Bank Probationary Officer

Quantitative Aptitude

PERCENTAGE

A fraction with its denominator as `100' is called a **percentage**. Percentage means per hundred.

So it is a fraction of the form $\frac{6}{100}, \frac{37}{100}$ and $\frac{151}{100}$ and these fractions can be expressed as 6%, 37% and 151% respectively.

In such a fraction, the numerator is called rate percent.

To express x% as a fraction or a decimal, divide x by 100.

If the price of an item increases by r%, then the reduction in consumption, so that the expenditure remains the same is

$$\left(\frac{r}{r+100}\right) x\,100\%$$

If the price of the commodity decreases by r%, the increase in consumption, so that the expenditure remains the same is

$$\left(\frac{r}{100-r}\right) x\,100\%$$

If the value is first increased by x% and then by y%, the final increase is

$$\left(x+y+\frac{xy}{100}\right)\%$$

If there is a decrease instead of increase, a negative sign is attached to the corresponding rate percent.

If the value of a number is first increased by x% and later it is decreased by x% then net change is always a decrease which is equal to

$$\left(\frac{x^2}{100}\right)\%$$

If pass marks in an examination is x% and if a student secures y marks and fails by z marks, then the maximum mark

$$= \frac{100(y+z)}{x}$$

A candidate scores x% in an examination fails by `a' marks while another candidate who scores y% gets `b' marks more than the minimum required for a pass, then the

maximum mark = $\frac{100(a+b)}{y-x}$

If the length of a rectangle is increased by x% and the breadth is decreased by y%, then the area is increased or decreased by $(x-y-\frac{xy}{100})\%$ according to the (+) ve or (-) ve sign obtained.

If the present population is P which increases R% annually, then

(i) the population after n years

$$= P\left(\frac{100+R}{100}\right)^n$$

(ii) the population n years ago

$$= P\left(\frac{100}{100+R}\right)^n$$

If the present value of a machine is P which depreciates at R% per annum, then

(i) the value of the machine after n years

$$= P\left(\frac{100-R}{100}\right)^n$$

(ii) the value of the machine n years ago

$$= P\left(\frac{100}{100-R}\right)^n$$

If x% students failed in a particular subject, y% students failed in another subject, and z% students failed in both subjects, then the pass present = 100+z-(x+y)

Fractional Equivalents of important percents

$1\% = \frac{1}{100}$	$2\% = \frac{1}{50}$	$4\% = \frac{1}{25}$	$5\% = \frac{1}{20}$
$40\% = \frac{2}{5}$	$60\% = \frac{3}{5}$	$80\% = \frac{4}{5}$	$100\% = 1$
$6\frac{1}{4}\% = \frac{1}{16}$	$12\frac{1}{2}\% = \frac{1}{8}$	$25\% = \frac{1}{4}$	$37\frac{1}{2}\% = \frac{3}{8}$
$8\frac{1}{3}\% = \frac{1}{12}$	$16\frac{2}{3}\% = \frac{1}{6}$	$33\frac{1}{3}\% = \frac{1}{3}$	$66\frac{2}{3}\% = \frac{2}{3}$

$8\% = \frac{2}{25}$	$10\% = \frac{1}{10}$	$20\% = \frac{1}{5}$
$50\% = \frac{1}{2}$	$62\frac{1}{2}\% = \frac{5}{8}$	$75\% = \frac{3}{4}$
$83\frac{1}{3}\% = \frac{5}{6}$	$87\frac{1}{2}\% = \frac{7}{8}$	$133\frac{1}{3}\% = \frac{4}{3}$

SOLVED EXAMPLES:

1. Find $33\frac{1}{3}\%$ of 600

Ans: $33\frac{1}{3}\%$ of 600 = $\frac{1}{3} \times 600 = 200$

2. What percent of 144 is 36?

Ans: Let x% of 144 = 36

(ie) $\frac{x}{100} \times 144 = 36$

(ie) $x = \frac{36 \times 100}{144} = 25$

3. 2.5 is 5% of what?

Ans : Let the number be x

$\therefore 5\% \text{ of } x = 2.5$

$\frac{5}{100} x \; x = 2.5 \Rightarrow x = 50$

4 In an examination 36% are pass marks. If an examinee gets 17 marks and fails by 10 marks, what are the maximum marks?

Ans : Pass mark=(17+10)= 27

Let maximum marks be x

Then 36% of x = 27 or $\frac{36}{100} x \; x = 27$

$x = \frac{27 \times 100}{36} = 75$

Hence, maximum marks = 75

The answer can be arrived quickly by

Maximum marks = $\frac{100(17+10)}{36}$

$= \frac{100 \times 27}{36} = 75$

5. Subtracting 40% of a number from the number, we get the result as 30. Find the number.

Ans: Let the number be x

$\therefore x - \frac{40}{100} x = 30$ (ie) $x\left(1 - \frac{2}{5}\right) = 30$

$x = 30 \times \frac{5}{3} = 50$

6. If the price of sugar be increased by 25%, find by how much percent must its consumption be decreased to keep the expenditure fixed on sugar?

