9. Percentage

Exercise 9A

1. Question

Express each of the following as a fraction:

(i) 48% (ii) 220% (iii) 2.5%

Answer

(i) 48% means, 48 divided by 100.

So, 48% = 48 /100

= 12 /25

(ii) 220% means, 220 divided by 100.

So, 220% = 220 /100

= 11 /5

(ii) 2.5% means, 2.5 divided by 100.

So, 2.5% = 2.5 /100

= 1 /40

2. Question

Express each of the following as a decimal:

(i) 6% (ii) 72% (iii) 125%

Answer

(i) 6% means, 6 divided by 100.

So, 6% = 6 /100

= 3 /50 = 0.06

(ii) 72% means, 72 divided by 100.

So, 72% = 72 /100

= 18 /25 = 0.72

(iii) 125% means, 125 divided by 100.

So, 125% = 125 /100

= 5 /4 = 1.25

3. Question

Express each of the following as a percentage:

(i) $\frac{9}{25}$ (ii) $\frac{3}{125}$ (iii) $\frac{12}{5}$

Answer

(i) $\frac{9}{25}$ = ($\frac{9}{25}$ x 100) %

= (9 x 4) %

= 36%

(ii) $\frac{3}{125}$ = ($\frac{3}{125}$ x 100) %

= 2.4%

(iii) $\frac{12}{5}$ = ($\frac{12}{5}$ x 100) %

= (12 x 20) %

= 240%

4. Question

Convert the ratio 4 : 5 to percentage.

Answer

4 : 5 = $\frac{4}{5}$

= ($\frac{4}{5}$ x 100) % [Because 100% = 1]

= 80%

5. Question

Express 125% as a ratio.

Answer

125% = 125/100

= 5 /4 [Divided by 25]

= 5 : 4

6. Question

Which is largest in $6\frac{2}{3}\%, \frac{3}{20}$ and 0.14?

Answer

$6\frac{2}{3}\%$

= (20 /3) %

= (20 /3 x 1 /100)

= 1 /15

= 0.06 ____ (i)

$\frac{3}{20}$ = 0.15 ____ (ii)

0.14 ____ (iii)

From equation (i), (ii) and (iii),

0.15 > 0.14 > 0.06

7 A. Question

What per cent of 150 is 96?

Answer

Percentage = (96 /150 x 100) %

= (96 /3 x 2) % [Divided by 50]

= (32 x 2) %

= 64%

7 B. Question

What per cent of 5 kg is 200 g?

Answer

5 kg = 5 x 1000

= 5000 g

Now,

Percentage = (200 /5000 x 100) %

= (200 /50) % [Divided by 100]

= 4 %

7 C. Question

What per cent of 2 litres is 250 mL?

Answer

2 liters = 2 x 1000

= 2000 mL

Now,

Percentage = (250 /2000 x 100) %

= (250 /20) % [Divided by 100]

= 12.5 %

8. Question

Find $4\frac{1}{2}\%$ of 3600.

Answer

$4\frac{1}{2}\%$ = (9 /2) x 100

= 9 /200

Now,

9 /200 of 3600 = 9 /200 x 3600

= 9 x 18 [Divided by 200]

= 162

9. Question

If 16% of number is 72, find the number.

Answer

Let the number = Z

∴ 16% of Z is 72.

⇒ 16 /100 × Z = 72

⇒ 16 Z = 7200

⇒ Z = 7200 /16

⇒ Z = 450

10. Question

A man saves 18% of his monthly income. If he saves Rs. 3780 per month, what is his monthly income?

Answer

Let Rs. Z his monthly income.

∴ Saving = 18% of Rs. Z

⇒ 3780 = 18 /100 × Z

⇒ 3780 = 9 /50 × Z

⇒ Z = 3780 × 50/9

⇒ Z = 420 × 50

[Because 420 × 9 = 3780]

⇒ Z = 21000

Therefore, his monthly income is Rs 21000/-

11. Question

A football team wins 7 games, which is 35% of total games played. How many games were played in all?

