CHAPTER - 4 EXERCISE 4.1

Fill in the blanks:

(i) If 30 % of x is 150, then x is _____ .

Answer:

500

Hint:

Given 30% of x is 150

i.e $\frac{30}{100} \times x = 150$

$\therefore x = \frac{\cancel{150}^{5} \times 100}{\cancel{30}}$

$\therefore x = 500$

(ii) 2 minutes is _____ % to an hour.

Answer:

$3\frac{1}{3}\%$

Hint:

Let 2 min be x% of an hour

and 1 hr = 60mm

$x\% = \frac{2}{60} \times 100 = \frac{200}{60} = \frac{10}{3} = 3\frac{1}{3}$

$x = 3\frac{1}{3}\%$

$$\frac{\cancel{150}^{5} \times 100}{\cancel{30}}$$

(iii) If x% of x = 25, then x = _____ .

Answer:

50

Hint:

Given that x% of x is 25

$\therefore \frac{x}{100} \times x = 25$

$\therefore x^2 = 25 \times 100 = 2500$

(iv) In a school of 1400 students, there are 420 girls. The percentage of boys in the school is _____

Answer:

70

Hint:

Given total number of students in school = 1400

Number of girls in school = 420

$\therefore$ Number of boys in school = 1400 – 420 = 980

% of boys in school $= \dfrac{\text{Number of boys}}{\text{Total number of students}} \times 100 = \dfrac{980}{1400} \times 100$

$= \frac{980}{14} = 70$

% of boys = 70%

(v) 0.5252 is _____ %.

Answer:

52.52%

Hint:

Given a number, and to express as a percentage, we need to multiply by 100

$\therefore$ to express 0.5252 as percentage, we should multiply by 100

$\therefore$ 0.5252 × 100 = 52.52%

Question 2.

Rewrite each underlined part using percentage language.

(i) One half of the cake is distributed to the children.

Answer:

50% of the cake is distributed to the children

Hint:

One half is nothing but $\frac{1}{2}$

as percentage, we need to multiply by 100

$\therefore \frac{1}{2} \times 100 = 50\%$

(ii) Aparna scored 7.5 points out of 10 in a competition.

Answer:

Aparna scored 75% in a competition

Hint:

7.5 points out of 10 is $\frac{7.5}{10} = 0.75$

For percentage, we need to multiply by 100

We get $0.75 \times 100 = 75\%$

(iii) The statue was made of pure silver.

Answer:

The statue was made of 100% pure silver

Hint:

Pure silver means there are no other metals

so, 100 out of 100 parts is made of silver $= \frac{100}{100}$

$\therefore$ to express as percentage, $\frac{100}{100} \times 100\% = 100\%$

(iv) 48 out of 50 students participated in sports.

Answer:

96% students participated in sports.

Hint:

48 out of 50 students in fraction form is $\frac{48}{50}$

As a percentage, we need to multiply by 100

$\therefore \frac{48}{50} \times 100^2 = 96\%$

(v) Only 2 persons out of 3 will be selected in the interview.

Answer:

Only $66\frac{2}{3}\%$ will be selected in the interview.

Hint:

2 out of 3 in fraction form is $\frac{2}{3}$

to express as percentage, we need to multiply by 100

$\frac{2}{3} \times 100 = \frac{200}{3} = 66\frac{2}{3}\%$

Question 3.

48 is 32% of which number?

Answer:

Let the number required to be found be 'x'

Given that 32% of x is 48

i.e., $\frac{32}{100} \times x = 48$

$\therefore x = \frac{48^3 \times 100}{32_2} = \frac{300}{2} = 150$

$\therefore x = 150$

Question 4.

What is 25% of 30% of 400?

Answer:

Required to find 25% of 30% of 400

First 30% of 400 $= \frac{30}{100} \times 400 = 120$

Next 25% of the above is $= \frac{25^1}{100_4} \times 120 = 30$

Question 5.

If a car is sold for ₹ 2,00,000 from its original price of ₹ 3,00,000, then find the percentage of decrease in the value of the car.

Answer:

original price of car = ₹ 3,00,000

actual selling price of car = ₹ 2,00,000

Decrease in amount from original = 3,00,000 – 2,00,000 = 1,00,000

$$\text{Percentage decrease} = \frac{\text{Decrease}}{\text{Original value}} \times 100$$

$$= \frac{1,00,000}{3,00,000} \times 100 = \frac{100}{3} = 33\frac{1}{3}\%$$

Question 6.

