

(1)

## Profit & Loss

The following terms are useful in profit and loss questions:

- (a) The cost price (abbreviated as C.P) of a product is the price paid by a person who wishes to sell it again.
- (b) There may be an allowance or trade discount reducing the C.P.
- (c) The list price or marked price is the price at which the product is listed or marked to be sold.
- (d) There may be a discount or series of discounts (usually expressed as a percent) on the list price.
- (e) The selling price (abbreviated as S.P) or sales price is the price at which the product is finally sold.
- (f) If the S.P is greater than the C.P, there has been a profit.
- (g) If the S.P is lower than the C.P, there has been a loss.
- (h) If the product is sold at the same price as the cost, there has been no loss or profit.
- (i) A percentage profit or loss may be based either on the C.P or on the S.P.
- (j) Profit or loss may be stated in terms of Rs. and dollar or in terms of percent.
- (k) Overhead expenses include such items as rent, salaries, etc., and may be added to C.P or to the profit to increase the S.P.

### Important Formulae

- ✓ -> Profit/Gain = S.P - C.P
- ✓ -> Loss = C.P - S.P
- ✓ -> Profit/Loss Percentage =  $\frac{S.P - C.P}{C.P} * 100$
- ✓ -> Loss % =  $\frac{Loss * 100}{C.P}$
- ✓ -> Profit % =  $\frac{Profit * 100}{C.P}$

SP = selling price  
 CP = cost price

Loss = CP - SP  
 Profit = SP - CP

SP + Loss = CP

CP = SP - Gain

sold out = 120  
 SP =

Item = x = 100 CP  
 ↑  
 20% P

-ve → Indicate Loss %

+ve → profit

-ve → loss

CP = 50K → 55K = SP

Q1. A man bought a bicycle for \$ 750 and sold it for \$ 675. Find his percentage loss.

- A. 5%
- B. 8%
- C. 10%
- D. 13%

CP = 750  
SP = 675

Loss = 75

Loss% =  $\frac{75}{750} \times 100 = 10$

Loss = CP - SP  
= 750 - 675 = 75



Q2. If a car is sold for Rs. 51000 the profit is 17%, what would be profit percentage if sold for Rs. 45000.

- A. 14.85%
- B. 15%
- C. 15.98%
- D. 16%

if sold for  $SP_1 = 51000$ , profit = 17%  
New val =  $SP_2 = 45000$

if sold for  $45000$

$\Rightarrow \frac{\text{Profit}_1}{SP_1} \times SP_2$

$\Rightarrow \frac{17\%}{51000} \times 45000 = 15\%$

Q3. A retailer buys a fridge for \$4500. For how much should he sell so that there is gain of 8%?

- A. \$4000
- B. \$4200
- C. \$4860
- D. \$5300

CP = 4500

Gain = 8%

SP = ?

Profit =  $\frac{\text{Profit}}{CP} \times CP$

SP = Gain + CP  
= 360 + 4500 = 4860

Profit =  $\frac{8\% \times CP}{100} \times CP$   
=  $\frac{8 \times 4500}{100} = 360$

Q4. A dealer sold a shirt at a profit of 15%. Had he sold it for Rs.4 more, his profit would have increased by 5%. The cost price of the shirt was

- ✓ A. Rs.80
- B. Rs.60
- C. Rs.125
- D. Rs.75

Handwritten solution for Q4:

Let CP = x

SP1 = 115% x

SP2 = 115% x + 4

Profit = 120% x

i.e. = 115% x + 4 = 120% x

$\frac{115x + 4}{100} = \frac{120x}{100}$

$115x + 4 = 120x$

$4 = 5x$

$x = 80$

Verification:  $\frac{120x}{100} - \frac{115x}{100} = 4$

SP = 115% of 80 = 92

SP + 4 = 96

Profit = 96 - 80 = 16

Profit % =  $\frac{16}{80} \times 100 = 20\%$

Initial profit % = 15%

Increment = 5%

Q5. A man sells a cycle for Rs.800 and loses something. If he had sold it for Rs.980, his gain would have been double the former loss. Cost Price is?