Answer

Let, total games played = Z

∴ percentage of games won = 35% of Z

⇒ 7 = 35/100 × Z

⇒ 7 = 7/20 × Z [Divided by 5]

⇒ Z = 7 × 20/7

⇒ Z = 20

12. Question

Amit was given an increment of 20% on his salary. If his new salary is Rs. 30600, what was his salary before the increment?

Answer

Let Amit’s old salary = Z

∴ Salary after increment = (Z + 20Z/100)

Now,

⇒ (Z + 20 Z/100) = 30600

⇒ (100 Z + 20 Z)/100 = 30600

⇒ 120 Z = 30600 × 100

⇒ Z = 25500

13. Question

Sonal attended her school on 204 days in a full year. If her attendance is 85%, find the number of days on which the school was opened.

Answer

Let the number of days the school was opened = Z

∴ Percentage of attendance = 85% of Z

Now,

85% of Z = 204

⇒ 85/100 × Z = 204

⇒ Z = 204 × 100/85

⇒ Z = 204 × 20/17 [Divided by 5]

⇒ Z = 12 × 20

⇒ Z = 240

14. Question

A’s income is 20% less than that of B. By what per cent is B’s income more than A’s?

Answer

Let B’s income = 100

Then, A’s income = (100 – 20) = 80

∴ B’s income more than A’s income = (100 – 80)/80 × 100

= 20/80 × 100

= 1/4 × 100

= 25

15. Question

The price of petrol goes up by 10%. By how much per cent must a motorist reduce the consumption of petrol so that the expenditure on it remains unchanged?

Answer

Let the consumption of petrol = 1 unit and its cost = Rs.100

∴ New cost of 1 unit of petrol = Rs.110

Now,

Rs.110 will yield 1 unit of petrol.

∴Rs.100 will yield (1/110 × 100)

= 10/11 unit of petrol

Now,

Reduction of consumption = 1 – (10/11)

= 1/11

Percentage of reduction = (1/11 × 100) %

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

16. Question

The population of a town increases by 8% annually. If the present population is 54000, what was it a year

ago?

Answer

Let population of the town a year ago = Z

∴ Present population = 108% of Z

⇒ 54000 = Z × 108/100

⇒ 54000 = Z × 27/25

⇒ Z = 54000 × 25/27

⇒ Z = 2000 × 25

⇒ Z = 50000

17. Question

The value of a machine depreciates every year by 20%. If the present value of the machine be Rs. 160000, what was its value last year?

Answer

Let the value of machine last year = Z

∴ Present value = (100 – 20) % of Z

⇒ 160000 = 80% of Z

⇒ 160000 = Z × 80/100

⇒ Z = 160000 × 100/80

⇒ Z = 2000 × 100

⇒ Z = 200000

18. Question

An alloy contains 40% copper, 32% nickel and rest zinc. Find the mass of zinc in one kg of the alloy.

Answer

Given,

Percentage of copper = 40%

Percentage of nickel = 32%

∴ Percentage of zinc = {100 – (40 + 32)} %

= 28 %

Now,

Mass of zinc in 1 kg of the alloy = (28 × 1/100) kg

= 0.28 kg

= 0.28 × 1000 g

= 280 g

19. Question

Balanced diet should contain 12% of proteins, 25% of fats and 63% of carbohydrates. If a child needs 2600 calories in his food daily, find in calories the amount of each of these in his daily food intake.

Answer

Amount of proteins = 12% of 2600

$$= 2600 \times \frac{12}{100}$$

= 26 × 12

= 312 calories

Amount of fats = 25% of 2600

$$= 2600 \times \frac{25}{100}$$

= 26 × 25

= 650 calories

Amount of carbohydrates = 63% of 2600

$$= 2600 \times \frac{63}{100}$$

= 26 × 63

= 1638 calories

20. Question

Gunpowder contains 75% nitre and 10% sulphur. Find the amount of gunpowder which carries 9 kg nitre. What amount of gunpowder would contain 2.5 kg sulphur?

