# Percentage analogy:

## 1. Percentage reduction and percentage increase of one quantity with respect to other:

Let the value of a bigger quantity than the given quantity be 'X'.

Let the value of a given quantity be 'Y'.

Now, the percentage of the given quantity with respect to the bigger quantity is given by,

$100*(Y/X)$.

Therefore, the Reduction % = $100 - (100*(Y/X))$. --------- (1)

Now, the percentage of the bigger quantity with respect to the given quantity is given by,

$100*(X/Y)$.

Therefore, the % Rise = $(100*(X/Y))-100$. ------------------(2)

Comparing (1) and (2), we get,

(Reduction %*( X/Y))= % Rise------------------------------------- (3)

But,

$Y= X - (X*\% \text{ Reduction}/100)$ ------------------------------------ (4)

Substituting (4) in (3), we get,

% Reduction *(100*X)/ ((100*X)-(X*% Reduction) = % Rise

Therefore,

% Reduction * (100/ (100- % Reduction)) = % Rise------------ (5).

### Example 1: If A is 150 and B is 125,

a)  What is the ratio of Reduction % of B with respect to A to % Rise of A with respect to B?
b)  What is the Reduction % of B with respect to A?
c)  What is the % Rise of A with respect to B?

### Solution:

a)  Reduction % of B with respect to A/ % Rise of A with respect to B = (Y/X) (From equation(3))

where X and Y are respectively the bigger and the given quantity.

Hence, the ratio = (125/150) = (5/6)

b)  Reduction % of B with respect to A = 100 – 100( 125/150) ( From equation (1))
$$= 100 – (500/6)$$
$$= 100 – (250/3)$$
$$= 16.67$$
c)  % Rise of A with respect to B = ( 100*(150/125))-100 ( From equation (2))
$$= 20.$$

**Example 2:** If A is 30% less than B, how much % B is greater than A?

**Solution:**

% Rise = 30*(100/ (100-30)) (From equation (5))

= 42.85.