**Noteguide for Uncertainty - Videos 1B, 1C, 1D, and 1E Name**

**1B - What uncertainty is and what it means:**

For the value **10 ± 2** We think the value is 10 , but it could be as big as and as small as

The absolute uncertainty is and the fractional uncertainty is or %

The rule for estimating uncertainty when measuring something on an analog scale: (like a ruler)

The rule for estimating the uncertainty of a digital meter:

The rule for finding the uncertainty of a collection of repeated measurements:

**Propagation of Uncertainty:** (How to find the uncertainty of a calculation)

**1C - Adding or subtracting the rule is:**

Examples

(7.6 ± .4)

- (2.5 ± .3)

(2.3 ± .1)

+ (3.6 ± .3)

See if you can get these - they are solved in the example problem videos that follow the main video:

(45 ± 3) + (12 ± 2) = ??

(12.1 ± 0.3) - (4.5 ± 0.6) = ??

(11 ± 3) - (7 ± 2) = ??

Answers: 57 ± 5, 7.6 ± 0.9, 4 ± 5

**1D - Multiplying or dividing the rule is:**

**With percents: (first video)**

(5 ± 10%)

x (20 ± 15%)

**With absolute uncertainty: (second video) (Write the weird math expression here)**

Example: A metal plate measures 21.1 + 0.5 cm by 15.3 + 0.1 cm. What is its area?

Step 1 -

Step 2 -

Try these examples: (Again - solved on the website)

|  |  |
| --- | --- |
| (45 ± 1) x (12 ± 1) = ??  540. ± 57 | (30.0 ± .7) / (1.2 ± .1) = ??  25 ± 2.7 |

**1E - The rule for powers: (Write the math expression here)**

Example: A cube measures 2.52 ± 0.05 cm on a side. What is its volume in cc?

Step 1 -

Step 2 -

Try these examples:

|  |  |
| --- | --- |
| (4.5 ± 1.0)2 = ??  20.3 ± 9.0 | 5.000 ± 0.020?? |