If the difference between 75% of a number and 60% of the same number is 82.5, then find 20% of that number.

Answer:

Given that 75% of number less 60% of number is 82.5

Let the number be 'x'

$\therefore \frac{75}{100} \times x - \frac{60}{100} \times x = 82.5$

$\therefore 0.75\, x - 0.60\, x = 82.5$

$\therefore 0.15\, x = 82.5$

$\therefore x = \frac{82.5}{0.15} = \frac{8250}{15} = 550$

Required to find 20% of number ie 20% of x.

$$\frac{20}{100} \times x = \frac{20}{100} \times 550 = 110$$

Question 7.

A number when increased by 18% gives 236. Find the number.

Answer:

Let the number be x. Given that when it is increased by 18%, we get 236.

$$x + \frac{18}{100}x = 236$$

$$\frac{100x + 18x}{100} = 236$$

$$\therefore \frac{118}{100}x = 236$$

$$\therefore \text{the number} = x = \frac{236 \times 100}{118} = 200$$

Question 8.

A number when decreased by 20% gives 80. Find the number.

Answer:

Let the number be x. Given that when it is increased by 20% we get 80.

$$x - \frac{20}{100} \times x = 80$$

$$\frac{100x - 20x}{100} = 80$$

$$\frac{80x}{100} = 80 \Rightarrow x = \frac{80 \times 100}{80}$$

x = 100

Question 9.

A number is increased by 25% and then decreased by 20%. Find the percentage change in that number.

Answer:

Method 1.

Let the number be x.

First it is increased by 25%

$\therefore$ It becomes x + $\frac{25}{100} \times x = \frac{125}{100}$

Secondary it is decreased by 20%

$\frac{125x}{100} - \frac{20}{100} \times \frac{125}{100}x = \frac{125}{100}x \times \frac{80}{100} = x$

Now we get back x, therefore there is no change.

Hence percentage change in that number is 0%

Question 10.

The ratio of boys and girls in a class is 5:3. If 16% of boys and 8% of girls failed in an examination, then find the percentage of passed students.

Answer:

Let number of boys be 'b' and number of girls be 'g'

Ratio of boys and girls is given as 5:3

b:g = 5:3 $\Rightarrow \frac{b}{g} = \frac{5}{3}$ ...... (A)

Failure in boys = 16% = $\frac{16}{100} \times b = \frac{16b}{100}$

Failure in girls = 8% = $\frac{8}{100} \times g = \frac{8g}{100}$

Pass in boys = 100 – 16% = 84% = $\frac{84}{100}b$ ...... (1)

Pass in girls = 100 – 8% = 92% = $\frac{92}{100}g$ .... (2)

From A, we have $\frac{b}{g} = \frac{5}{3}$, adding I on both sides, we get

$\frac{b}{g} + 1 = \frac{5}{3} + 1$

$\frac{b+g}{g} = \frac{5+3}{3} = \frac{8}{3}$

$\therefore$ g = $\frac{3}{8}$(b + g) .... (3)

Similarly b = $\frac{5}{8}$ (b + g) .... (4)
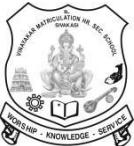

Total pass = pass in girls + pass in boys

= (1) + (2) = $\frac{84}{100}b + \frac{92}{100}g$

$$\text{Total pass percentage} = \frac{\text{total pass}}{\text{total students}} \times 100$$

$$\text{Total pass} = \text{boys passed} + \text{girls passed} = \left(\frac{\frac{84}{100}b + \frac{92}{100}g}{b+g}\right) \times 100$$

Substituting (3) & (4) in the above, we get

$$= \left(\frac{\frac{84}{100}b + \frac{92}{100}g}{b+g}\right) \times 100$$

$$= \left[\frac{\frac{84}{100} \times \frac{5}{8}(b+g)}{(b+g)} + \frac{\frac{92}{100} \times \frac{3}{8}(b+g)}{(b+g)}\right] \times 100$$

$$= \frac{84}{100} \times \frac{5}{8} + \frac{92}{100} \times \frac{3}{8} = \left[\frac{420}{800} + \frac{276}{800}\right] \times 100$$

$$= \frac{696}{800} \times 100 = 87\%$$

Question 11.