Answer

Let the amount of gunpowder which carries 9 kg nitre = Z

∴ 75% of Z = 9 kg

⇒ Z × 75/100 = 9

⇒ Z = 9 × 100/75

⇒ Z = 9 × 4/3

⇒ Z = 12 kg

Now,

Let the amount of gunpowder which carries 2.5 kg sulphur = K

∴ 10% of K = 2.5 kg

⇒ K × 10/100 = 2.5

⇒ K = 2.5 × 100/10

⇒ K = 2.5 × 10

⇒ K = 25 kg

21. Question

Divide Rs. 7000 among A, B and C such that A gets 50% of what B gets and B gets 50% of what C gets.

Answer

Let the amount of money gets by C = Rs. Z

∴ Amount of money B gets = (50% of Rs.Z)

∴ Amount of money A gets = (50% of B)

= (25% of Rs.Z)

Now,

Z + (50% of Rs.Z) + (25% of Rs.Z) = RS.7000

⇒ Z + (Z × 50/100) + (Z × 25/100) = 7000

⇒ Z + 50 Z/100 + 25 Z/100 = 7000

⇒ 175 Z/100 = 7000

⇒ Z = 7000 × 100/175

⇒ Z = 7000 × 4/7

⇒ Z = 4000

∴ C gets = Rs.4000

∴ Amount of money B gets = (50% of Rs.Z)

= (50% of Rs.4000)

= (Rs.4000 × 50/100)

= Rs.2000

∴ Amount of money A gets = (25% of Rs.Z)

= (25% of Rs.4000)

= (Rs.4000 × 25/100)

= Rs.1000

22. Question

Find the percentage of pure gold in 22-carat gold, if 24-carat gold is 100% pure.

Answer

22-carat gold contains 22 parts out of 24 parts.

∴ Percentage of pure gold in 22-carat gold $= \left(\frac{22}{24} \times 100\right)\% = 91\frac{2}{3}\%.$

Hence, 22-carat gold contains $91\frac{2}{3}\%$ of pure gold.

23. Question

The salary of an officer is increased by 25%. By what per cent should the new salary be decreased to restore the original salary?

Answer

Let the original salary = Rs.100

Then,

After increment of 25% = 100 (1 + 25/100)

= 100 (125/100)

= Rs.125

Now,

To restore the original salary,

Let the new salary decreased by Z%

∴ 125(1 – Z/100) = 100

⇒ (1 – Z/100) = 100/125

⇒ (1 – Z/100) = 4/5

⇒ Z/100 = 1/5 [1 – 4/5 = 1/5]

⇒ Z = 100/5

⇒ Z = 20%

Exercise 9B

1. Question

Choose the correct answer: $\frac{3}{5} = ?$

A. 30%

B. 40%

C. 45%

D. 60%

Answer

3/5 = (3/5 × 100) %

= (3 × 20) %

= 60%

2. Question

0.8% when expressed as a percentage, is

A. 0.08

B. 0.008

C. 8

D. 0.8

Answer

0.8% = 0.8/100

= 0.008

3. Question

$6:5$ when expressed as a percentage, is

A. $83\frac{1}{3}\%$

B. 90%

C. 120%

D. 6.5%

Answer

6 : 5 = 6/5

= (6/5 × 100) % [100% = 1]

= (6 × 20) %

= 120 %

4. Question

5% of a number is 9. The number is

A. 45

B. 90

C. 135

D. 180

Answer

Let number = Z

Then,

5% of Z = 9

⇒ 5/100 × Z = 9

⇒ 5 Z = 900

⇒ Z = 180

5. Question

What per cent of 90 is 120?

A. 75%

B. $33\frac{1}{3}\%$

C. $133\frac{1}{3}\%$

D. none of these

Answer

Let Z% of 90 is 120

∴ Z/100 × 90 = 120

⇒ 90 Z = 120 × 100

⇒ Z = 12000/90

⇒ Z = 400/3

⇒ Z = $133\frac{1}{3}\%$

6. Question

What per cent of 10 kg 250 g?

