

GENERAL CHEMISTRY

STANDARD 1.11

1.11: Multiply and divide numbers maintaining the precision of the measurement

MULTIPLYING/DIVIDING SIGNIFICANT FIGURES

- The same rules exist for multiplying and dividing significant figures
 - BUT they are different from the rules for adding and subtracting!
- Remember to keep final answer with the same number of significant figures as the measurement with the fewest number of significant figures
 - Multiplication/division can not change the number of significant figures in the measurement
 - Do not round any measurements before multiplying/dividing
 - The precision of the measurement MAY change, but the number of significant figures can NOT change

MULTIPLYING/DIVIDING EXAMPLE

Multiply the following measurements together using significant figures:

13.5 m

14.72 m

3.255 m

0.1 m

First, count the number of significant figures in each measurement:

13.5 m

14.72 m

3.255 m

0.1 m

3 S. F.

4 S. F.

4 S. F.

1 S. F.

The fewest number of significant figures is one, so the answer can only have one significant figure. Round the final answer to only one significant figure.

$$13.5 \times 14.72 \times 3.255 \times 0.1 = 64.68336 = 60 \text{ m}$$

MULTIPLYING/DIVIDING EXAMPLE

Divide the following measurements together using significant figures:

285.2 K

235 K

First, count the number of significant figures in each measurement:

285.2 K

235 K

4 S. F.

3 S. F.

The fewest number of significant figures is three, so the answer can only have three significant figures. Round the final answer to three significant figures.

$$285.2 / 235 = 1.213617021 = 1.21$$

Since the units cancel out, the final answer is 1.21 with no units (unitless)