12% of 250 litre is the same as _____ of 150 litre.

(A) 10%

(B) 15%

(C) 20%

(D) 30%

Answer:

(C) 20%

Hint:

12% of 250 = $\frac{12}{100}$ × 250 = 30 lit.

Percentage: $\frac{30}{150}$ × 100 = 20%

Question 12.

If three candidates A, B and C in a school election got 153,245 and 102 votes respective percentage of votes got by the winner is _____ .

(A) 48%

(B) 49%

(C) 50%

(D) 45%

Answer:

(B) 49%

Hint:

Candidate 1: 153

Candidate 2: 245 – winner [as maximum votes]

Candidate 3: 102

Total votes = 1 + 2 + 3 = 153 + 245 + 102 = 500

$$\% \text{ of votes for winner} = \frac{\text{no. of votes that winner got}}{\text{total votes}} \times 100$$

$$= \frac{245}{500} \times 100 = 49\%$$

Question 13.

15% of 25% of 10000 = _____ .

(A) 375

(B) 400

(C) 425

(D) 475

Answer:

(A) 375

Hint:

15% of 25% of 10000 is

First let us do 25% of 10,000, which is

$$\frac{25}{100} \times 100\cancel{00} = 2500$$

Next 15% of the above is $\frac{15}{100}$ × 2500 = 375

Question 14.

When 60 is subtracted from 60% of a number to give 60, the number is

(A) 60

(B) 100

(C) 150

(D) 200

Answer:

(D) 200

Hint:

Let the number be 'X'

60% of the number is $\frac{60}{100} \times x = \frac{60x}{100}$

Given that when 60 is subtracted from 60%, we get 60

i.e $\frac{60}{100}$ x – 60 = 60

∴ $\frac{60}{100}$ x 60 + 60 = 120

∴ x = $\frac{120 \times 100}{60}$ = 200

Question 15.

If 48% of 48 = 64% of x, then x =

(A) 64

(B) 56

(C) 42

(D) 36

Answer:

(D) 36

Hint:

Given that 48% of 48 = 64% of x

$$\frac{48}{100} \times 48 = \frac{64}{100} \times x$$

$$x = \frac{\cancel{48}^{3} \times \cancel{48}^{12}}{\cancel{64}_{21}} = 36$$

x = 36

Question 1.

Fill in the blanks:

(i) Loss or gain percentage is always calculated on the _____ .

Answer:

Cost Price

(ii) A mobile phone is sold for ₹ 8400 at a gain of 20%. The cost price of the mobile phone is _____ .

Answer:

₹ 7000

Hint:

Let cost price of mobile be ₹ x

Given that selling price is ₹ 8400 and gain is 20%

As per formula,

$$SP = \frac{(100 + gain\%)}{100} \times CP$$

∵ by substituting we get,

$$8400 = \frac{(100 + 20)}{100} \times x$$

$$8400 = \frac{120}{100} x$$

$$x = \frac{\overset{70}{\cancel{8400}} \times 100}{\cancel{120}} = ₹\ 7000$$

(iii) An article is sold for ₹ 555 at a loss of $7\frac{1}{2}$%. The cost price of the article is _____ .

Answer:

₹ 600

Hint:

Given selling price is ₹ 555 & loss $7\frac{1}{2}$%

as per formula

$$SP = \frac{(100 - loss\%)}{100} \times CP$$

by substituting, we get

$$555 = \frac{\left(100 - 7\frac{1}{2}\right)}{100} \times CP$$

$$\therefore 555 = \frac{100 - \frac{15}{2}}{100} \times CP = \frac{\frac{200 - 15}{2}}{100} \times CP$$

$$555 = \frac{\frac{185}{2}}{100} \times CP$$

$$\therefore CP = \frac{555 \times 100}{\frac{185}{2}} = \frac{555 \times 100}{185} \times 2 = ₹\ 600$$

(iv) A mixer grinder marked at ₹ 4500 is sold for ₹ 4140 after discount. The rate of discount is _____ .