A. 25%

B. 5%

C. 10%

D. 2.5%

Answer

10 kg = 10 × 1000

= 10000 g

Let Z% of 1000 is 250

∴ Z/100 × 10000 = 250

⇒ 100 Z = 250

⇒ Z = 250/100

⇒ Z = 2.5%

7. Question

40% of $? = 240$

A. 60

B. 600

C. 6000

D. 960

Answer

Let, 40% of Z = 240

⇒ 40/100 × Z = 240

⇒ Z = 240 × 100/40

⇒ Z = 6 × 100 [40 × 6 = 240]

⇒ Z = 600

8. Question

?% of 400 = 60

A. 6

B. 12

C. 15

D. 20

Answer

Let, Z% of 400 = 600

⇒ Z/100 × 400 = 60

⇒ 4 Z = 60

⇒ Z = 60/4

⇒ Z = 15

9. Question

(180% of ?) $\div 2 = 504$

A. 400

B. 480

C. 600

D. 560

Answer

Let (180% of Z) $\div 2 = 504$

∴ (180/100 × Z) $\div 2 = 504$

⇒ (18/10 × Z) = 504 × 2

⇒ Z = 504 × 2 × 10/18

⇒ Z = 504 × 10/9

⇒ Z = 560

10. Question

20% or Rs. 800 = ?

A. $Rs.160$

B. $Rs.16$

C. $Rs.1600$

D. none of these

Answer

20% of Rs.800 = 20/100 × 800

= 20 × 8

= 160

11. Question

In an examination, Nitin gets 98 marks. This amounts to 56% of the maximum marks.

What are the maximum marks?

A. 75

B. 150

C. 175

D. 225

Answer

Let the maximum marks = Z

∴ 56% of Z = 98

⇒ Z × 56/100 = 98

⇒ Z = 98 × 100/56

⇒ Z = 7 × 100/4

⇒ Z = 175

12. Question

A number is first increased by 10% and then reduced by 10%. The number

A. does not change

B. decrease by 1%

C. increased by 1%

D. none of these

Answer

Let the number = Z

10% increased by number = Z (1 + 10/100)

= 11Z/10

Now,

10% decreased by number = 11Z/10 (1 - 10/100)

= (11Z/10) (90/100)

= 99Z/100

∴ difference = Z – 99Z/100

= Z/100

Percentage of decreases = Z/100 × 1/Z × 100

= 1%

13. Question

A period of 4 hours 30 min is what per cent of a day?

A. $18\frac{3}{4}\%$

B. 20%

C. $16\frac{2}{3}\%$

D. 19%

Answer

4 hours 30 min = (4 × 60) + 30

= 240 + 30

= 270 min

24 hours = 24 × 60

= 1440 min

Now,

Percentage = (270/1440 × 100) %

= (3/16 × 100) %

= (3/4 × 25) %

= (75/4) %

= $18\frac{3}{4}\%$

14. Question

In an examination, 65% of the total examines passed. If the number of failures is 420, the total number of examines is

A. 500

B. 1000

C. 1200

D. 1625

Answer

Let the total number of examines = Z

Percentage of examines failed = (100 – 65) % = 35%

∴ 35% of Z = 420

⇒ Z × 35/100 = 420

⇒ Z = 420 × 100/35

⇒ Z = 12 × 100

⇒ Z = 1200

15. Question

A number exceeds 20% of itself by 40. The number is

A. 50

B. 60

C. 80

D. 320

Answer

Let the number = Z

∴ 20% of Z + 40 = Z

⇒ (Z × 20/100) + 40 = Z

⇒ Z/5 + 40 = Z

⇒ Z – Z/5 = 40

⇒ 4Z/5 = 40

⇒ Z = 40 × 5/4

⇒ Z = 50

16. Question

A number decreased by $27\frac{1}{2}\%$ of itself by 87. The number is

A. 58

B. 110

C. 120

D. 135

Answer

Let the number = Z

∴ Z - ($27\frac{1}{2}\%$ of Z) = 87

⇒ Z - (Z × 55/2 × 1/100) = 87

⇒ Z - (Z × 11/2 × 1/20) = 87

⇒ Z- (11Z/40) = 87

⇒ 29Z/40 = 87

⇒ 29Z/40 = 87

⇒ Z = 87 × 40/29

⇒ Z = 120

17. Question

0.05 is what per cent of 20?

