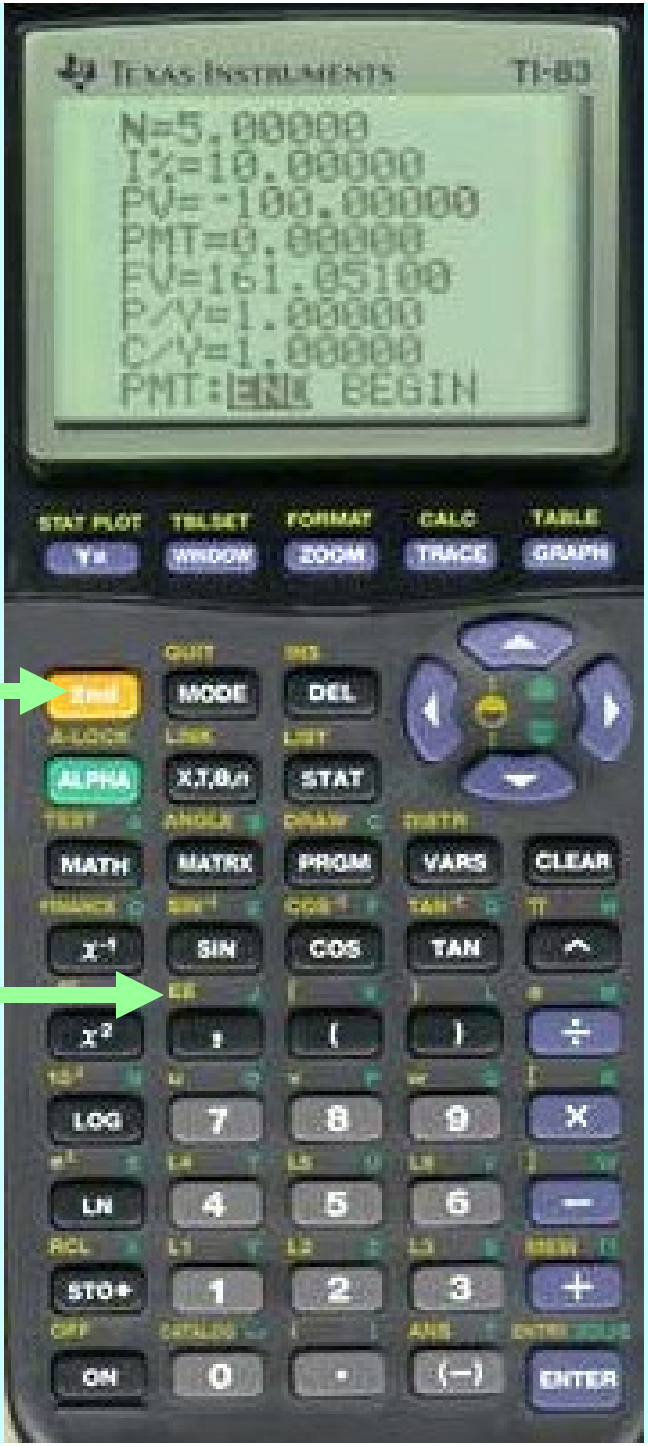
0.002060	**4**	**3.500×10^{-4}**	**4**
98 000	**2**	**876 000.**	**6**
200.003	**6**	**3.2×10^{46}**	**2**
5678.94	**6**	**1.000000**	**7**
0.0000012	**2**	**0.002×10^{4}**	**1**