Answer:

8 %

Hint:

Marked price is ₹ 4500

Discounted price in ₹ 4140

∴ Discount = Marked price – Discounted priòe

= 4500 – 4140 = 360

$$\therefore \text{Rate of discount} = \frac{\text{Discount}}{\text{Marked Price}} \times 100$$

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

(v) The total bill amount of a shirt costing ₹ 575 and a T-shirt costing ₹ 325 with GST of 5% is _____ .

Answer:

Cost of price shirt = ₹ 575 (CP)

GST = 5%

$$\text{Bill amount formula} = CP \times \left(\frac{100 + GST\%}{100}\right)$$

$$= 575 \times \left(\frac{100 + 5}{100}\right) = 575 \times \frac{105}{100} = ₹ 603.75$$

Cost of price shirt = ₹ 325 (CP)

GST = 5%

$$\text{Bill amount} = CP \times \left(\frac{100 + GST\%}{100}\right)$$

$$= 325 \times \left(\frac{100 + 5}{100}\right) = ₹ 341.25$$

∴ Total bill amount = ₹ 603.75 + ₹ 341.25 = ₹ 945

Question 2.

If selling an article for ₹ 820 causes 10% loss on the selling price, then find its cost price.

Answer:

Given that selling price (SP) = ₹ 820

Loss % = 10 %

$$\text{As per formula SP} = CP \times \frac{(100 - \text{loss}\%)}{100}$$

∴ Substituting in formula, we get

$$820 = CP \times \left(\frac{100 - 10}{100}\right)$$

$$\therefore CP = \frac{820 \times 100}{90} = 911$$

Question 3.

If the profit earned on selling an article for ₹ 810 is the same as loss on selling it for ₹ 530, then find the cost price of the article.

Answer:

Case 1: Profit = Selling price (SP) – Cost price (CP)

Case 2: Loss = Cost price (CP) – Selling price (SP)

Given that profit of case 1 = loss of case 2

∴ P = 810 – CP

L = CP – 530

Since profit (P) = loss (L)

810 – CP = CP – 530

∴ 2CP = 810 + 530 = 1340 ⇒ C.P = 1340/2

∴ CP = 670

Question 4.

If the selling price of 10 rulers is the same as the cost price of 15 rulers, then find the profit percentage.

Answer:

Let cost price of one ruler be x

Given that selling price (SP) of 10 rulers.

i.e., same as cost price (CP) of 15 rulers

∴ SP of 10 rulers = 15 × x = 15x

∴ SP of 1 ruler = 15x/10 = 1.5x

∴ Gain = SP of 1 ruler – CP of 1 ruler = 1.5x – x = 0.5x

$$\text{Gain \%} = \frac{\text{Gain}}{CP} \times 100 = \frac{0.5x}{x} \times 100 = 50\%$$

Question 5.

Some articles are bought at 2 for ₹ 15 and sold at 3 for ₹ 25. Find the gain percentage.

Answer:

Let cost price of one article be C.P

Given that 2 are bought for ₹ 15

$\therefore 2 \times CP = 15 \Rightarrow CP = \frac{15}{2}$

Let selling price of one article be SP

Given that 3 are sold for ₹ 25

$\therefore 3 \times SP = 25 \Rightarrow SP = \frac{25}{3}$

$\therefore$ Gain $= SP - CP = \frac{25}{3} - \frac{15}{2} = \frac{50-45}{6} = \frac{5}{6}$

$$\text{Gain \%} = \frac{\text{Gain}}{\text{CP}} \times 100 = \frac{\frac{5}{6}}{\frac{15}{2}} \times 100 = \frac{\cancel{5}}{\cancel{6}_3} \times \frac{\cancel{2}}{\cancel{15}_3} \times 100 = \frac{100}{9}$$

$= 11\frac{1}{9}$

Question 6.

By selling a speaker for ₹ 768, a man loses 20%. In order to gain 20%, how much should he sell the speaker?

Answer:

Selling price (SP) of speaker = ₹ 768

Loss % = 20 %

as per formula

$$SP = CP \times \frac{(100 - \text{loss\%})}{100}$$

$$\therefore 768 = CP \times \left(\frac{100 - 20}{100}\right)$$

$\therefore CP = (768 \times 100)/80 = 960$

For gain of 20%, we should now calculate the selling price

$$\therefore SP = CP\left(\frac{100 + gain\%}{100}\right)$$

$$= 960\left(\frac{100 + 20}{100}\right) = 960 \times \frac{120}{100}$$

= 96 × 12 = ₹ 1152

Question 7.