Ans:

Decrease in consumption

$= \left(\frac{25}{100+25}\right)100\% \quad = \frac{25 \times 100}{125}\% = 20\%$

7. The salary of a worker was first increased by 10% and thereafter decreased by 5%. What was the effect in his salary?

Ans: % effect = $\left(10 - 5 - \frac{10 \times 5}{100}\right)\%$

$\therefore$ His salary is increased by 4.5% (because the sign is +ve.)

8. The value of a machine depriciates at the rate of 10% per annum. If its present value is Rs. 81,000 what will be its worth after 2 years?

Ans: The value of the machine after

2 years = Rs. $81{,}000 \times \left(1 - \frac{10}{100}\right)^2$

= Rs. 81000 x $\frac{9}{10} \times \frac{9}{10}$ = Rs. 65,610

9. Due to fall of 10% in the rate of sugar, 500 gm more sugar can be purchased for Rs. 140. Find the original rate and reduced rate.

Ans : Money spent originally=Rs. 140

Less Money to be spent now

= 10% of 140

= Rs. 14

$\therefore$ Rs. 14 now yield 500gm sugar

$\therefore$ Present rate of sugar = Rs. 28 per kg.

If the present value is Rs. 90, the original value = Rs. 100

If the present value is Rs. 28 the original value

= Rs. $\frac{100}{90} \times 28$

= Rs. 31.11

10. In an examination, 42% students failed in History and 52% failed in Geography. If 17% students failed in both subjects, find the percentage of those students who passed in both the subjects.

Ans:- Pass percent=100+17-(42+52)

= 117 - 94

= 23

PRACTICE TEST

1. 65% of 7+35% of 3 = ?% of 56

1) 1 2) 10 3) 50 4) 100

2. What is 20% of a number whose 200% is 360?

1) 72 2) 36 3) 52 4) 144

3. What percent of $\frac{4}{7}$ is $\frac{2}{35}$?

1) 2.5% 2) 1000%

3) 25% 4) 10%

4. The total income of A and B is Rs. 6000. A spends 60% of his income and B spends 80% of his income. If their savings are equal, then the income of A is,

1) Rs. 3500 2) Rs. 2000

3) Rs. 4000 4) Rs. 3000

5. With an increase of Rs. 2,000, Vishnu's monthly salary became Rs. 12,000. What is the percent increase in his salary?

1) 20 2) 25 3) 40 4) 80

6. if 75% of the students in a school are boys and the number of girls is 420, the number of boys is

1) 1176 2) 1350

3) 1260 4) 1125

7. The salary of a worker is first increased by 10% and therafter it was reduced by 10%. What was the change in his salary?

1) 1% increase 2) 5% increase

3) no change 4) 1% decrease

8. A water tank contains 5% salt by weight. x litres of fresh water is added to 40 litres of tank water, so that the solution contains 2% salt. The value of x is

1) 40 2) 50 3) 55 4) 60

9. The population of a town increases 5% annually. If it is 15,435 now, what was it 2 years ago?

1) 14,000 2) 13,473

3) 12,345 4) 10,145

10. Navin spends 15% of his salary on cloths, 30% on food and 10% on transport. After this if he is left with Rs. 900/- what is his salary?

1) Rs. 1,500 2) Rs. 2000

3) Rs. 1,635 4) Rs. 2500

11. When the price of an article was reduced by 15% the sale of the article is increased by

20%. What was the effect on the sales?

1) 2% increase 2) 1% increase
3) 2% decrease 4) 1% decrease

12. In an election between two candidates, the one gets 35% of the votes polled is defeated by 15000 votes. The number of votes casted by the winning candidate is

1) 15,000 2) 1,75,000
3) 32,500 4) 52,500

13. In an examination, 70% students passed in English and 75% in Hindi while 20% failed in both the subjects. If 260 students passed in both the subjects, the total number of students is

1) 400 2) 500
3) 340 4) 460

14. If the radius of a circle is diminished by 10%, the area is diminished by

1) 36% 2) 20%
3) 19% 4) 10%

15. The price of an article is cut by 10%. In order to restore it to its former value, the new price must be increased by

1) $10\frac{1}{3}\%$ 2) 11%
3) $11\frac{1}{9}\%$ 4) $12\frac{1}{9}\%$

16. The breadth of a rectangular field is 60% of its length. If the perimeter of the field is 800m, What is the area of the field?