To use the “Exponential” button on a calculator for Scientific Notation

TI 83

2nd function

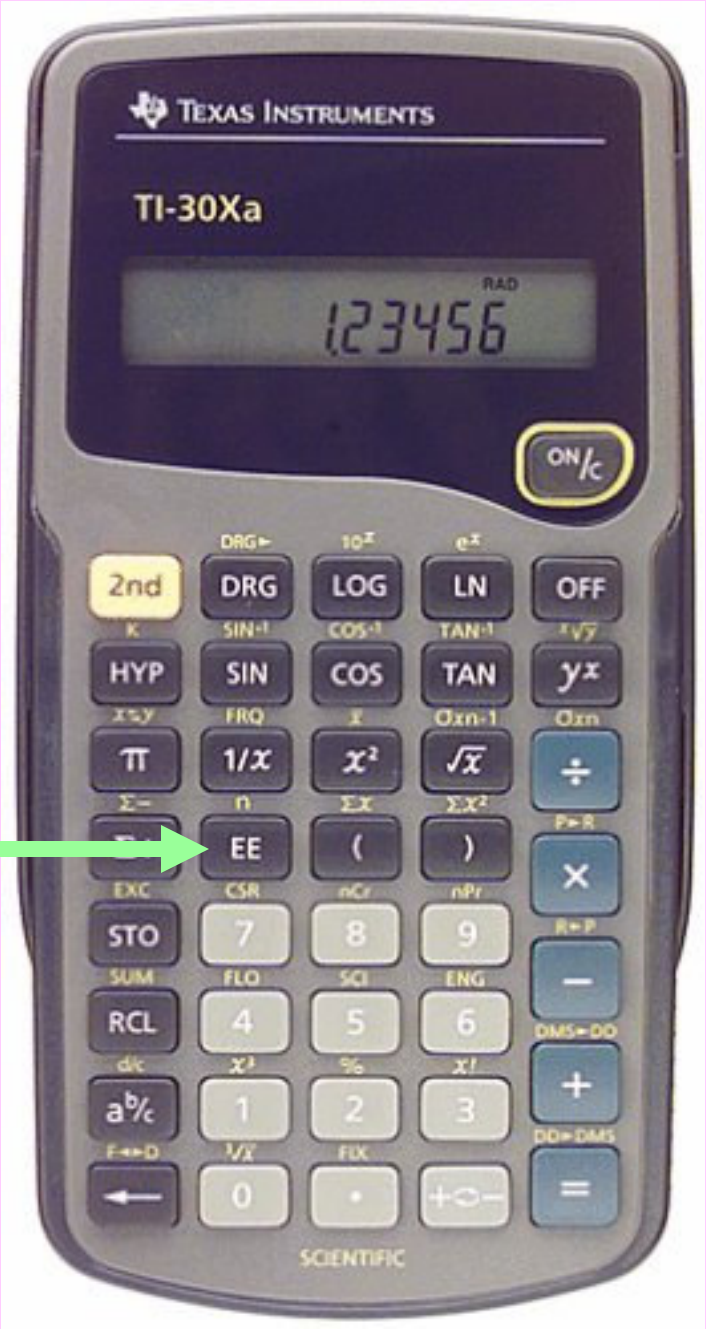
EE (above the ,)