- A. Rs.1000
- B. Rs.750
- C. Rs.800
- ✓ D. Rs.860

Handwritten solution for Q5:

sale = Rs. 800, loss = L

SP1

CP = sale + loss

CP = 800 + L

Gain = 2L

SP2 = 980

Cost = sale - gain

CP = 980 - 2L

Equation 1:  $800 + L = 980 - 2L$

Equation 2:  $L + 2L = 980 - 800$

$3L = 180$

$L = 60$

CP = 800 + 60 = 860

Q6. A man buys oranges at the rate of 6 for Rs.5 and sells them at the rate of 5 for Rs.6. What was his gain percent?

- A. 42%
- B. 46%
- C. 44%
- D. 43%

Handwritten solution for Q6:

Item	Rs
6 (1)	5
5 (2)	6

(1) SP = 6 x 6 = 36

(2) CP = 5 x 5 = 25

Gain = 36 - 25 = 11

Gain % =  $\frac{11}{25} \times 100 = 44\%$

Formula:  $\text{Gain \%} = \frac{\text{SP} - \text{CP}}{\text{CP}} \times 100$

$\frac{36 - 25}{25} \times 100 = 44\%$

# Interest

Simple I = principal Amt  $\times$  time  $\times$  IR  
Int. Rate

$$= \frac{PA \times T \times I}{100}$$

Compound I =  $(1 + \text{Int. Rate}) \times \text{Original Value}$

*no. of years*

Q1. Find the simple interest on Rs.500 borrowed for 4 years at 11% per annum.

- A. 120
- B. 180
- C. 220
- D. 280

$P = 500, T = 4, IR = 11\%$

$$I = 500 \times 4 \times \frac{11}{100} = 220 \text{ Ans!}$$

11  $\rightarrow$  Interest  
11% - IR

Q2. Find the simple interest on a 90 day loan of Rs.9000 at 16%.

- A. Rs.340
- B. Rs.350
- C. Rs.360
- D. None

$$I = 9000 \times \frac{90}{365} \times \frac{16}{100} = 360$$

$90 \times 4 = 360$

$\frac{90}{365} \checkmark$

Q3. Find the amount of money gained from an investment of Rs.800 for 2 years at 10% per annum compound interest.

- A. Rs.950
- B. Rs.958
- C. Rs.960

$$I = (1 + 10\%)^2 \times 800$$

$$= (1 + \frac{10}{100})^2 \times 800 = (1.1)^2 \times 800 = 1.21 \times 800$$

$\frac{10}{100} = 0.1$

$\frac{121}{100} \times 800$

✓ D. Rs.968 ✓

## Ratio & Proportion

$$a:b = \frac{a}{b}$$

$$(1+12) \times PA$$

Q1. Ratio between two quantities is 7 : 9, If the first quantity is 511 kg, the other quantity is?

- A. 541 kg
- B. 657 kg
- C. 765 kg
- D. 677 kg

⇒ First  $7x = 511 \text{ kg} \Rightarrow x = 73$

2nd  $9x = ( )$   
 $9 \times 73 = 657 \text{ kg}$

1st =  $\frac{\text{Total Amount} \times 1}{16}$

$511 = \frac{7}{16} \times ?$

Q2. A sum of money is distributed among 3 friends A, B and C in the ratio 2 : 4 : 14. If B gets Rs.12 more than A. How much money does C get?

- A. Rs.80
- B. Rs.82
- ✓ C. Rs.84
- D. Rs.86

A : B : C

$2x : 4x : 14x$

Amount = x

$C = 14 \times 6$   
 $84$

$B - A = 12$   
 $4x - 2x = 12 \Rightarrow 2x = 12$   
 $x = 6$

Q3. Sohail has a certain number of ten, twenty and fifty rupee notes in the ratio of 3 : 2 : 4 amounting to Rs.8100. How many 10 rupee notes he has?

- A. 80
- B. 85
- C. 90
- D. None

3x30  
90

Note = x

$$10(3x) + 20(2x) + 50(4x) = 8100$$

$$30x + 40x + 200x = 8100$$

$$\Rightarrow 270x = 8100 \Rightarrow x = \frac{8100}{270}$$

x = 30

Q4. If Rs.900 divided among A, B and C in such a way that A's share is 3 times that of B and B's share is 2 times that of C. The A's share is?

