

**Chapter 3 – Division (C and D Scale)**

**3.1 Subtracting with Uniform Scales**

Fig. 3.1 shows how we can subtract numbers using a pair of uniform scales (e.g. two ordinary rulers).

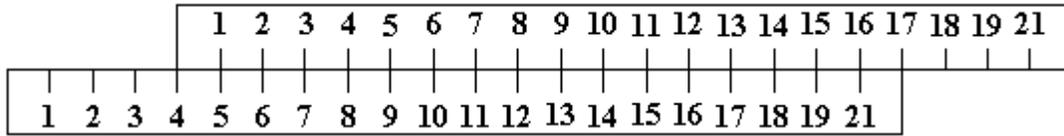


Fig 3-1

To Calculate 6 – 2:

1. Find 6 on the lower scale.
2. Place the 2 of the upper scale over 6.
3. the left index (i.e. the 0) of the upper scale indicates the answer as 4 on the lower scale.

**3.2 Simple Division**

When we subtract numbers on the C and D scales we have division.

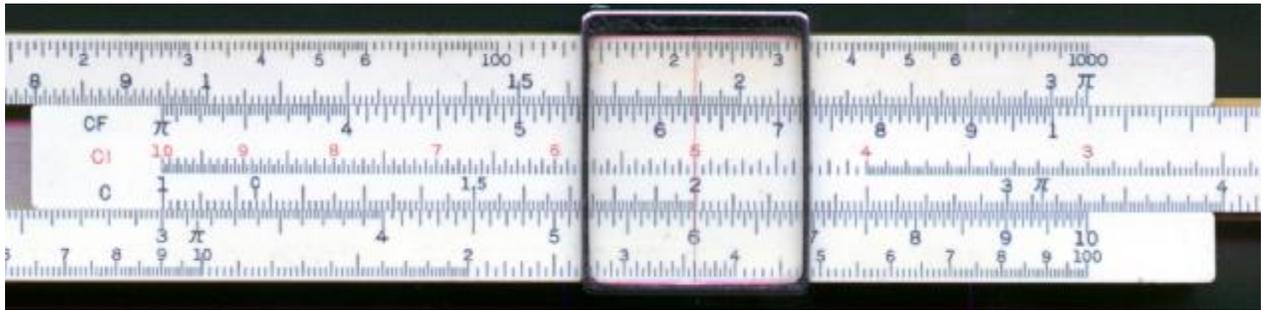


Fig 3-2

This is because the lengths we are subtracting are the logarithms of the numbers.

Example 1:  $6 \div 2 = 3$  (Fig. 3-2)

1. Set the hair line over 6 on the D scale.
2. Place the 2 of the C scale under the hair line.
3. Below the left index of the C scale read off the answer as 3 on the D scale.

Note: The hair line on the cursor may be used for division in the following ways.

- (a) To mark the numerator (i.e. number we are dividing into) on the D scale if it does not fall exactly on a graduation, so that the denominator (i.e. number we are dividing by) on the C scale can be set above it.
- (b) Then to set over the index on the C scale so that the answer can be located on easily on the D scale.

Important Points.

- (a) When we set up division on the C and D scale it appears seemingly upside down. To calculate  $6 \div 2$  (i.e.  $\frac{6}{2}$ ), we find 6 on the (lower) D scale and 2 is placed above it on the (upper) C scale, thus appearing on the Slide Rule as  $\frac{2}{6}$ .
- (b) For division the answer is always indicated on the D scale by the index of the C scale. If the left index of the C scale runs off the end of the D scale, you will notice that the right index will come onto the D scale. Whichever index comes onto the scale, we can use that index to find the answer.

Example 2:  $56 \div 7 = 8$

1. Set the hair line over 56 on the D scale.
2. Place the 7 of the C scale under the hair line.
3. Below the right index of the C scale read off the answer as 8 on the D scale.