To use the “Exponential” button on a calculator for Scientific Notation

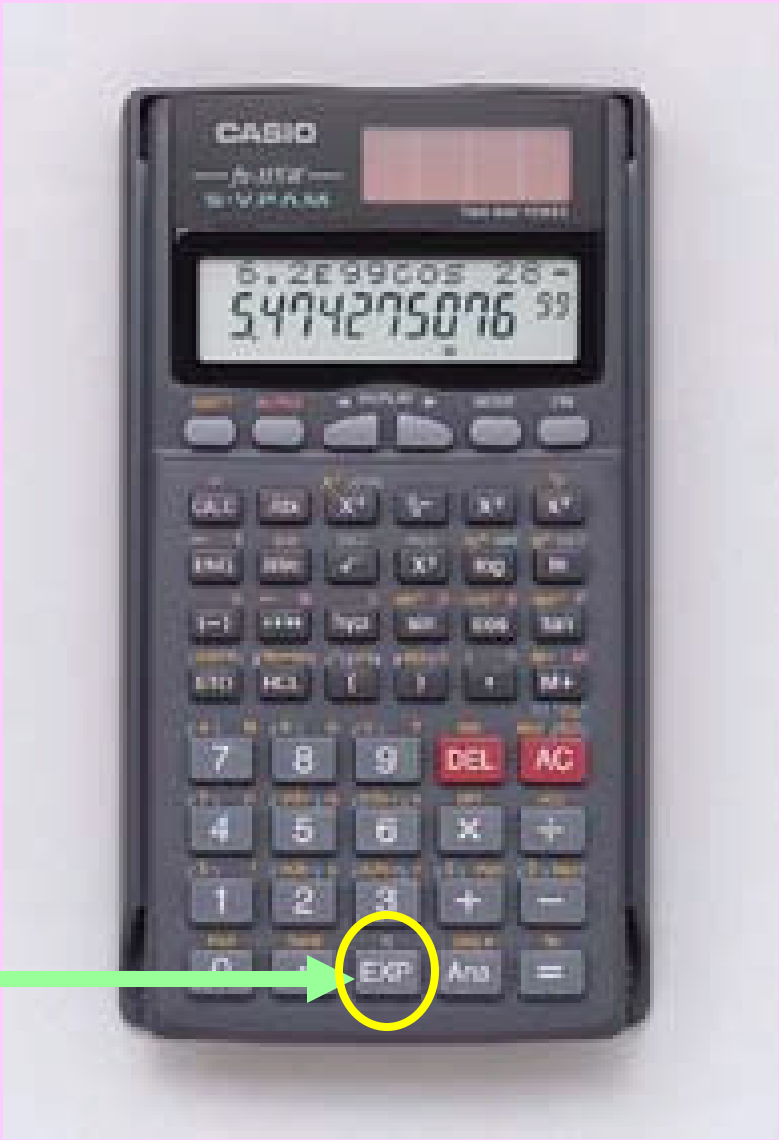
TI30Xa

EE



To use the “Exponential” button on a calculator for Scientific Notation

CASIO

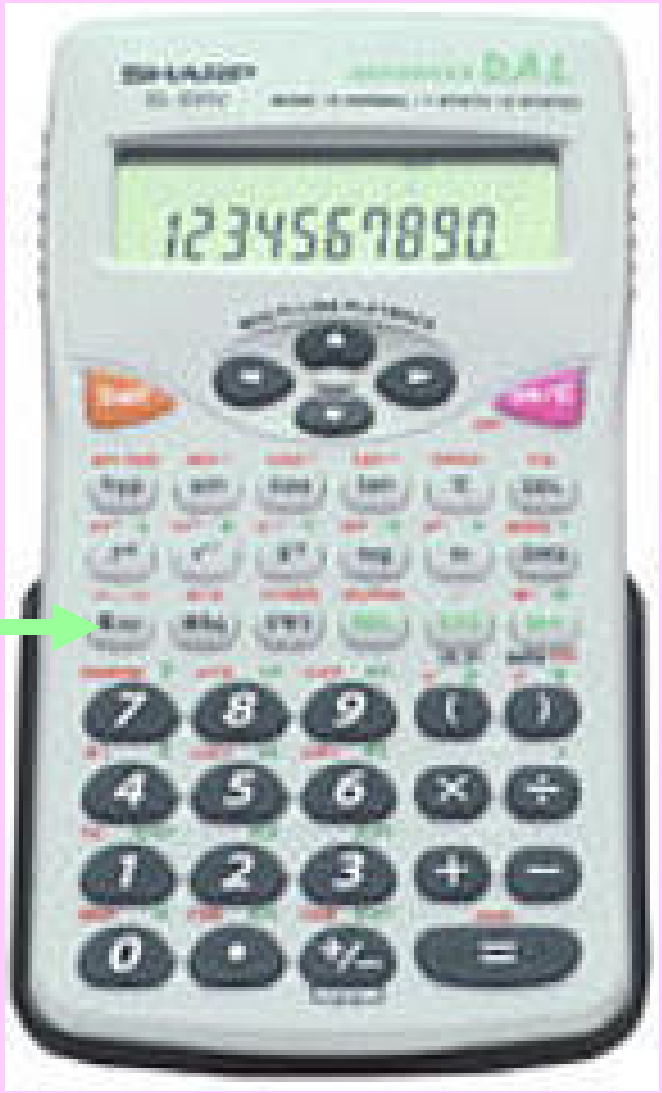


EXP

To use the “Exponential” button on a calculator for Scientific Notation

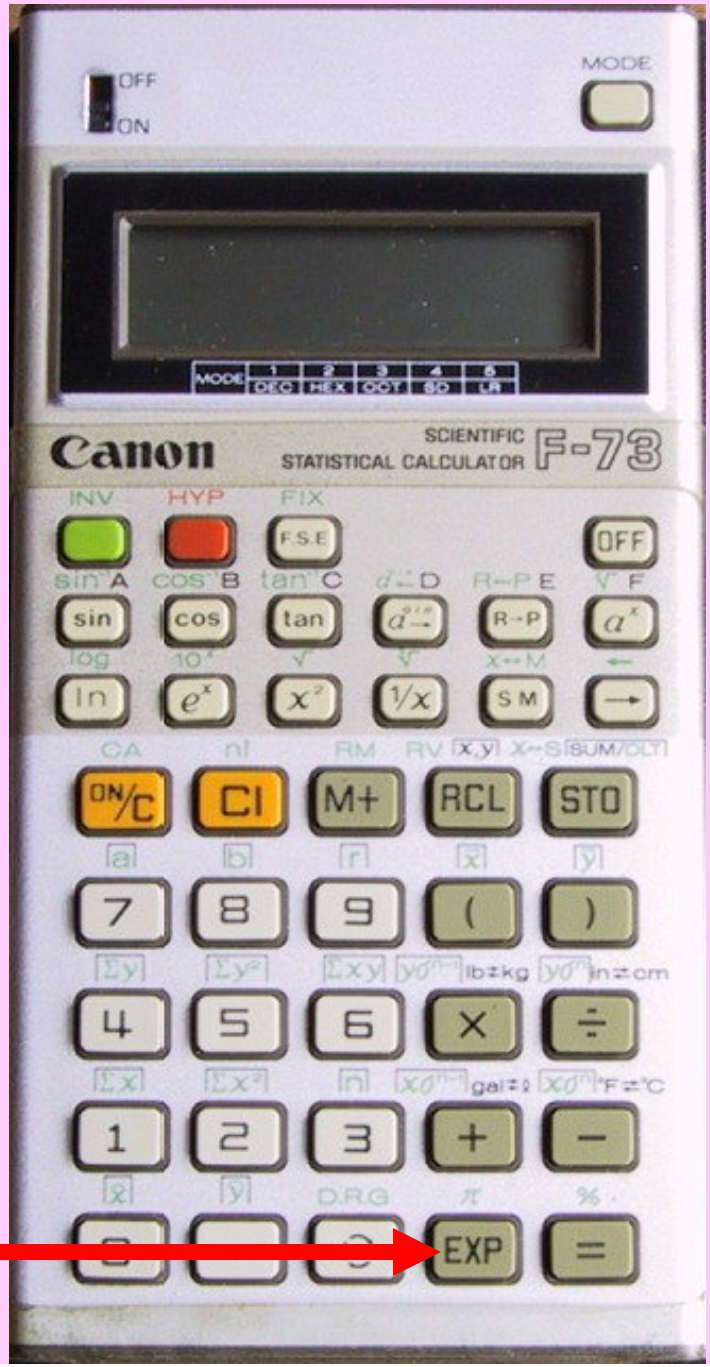
SHARP

EXP



To use the “Exponential” button on a calculator for Scientific Notation

CANON



When entering Scientific Notation on a calculator, NEVER USE "x" and "10" . Instead of "10 to the…", use EE (or EXP).

Enter 4.56×10^5 on you calculator:

It should show " 4.56E5" or "4.56 ^{05}"
or "4.56 05" or maybe even "4.56×10^5"

Do the following calculations using your Scientific Calculator:

$(3.456 \times 10^{-9}) \times (566.2)$ _____

$$\frac{6.500 \times 10^{-12}}{0.0257} =$$ _____

Do the following calculations using your Scientific Calculator:

$(3.456 \times 10^{-9}) \times (566.2) = 0.000001957$

or 1.9567872×10^{-6}

$$\frac{6.500 \times 10^{-12}}{0.0257} = \_\_\_\_\_$$

Do the following calculations using your Scientific Calculator:

$(3.456 \times 10^{-9}) \times (566.2) = 0.000001957$

or 1.9567872×10^{-6}

$$\frac{6.500 \times 10^{-12}}{0.0257} = 2.529182879 \times 10^{-10}$$

Rules for Calculations with Significant Digits

For Multiplication or Division:

Answer is rounded to the LOWEST # OF SD'S in the data.