- A. Rs.600
- B. Rs.550
- C. Rs.435
- D. Rs.250

let C = x Then

$$B = 2x$$

$$A = 3(2x) = 6x$$

C : B : A  
x : 2x : 6x

$$100 + 200 + 600$$

= 900

Q5. Two numbers are respectively 20% and 50% more than a third number. The ratio of the two numbers is:

- A. 4:5
- B. 3:5
- C. 5:7
- D. 2:5

Third number = x  $\rightarrow$   $\frac{100\%}{+20} = 120\%$

First number =  $120\% x = \frac{120}{100} x$

=  $\frac{6}{5} x$

2nd number =  $150\% x$

=  $\frac{150}{100} x = \frac{3}{2} x$

$\Rightarrow \frac{6x}{5} : \frac{3x}{2}$   
 $\Rightarrow \frac{12x}{10} : \frac{15x}{10}$   
 $\Rightarrow 4 : 5$

Q6. In a school ratio of the number between male and female teachers is 5 : 9, If the number of female teachers is 27, find the number of male teachers.

- A. 18

No. of Teacher = x

9x = 27

x = 3

male = 5x = 15x3 = 15

- B. 14
- C. 15
- D. 12

a b c d

Q7. The fourth proportion of 11, 7, 22 is

- A. 7
- B. 14
- C. 13
- D. 11

Formula =  $d = \frac{b \times c}{a} = \frac{7 \times 22}{11} = 14$

Q8. There are two numbers and their ratio is 3 : 9. If we subtract 9 from both numbers then their ratio becomes 12 : 13, what is the largest number?

- A. 23
- B. 55
- C. 33
- D. 45 None

Assume =  $3x$  and  $9x$   
 $3x - 9 : 9x - 9 :: 12 : 13$

$\frac{3x-9}{9x-9} = \frac{12}{13}$       $x =$

Q9. A is younger than B by 3 years. If the ratio of their current ages is 4 : 5, find the age of <sup>B</sup>A?

- A. 10
- B. 13
- C. 14
- D. 15

let  $A = x$ ,  $B = x + 3 = 15$

$\frac{A}{B} = \frac{x}{x+3} :: 4 : 5$

$\frac{x}{x+3} = \frac{4}{5}$

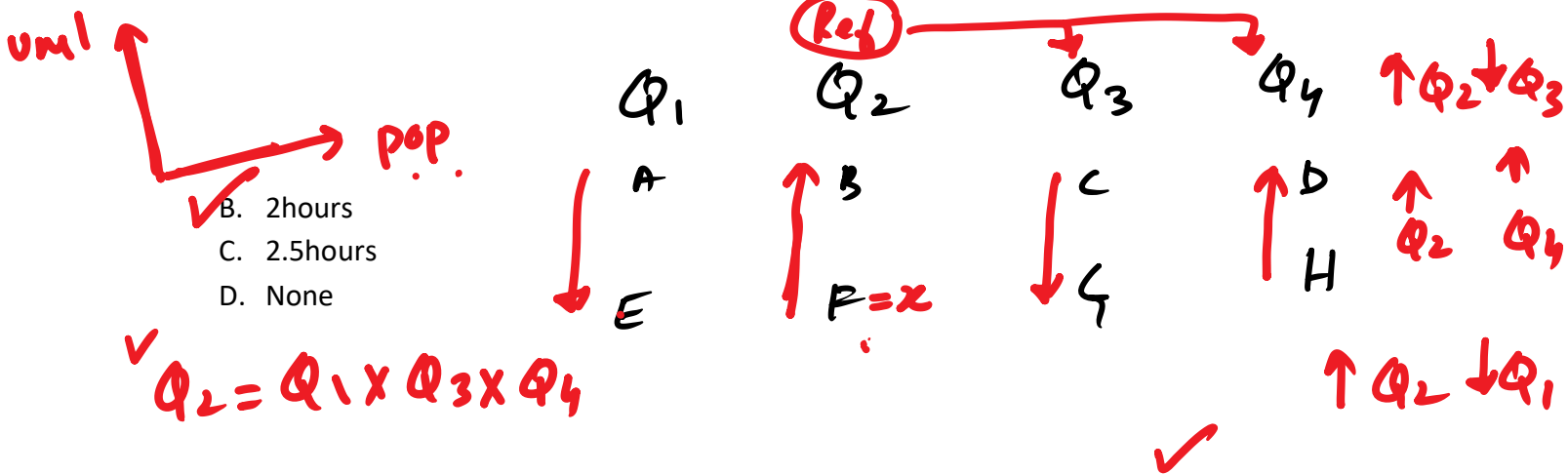
$x = 12$  ✓  
 $B = 15$

Q10. Four people can paint a fence in 3 hours. How long will it take 6 people to paint it? ✓