Exercise 3(a)

(i)  $\frac{43}{5.5} =$

(ii)  $\frac{5.7}{1.9} =$

(iii)  $\frac{77}{35} =$

(iv)  $675 \div 326 =$

(v)  $196 \div 14 =$

(vi)  $6.6 \div 14.2 =$

### 3.3 Locating the Decimal Point

The best method is to make a quick estimate of the answer. This can be accomplished by several different approaches.

Example 1:

$$194 \div 4.15 = '467'$$

(i.e. approx.  $200 \div 4 = 50$ )

therefore the answer is 46.7

Standard form (or scientific notation) may be used when very large or vary small numbers are involved.

Example 2:

$$56000 \div 750 = '746'$$

(i.e. approx.  $(6 \times 10^4) \div (8 \times 10^2) = .75 \times 10^2$ )

Good general methods are:

(a) or large numbers divide both numbers by 10, 100, or 1000 etc. (whichever is applicable). That is, cancel corresponding zeros in both numerator and denominator (i.e. top and bottom).

Example 3:

$$\frac{47000}{3240} = '145'$$

(i.e.  $\frac{50000}{3000} = \frac{50}{3} \approx 16$ )

therefore the answer is 14.5

(b) For small numbers multiply both by 10, 100, 1000 etc., by moving the decimal point a certain number of places to the right as follows.

Example 4:

$$\frac{0.42}{0.061} = '688'$$

(i.e. approx.  $\frac{0.4}{0.06} = \frac{40}{6} \approx 7$ )

therefore the answer is 6.88

Exercise 3(b)

Locate the decimal point for the following:

(i)  $\frac{36}{4.1} = '878'$

(ii)  $\frac{75.9}{2.48} = '306'$

$$(iii) \quad \frac{800}{0.243} = '362'$$

$$(iv) \quad \frac{0.23}{30.4} = '756'$$

$$(v) \quad \frac{261}{0.012} = '2175'$$

$$(vi) \quad 9.42 \div 216 = '436'$$

$$(vii) \quad 0.024 \div 0.08 = '300'$$

$$(viii) \quad 520 \div 0.45 = '1155'$$

$$(ix) \quad 0.084 \div 0.0025 = '336'$$

$$(x) \quad 43500 \div 13.6 = '32'$$

Note:

- (a) When we divide by a number less than 1, the answer is always larger than the number we are dividing into.
- (b) Unlike multiplication, with division we never run off the end of the D scale for the answer. Either the left or right index of the C scale will always be on the D scale.

### 3.4 Continuous Division

When dividing a number by 2 or more numbers, after each division, hold the answer on the D scale with the hair line and repeat the division process as many times as necessary. (For combined multiplication and division see Unit 4).

#### Exercise 3(c)

Miscellaneous Division.

$$(i) \quad \frac{360}{18} =$$

$$(ii) \quad \frac{4800}{0.6} =$$

$$(iii) \quad \frac{12.25}{35} =$$

$$(iv) \quad \frac{1}{8} =$$

$$(v) \quad \frac{43.75}{0.0304} =$$

$$(vi) \quad 3025 \div 55 =$$

$$(vii) \quad 1925 \div 17.5 =$$

$$(viii) \quad \pi \div 2 =$$

$$(ix) \quad \pi \div 6 =$$

$$(x) \quad 93 \div 9600 =$$

$$(xi) \quad \frac{219}{17 \times 28} =$$

$$(xii) \quad \frac{35}{0.12 \times 0.47} =$$

$$(xiii) \quad \frac{805}{104 \times 0.043} =$$

$$(xiv) \quad \frac{1406}{52^2} =$$

$$(xv) \quad \frac{19.22}{31^2} =$$

$$(xvi) \quad 0.00593 \div 2.66 =$$

$$(xvii) \quad 0.00207 \div 0.000523 =$$

$$(xviii) \quad 36400 \div 26 =$$

$$(xix) \quad 20.25 \div 0.00045 =$$

$$(xx) \quad 0.001035 \div 111 =$$