1) 37,500 sq.m. 2) 4,800 sq.m
3) 18,750 sq.m 4) 40,000 sq.m

17. In a factory, 60% of the employees are males. Among them 20% are matriculates and the remaining are graduates. Among the females 40% are matriculates and the remaining are graduates. If the total number of female employees in the factory is 640, how many graduates are there in the factory?

1) 1024 2) 896
3) 1,152 4) 1000

18. In an employment exchange, 40% of the job seekers are graduates, 20% are post-graduates and remaining 6000 are non-graduates. How many post-graduate job seekers are there?

1) 3,000 2) 6,000
3) 9,000 4) 12,000

19. A company hired a salesman on a monthly salary of Rs. 3,000. In addition to it, the salesman was entitled for 20% commission on the monthly sale. How much sale the salesman should do if he wants his monthly income as Rs. 10,000?

1) Rs. 50,000 2) Rs. 15,000
3) Rs. 35,000 4) Rs. 21,000

20. In a public sector company, 30% employees opted for pension and 50% employees opted for provident fund. The remaining employees were uncertain. If the difference between those who opted for provident fund and those who were uncertain was 1440, how many employees were there in the company?

1) 7,200 2) 2,400
3) 2,880 4) 4,800

21. Prasanna spends 25% of her monthly income on petrol for her car, $\frac{2}{3}$rd of the remaining income on house hold items, rent, etc. If she is left with Rs. 1,800 with her at the end of the month how much does she spend on petrol?

1) Rs. 1,800 2) Rs. 720
3) Rs. 2,500 4) Rs. 1,440

22. Rajesh earns Rs. 2,300 per month. He spends Rs. 1,200 on food, Rs. 630 on conveyance, 10% of his monthly income on other incidentals and saves the remaining amount. How much money will he save in one year?

1) Rs. 2300 2) Rs. 2880
3) Rs. 2600 4) Rs. 2400

23. In an examination, Hari got 8 marks less than 80% of the full marks and Ravi got 5 marks more than 70% of the full marks. Hari

beats Ravi by 2 marks. The marks scored by Ravi is

1) 90 2) 110 3) 130 4) 140

24. A candidate secured 20% marks in a test and failed by 10 marks. Another candidate secured 42% and got one mark more than the bare minimum to pass. The maximum mark is

1) 50 2) 60 3) 65 4) 70

25. A's salary is 20% less than B's salary and B's salary is 20% more than C's salary. If the sum of the salaries of A and B is Rs. 5,400 then C's salary is

1) Rs. 3,000 2) Rs, 2,880
3) Rs. 2,500 4) Rs. 2,700

26. The price of some commodity was reduced by 20%. To bring the price of that commodity to the original level, by how much percentage of the increase in the price of that commodity will have to be made?

1) 12.5% 2) 20%
3) 25% 4) 37.5%

27. In a college election between two candidates, the candidate who got 62% of the votes, won by 144 votes. The total number of votes is

1) 600 2) 800
3) 925 4) 1200

28. In a class, 30% of the boys play football, 40% of the remaining play cricket and the remaining 21 boys play different other games. How many boys are there in the class?

1) 50 2) 100 3) 48 4) 96

29. In an examination 40% of the students failed in English, 60% passed in Mathematics. If 10% of the students failed in both the subjects, what is the pass percent?

1) $33\frac{1}{3}$ 2) 30
3) $36\frac{2}{3}$ 4) 50

30. In a library, 30% of books are on computers, 5% on English, 35% on Science and remaining 900 are on various other fields. How many books on English are there in the library?

1) 3000 2) 300
3) 150 4) 200

31. Ramu spends 40% of his income on food, 1/3 rd of the remaining on transport and 10% of the remaining on books. If he spends Rs. 250 for rent of his house, what is his salary?

1) Rs. 6,000 2) Rs. 625
3) Rs. 62,500 4) Cannot be determined

32. In an examination, A got 10% marks less than B, B got 25% more than C, and C got 20% less than D. If A got 360 out of 500, the percentage marks obtained by D was

1) 70 2) 75
3) 80 4) 85

ANSWERS TO PRACTICE

1. (2)	2. (2)	3. (4)	4. (2)	5. (1)	6. (3)	7. (4)	8.(4)
9. (1)	10. (2)	11. (1)	12. (3)	13. (1)	14. (3)	15. (3)	16.(1)
17. (3)	18. (1)	19. (3)	20. (4)	21.(1)	22. (2)	23. (2)	24. (1)
25. (3)	26. (3)	27. (1)	28.(1)	29.(2)	30. (3)	31. (4)	32.(3)