Perform the following calculation and round the answer to the correct number of significant digits:

$(5.6 \times 10^{3})\ (3.651 \times 10^{-7})$

(*calculator answer* _____)

Final answer _____

Perform the following calculation and round the answer to the correct number of significant digits:

$(5.6 \times 10^{3})\ (3.651 \times 10^{-7})$

2 SD's

4 SD's

(*calculator answer* _____)

Final answer _____

Rounded to 2 SD's

Perform the following calculation and round the answer to the correct number of significant digits:

$(5.6 \times 10^{3})\ (3.651 \times 10^{-7})$

Less than 5, so the "0" is not rounded up.

(*calculator answer* 2.04456×10^{-3} or 0.00204456)

Final answer 2.0×10^{-3} or 0.0020

Rounded to 2 SD's

Rounded to 2 SD's

Perform the following calculation and round the answer to the correct number of significant digits:

$$\frac{(9.533 \times 10^{3})}{(3.02 \times 10^{-7})}$$

(*calculator answer* _____)

Final answer _____

Perform the following calculation and round the answer to the correct number of significant digits:

4 SD's

$$\frac{(9.533 \times 10^{3})}{(3.02 \times 10^{-7})}$$

3 SD's

(*calculator answer* _____)

Final answer _____

Round to 3 SD's

Perform the following calculation and round the answer to the correct number of significant digits:

4 SD's

$$\frac{(9.533 \times 10^{3})}{(3.02 \times 10^{-7})}$$

3 SD's

(*calculator answer* $3.156622517 \times 10^{10}$)

Final answer 3.16×10^{10}

Round to 3 SD's

Rules for Calculations with Significant Digits

For Addition or Subtraction:

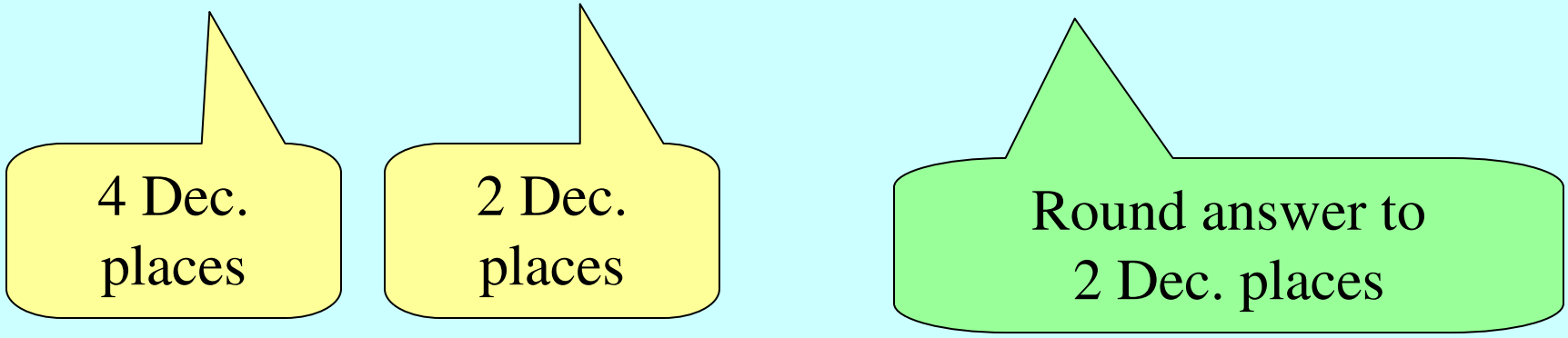
Answer is rounded to the LOWEST # OF DECIMAL PLACES in the data.

Do the following calculation and round the answer off correctly:

4456.9833 + 32.41 = _____

Do the following calculation and round the answer off correctly:

4456.9833 + 32.41 = _____



Do the following calculation and round the answer off correctly:

4456.9833 + 32.41 = _____

4 Dec. places

2 Dec. places

Round answer to 2 Dec. places

(*Calculator answer = 4489.3933*)

Final Answer = 4489.39

Rounded to 2 Dec. places

NOTE: When adding or subtracting numbers in Scientific Notation:

1. **Adjust so all data is to the same exponent**
2. **Use the decimal place rule on the regular (*non-exponent*) part of the numbers**

See examples from your teacher

Mixed Calculations

(Addition or Subtraction MIXED WITH Multiplication or Divison)

See examples from your teacher