Find the unknowns x, y and z.

S.No	Name of the item	Marked Price	Selling Price	Discount
(i)	Book	₹225	x	8%
(ii)	LED TV	y	₹11970	5%
(iii)	Digital clock	₹750	₹615	z

Answer:

(i) Book marked price = ₹ 225 discount 8%

$\therefore$ Selling price (x) = Marked price × $\left(\frac{(100 - d\%)}{100}\right)$

$= 225 \times \frac{(100 - 8)}{100} = 225 \times \frac{92}{100} = $ ₹ 207

(ii) LED TV selling price = 11970 discount = 5%, Marked price = y

$\therefore$ Selling price Marked price y × $\left(\frac{(100 - d\%)}{100}\right)$

$\therefore 11970 = y \times \frac{(100 - 5)}{100}$

$\therefore y = \frac{11970 \times 100}{95} = 126 \times 100 = $ ₹ 12,600

(iii) Digital clock marked price (MP) = ₹ 750, MP = ₹ 12.600

Selling price (SP) = ₹ 615, Discount = z

$$SP = MP \times \left(\frac{(100 - d\%)}{100}\right)$$

$$\therefore 615 = 750 \times \frac{(100 - z)}{100}$$

$$\therefore (100 - z) = \frac{615 \times 100}{750}$$

100 − z = 82

$\therefore$ z = 100 − 82, Discount = 18%

Question 8.
Find the total bill amount for the data given below:

S.No	Name of the item	Marked Price	Discount	GST
(i)	School bag	₹500	5%	12%
(ii)	Hair dryer	₹2000	10%	28%

Answer:

Formula for discounted price LW = Marked price (MP) $\times \frac{(100 - d\%)}{100}$

When d is the discount %

$$\therefore DP = MP \times \left(\frac{(100 - d\%)}{100} \right)$$

(i)   School bag $= MP \times \left(\frac{(100 - d\%)}{100} \right)$

$$= 500 \times \frac{(100 - 5)}{100} = \frac{500 \times 0.95}{100} = ₹ 475$$

(ii)   Hair drier $= MP \times \left(\frac{(100 - d\%)}{100} \right)$

$$= 2000 \times \left(\frac{(100 - 10)}{100} \right) = 2000 \times 0.9 = ₹1,800.$$

For bill amount, we should apply GST on the discounted value of the items.

Formula: Bill amount = Discounted price $\times \left(\frac{(100 + GST\%)}{100} \right)$

∴ For (i) School bag.

Bill amount 475 $\times \left(\frac{(100 + 12)}{100} \right) = 475 \times 1.12 = ₹'532$

∴ For (ii) Hair drier,

Bill amount $= 1800 \times \left(\frac{(100 + 28)}{100} \right) = 1800 \times 1.28 = $

∴ Total bill amount Bill amount of School bag + Stationary + Cosmetics + Hair drier

= 532 + 252 + 1357 + 2304

= ₹ 4.445

Question 9.

A branded Air-Conditioner (AC) has a marked price of ₹ 38000. There are 2 options given for the customer.

(i) Selling Price is the same ₹ 38000 but with attractive gifts worth ₹ 3000

(or)

(ii) Discount of 8% on the marked price but no free gifts. Which offer is better?

Answer:

Marked price of AC = ₹ 38,000

Option 1:

Selling price = ₹ 38000 & gifts worth ₹ 3000

∴ Net gain for customer = ₹ 3000 as there is no discount on AC

Option 2:

Discount of 8%, but no gift

∴ Discounted value = MP × $\left(\frac{(100 - d\%)}{100} \right)$

$38000 × \frac{(100 - 8)}{100}$ = 38000 × 0.92 = 34960

∴ Savings for customer = 38000 – 34960 = 3040

Therefore, the customer gets 3000 gift in option I where as he is able to save only ₹ 3040 in option 2.

Therefore, option 2 is better.

Question 10.