A. 25%

B. 2.5%

C. 0.25%

D. 0.025%

Answer

Percentage = (0.05/20 × 100) %

= (0.05 × 5) %

= 0.25%

18. Question

One-third of 1206 is what per cent of 134?

A. 3%

B. 30%

C. 20%

D. 300%

Answer

Percentage = {(1/3 × 1206) × (1/134) × 100} %

= {402 × 1/134 × 100} %

= {3 × 100} %

= 300%

19. Question

x% of y is y% of $?$

A. x

B. $100x$

C. $\frac{x}{100}$

D. $\frac{y}{100}$

Answer

Let x% of y is y% of Z

∴ x/100 × y = y/100 × Z

⇒ x y/100 = y/100 × Z

⇒ Z = x y/100 × 100/y

⇒ Z = x

20. Question

What per cent of $\frac{2}{7}$ is $\frac{1}{35}$?

A. 2.5%

B. 10%

C. 20%

D. 25%

Answer

Percentage = {(1/35)/(2/7) × 100} %

= {1/35 × 7/2 × 100} %

= {1/5 × 1/2 × 100} %

= {1/5 × 50} %

= 10%

CCE Test Paper-9

1 A. Question

Express:

24% as a fraction;

Answer

24% means, 24 divided by 100.

So, 24% = 24/100

= 6/25

1 B. Question

Express:

105% as a decimal;

Answer

105% means, 105 divided by 100.

So, 105% = 105/100

= 1.05

1 C. Question

Express:

4 : 5 as a percentage;

Answer

4 : 5 = 4 /5

= (4 /5 x 100) % [Because 100% = 1]

= 80%

1 D. Question

Express:

56% as a ratio.

Answer

56% means, 56 divided by 100.

So, 56% = 56/100

= 14/25

= 14:25

2. Question

If 34% of a number is 85, find the number.

Answer

Let the number = Z

∴ 34% of Z = 85

⇒ 34/100 x Z = 85

⇒ Z = 85 x 100/34

⇒ Z = 5 x 100/2

⇒ Z = 250

3. Question

The value of a machine depreciates every year by 10%. If the present value of the machine is Rs.54000, what was its value last year?

Answer

Let the value of the machine last year = Z

∴ Present value of the machine = (100 – 10) % of Rs.Z

⇒ 54000 = 90% of Z

⇒ 54000 = Z x 90/100

⇒ Z = 54000 x 100/90

⇒ Z = 600 x 100

⇒ Z = 60000

4. Question

An alloy contains 30% copper, 42% nickel and rest zinc. Find the mass of zinc in 1 kg of alloy.

Answer

Given,

Percentage of copper = 30%

Percentage of nickel = 42%

∴ Percentage of zinc = {100 – (30 + 42)} %

= 28 %

Now,

Mass of zinc in 1 kg of the alloy = (28 × 1/100) kg

= 0.28 kg

= 0.28 × 1000 g

= 280 g

5. Question

In a class, 60% of the total number of students are boys and there are 14 girls. How many students are there in the class?

Answer

Let the total number of students = Z

Percentage of girls = (100 – 60) % = 40%

Now,

Number of girls = 40% of Z

⇒ 14 = Z × 40/100

⇒ Z = 14 × 100/40

⇒ Z = 14 × 5/2

⇒ Z = 35

6. Question

Which is largest in $8\frac{1}{3}\%, \frac{4}{25}$ and 0.15?

Answer

= (25 /3) %

= (25 /3 x 1 /100)

= 8.33 /100

= 0.08 _____ (i)

$\frac{4}{25}$ = 0.16 _____ (ii)

0.15 _____ (iii)

From equation (i), (ii) and (iii),

0.16 > 0.15 > 0.08

7. Question

What per cent of $\frac{2}{9}$ is $\frac{1}{45}$?