- A. 1 hour



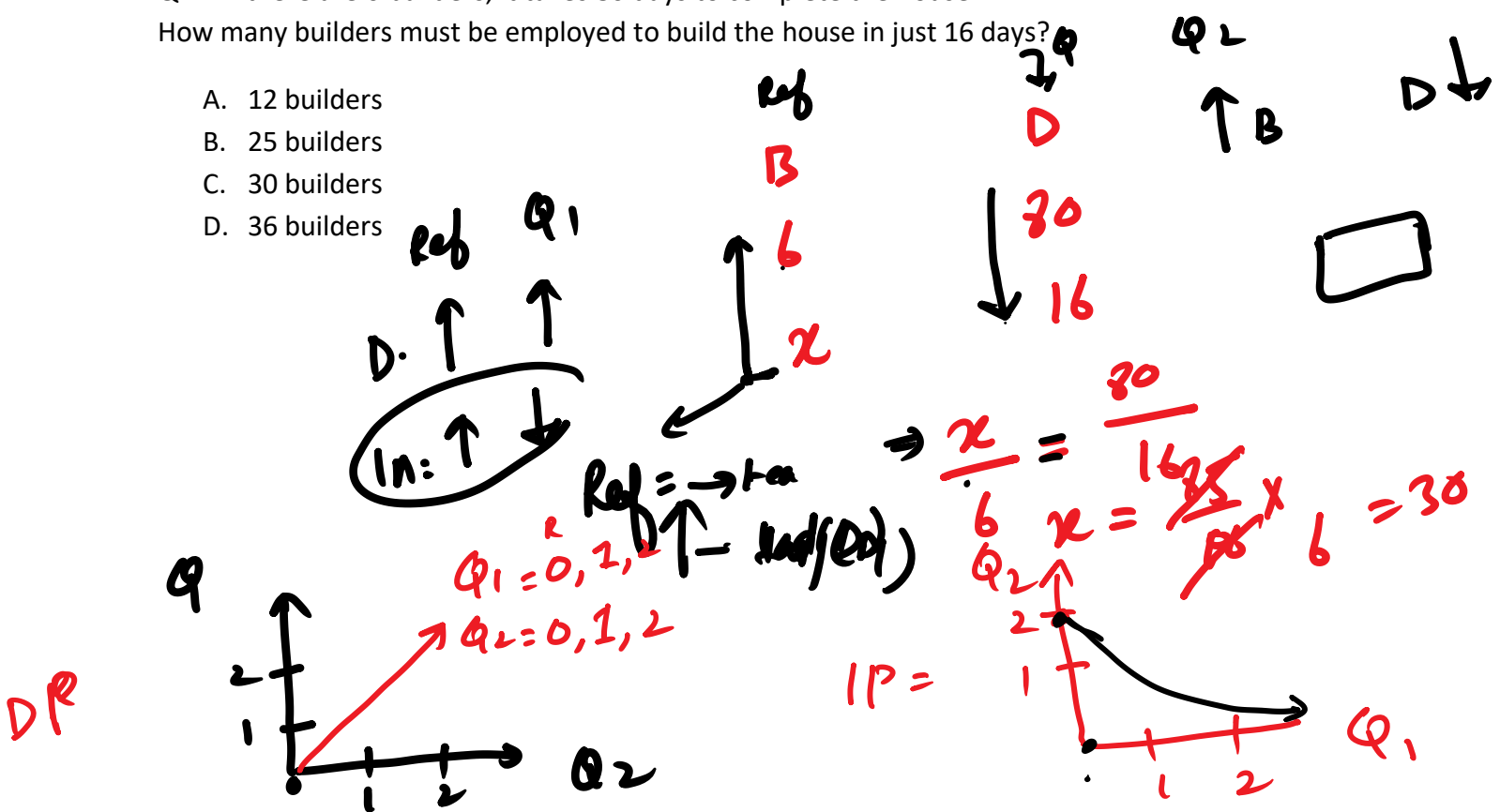
$\frac{x}{3} = \frac{4}{6}$   
 $x = 2 \text{ hr}$



Q11. If there are 6 builders, it takes 80 days to complete the house.

How many builders must be employed to build the house in just 16 days?

- A. 12 builders
- B. 25 builders
- C. 30 builders
- D. 36 builders



By Engr. Naveed Anjum

Insta: naveed\_anjum615