If a mattress is marked for ₹ 7500 and is available at two successive discount of 10% and 20%, find the amount to be paid by the customer.
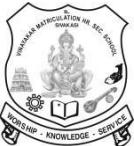
Answer:

Marked price of mattress = ₹ 7500

Discount d_1 = 10%

Discount d_2 = 20%

$$\text{Price after discount } d_1 = MP × \frac{(100 - d_1\%)}{100}$$
$$= 7500 × \frac{(100 - 10)}{100} = 7500 × \frac{90}{100} = 6750$$

$$\text{Price after second discount } d_2 = \text{Discount price} × \frac{(100 - d_2\%)}{100}$$
$$= 6750 × \frac{(100 - 20)}{100} = ₹ 5400$$

Question 11.

A fruit vendor sells fruits for ₹ 200 gaining ₹ 40. His gain percentage is

(A) 20%

(B) 22%

(C) 25%

(D) 16

Answer:

(C) 25%

Hint:

Selling price ₹ 200

Gain = 40

∴ CP – Selling price – gain = 200 – 40 = 160

$$\text{Gain \%} = \frac{\text{Gain}}{\text{CP}} \times 100 = \frac{40}{160} \times 100 = 25\%$$

Question 12.

By selling a flower pot for Z528, a woman gains 20%. At what price should she sell it to gain 25%?

(A) ₹ 500

(B) ₹ 550

(C) ₹ 553

(D) ₹ 573

Answer:

(B) ₹ 550

Hint:

If selling price (sp) = ₹ 528

Gain % = 20 %

∴ CP = ?

$$\text{Selling price SP} = \text{CP} \times \left(\frac{100 + \text{gain\%}}{100}\right)$$
$$\therefore 528 = \text{CP} \times \frac{100 + 20}{100}$$
$$\therefore \text{CP} = \frac{528 \times 100}{120} = 440$$

If gain % = 25%, Selling price ?

$$\text{Selling price SP} = \text{CP} \times \left(\frac{100 + \text{gain\%}}{100}\right)$$
$$= 440 \times \frac{(100 + 25)}{100} = 440 \times \frac{125}{100} = ₹ 550$$

Question 13.

A man buys an article for ₹ 150 and makes overhead expenses which are 12% of the cost price. At what price must he sell it to gain 5%?

(A) ₹ 180

(B) ₹ 168

(C) ₹ 176.40

(D) ₹ 88.20

Answer:

(C) ₹ 176.40

Hint:

Cost price of article = ₹ 150

Over head expenses = 12% of cost price

$= \frac{12}{100} \times 150 = ₹ 18$

∴ Effective cost of article = 150 + 18 = ₹ 168

Now, to gain 5%, he has to sell at

$$SP = CP \times \left(\frac{100 + \text{gain}\%}{100}\right)$$

$$= 168 \times \left(\frac{(100 + 5)}{100}\right) = 168 \times 1.05 = 176.40$$

Question 14.

What is the marked price of a hat which is bought for Z210 at 16% discount?

(A) ₹ 243

(B) ₹ 176

(C) ₹ 230

(D) ₹ 250

Answer:

(D) ₹ 250

Hint:

Let marked price be MP

Discounted price = ₹ 210

Rate of discount = 16%

As per formula:

$$\text{Discounted price} = MP \times \left(\frac{(100 - d\%)}{100}\right) = \frac{(100 - 16)}{100}$$

$$MP = \frac{210 \times 100}{84} = 250$$

Question 15.

The single discount in % which is equivalent to two successive discounts of 20% and 25% is

(A) 40%

(B) 45%

(C) 5%

(D) 22.5%

Answer:

(A) 40%

Hint:

Let marked price be MP, after discount 1 of 20%,

$$\text{Discounted price} = MP \times \frac{(100 - d_1\%)}{100} = \frac{(100 - 20)}{100} = MP \times \frac{80}{100}$$

After discount 2 of 25%,

$$\text{Discounted Price} = \text{Discounted price} \times \frac{(100 - d_2\%)}{100}$$

$$= MP \times \frac{80}{100} \times \frac{(100 - 25)}{100}$$

$$= MP \times \frac{\overset{4}{\cancel{80}} \times \overset{15}{\cancel{75}}}{100 \times \underset{2}{\cancel{100}}} = MP \times \frac{60}{100}$$

$$= MP \times \frac{(100 - 40)}{100} \quad 60 \text{ can be written as } 100 - 40$$

Comparing with formula, we get

∴ This is equivalent to a single discount of 40%