A. 2.5%

B. 5%

C. 7.5%

D. 10%

Answer

Percentage = {(1/45)/(2/9) × 100} %

= {1/45 × 9/2 × 100} %

= {1/5 × 1/2 × 100} %

= {1/5 × 50} %

= 10%

8. Question

A number decreased by 30% gives 84. The number is

A. 90

B. 110

C. 120

D. 135

Answer

Let the number = Z

∴ Z – (30% of Z) = 84

⇒ Z – (Z × 30/100) = 84

⇒ Z – 30 Z/100 = 84

⇒ 70 Z/100 = 84

⇒ Z = 84 × 100/70

⇒ Z = 12 × 10

⇒ Z = 120

9. Question

(?)% of 320 is 48?

A. 25%

B. 15%

C. 14%

D. 9%

Answer

Percentage = (48/320 × 100) %

= (48/32 × 10) %

= (3/2 × 10) %

= 15%

10. Question

What per cent of 45 is 54?

A. $83\frac{1}{3}\%$

B. 104%

C. 108%

D. 120%

Answer

Percentage = (54/45 × 100) %

= (54/9 × 20) %

= (6 × 20) %

= 120%

11. Question

A number exceeds 25% of itself by 60. The number is

A. 75

B. 45

C. 80

D. 65

Answer

Let the number = Z

∴ 25% of Z + 60 = Z

⇒ (Z × 25/100) + 60 = Z

⇒ Z/4 + 60 = Z

⇒ Z – Z/4 = 60

⇒ 3Z/4 = 60

⇒ Z = 60 × 4/3

⇒ Z = 80

12. Question

5% of which number is 12?

A. 120

B. 180

C. 240

D. 320

Answer

Let the number = Z

∴ 5% of Z = 12

⇒ Z × 5/100 = 12

⇒ Z = 12 × 100/5

⇒ Z = 12 × 20

⇒ Z = 240

13. Question

Fill in the blanks.

(i) $7\frac{1}{2}$% of Rs.1200 = ……..

(ii) 240 mL is……% of 3 L.

(iii) If x % of 35 is 42, then x =……..

(iv) $\frac{12}{5}$ = ……%.

(v) 120 = (……)% of 80.

Answer

(i) 90

$7\frac{1}{2}$% of Rs.1200 = (15/2) % of Rs.1200

= 15/2 × 1/100 × 1200

= 15/2 × 12

= 90

∴ Rs.90

(ii) 8

240 mL = (240/1000) L

Now,

Percentage = (240/1000 × 1/3 × 100) %

= (240/10 × 1/3) %

= (80/10) %

= 8%

(iii) 120

X% of 35 = 42

⇒ 35 × X/100 = 42

⇒ 35X/100 = 42

⇒ X = 42 × 100/35

⇒ X = 6 × 100/5

⇒ X = 120

(iv) 240

12/5 = (12/5 × 100) %

= (12 × 20) %

= 240%

(v) 150

Let the number = Z

∴ 120 = Z% of 80

⇒ 120 = 80 × Z/100

⇒ Z = 120 × 100/80

⇒ Z = 120 × 5/4

⇒ Z = 150

14. Question

Write ‘T’ for true and ‘F’ for false for each of the following:

(i) 6% of 8 is 48.

(ii) 6 : 5 = 30%.

(iii) $\frac{3}{5}$ = 60%.

(iv) 6 hours = 25% of a day.

Answer

(i) False

6% of 8 = 8 × 6/100

= 48/100

= 0.48

(ii) False

6:5 = 6/5

= (6/5 × 100) %

= (6 × 20) %

= 120%

(iii) True

3/5 = 3/5

= (3/5 × 100) %

= (3 × 20) %

= 60%

(iv) True

1 day = 24 hours

6 hours = (6/24 × 100) %

= (1/4 × 100) %

= 25%