{QUANTITATIVE ABILITY - PERCENTAGES, PROFIT, LOSS & DISCOUNT}
CONCEPTS

The problems on percentages may not appear directly but the applications are present in profit and loss, simple and compound interest and data interpretation and other areas.

Percent means for every hundred.
Percentage conversions: You must commit to memory these percentage equivalents.
1=100 %,
1/2 = 50 %,
1/3 =33.33 %, 2/3 = 66.67%
1/4 = 25 %, 3/4 = 75%,
1/5 = 20%, 2/5 = 40 %, 3/5 = 60%, 4/5 = 80%,
1/6 = 16.66%,
1/7 = 14.28%;
1/8= 12.5%; 3/8 = 37.5%, 5/8 = 62.5%, 7/8 = 87.5%,
1/9 =11.11%,
1/10 = 10%;
1/11 = 9.09%;
1/12 = 8.33;

Formula 1:
A is what percentage of B?
⇒ A = x% of B
⇒ x = 100A/B %

Formula 2:
A is how much percent greater than B?
$\Rightarrow \frac{(A-B)}{B} \times 100$ %

Formula 3:
A is how much percent less than B?
$\Rightarrow \frac{(B-A)}{B} \times 100$ %

Formula 4:
If A is increased by K% then the new number is A + (K A)/100
But there are several methods available to calculate easily.

Example: A is increased by 20% then the new number can be calculated as
Method 1: (100+20) % × A
⇒120 % × A

Method 2: Calculate 20% of the given number and add to the original number A.
⇒ A + (20 % × A)
Method 3: If basic ratio is available for the given percentage then
⇒A + (1/5 × A) ⇒ 6/5 × A

Formula 5:
If A is decreased by K% then the new number is A - (K A)/100

But there are several methods available to calculate easily.

Example: A is decreased by 20% then the new number can be calculated as
Method 1: (100−20) % × A
⇒ 80 % ×A

Method 2: Calculate 20% of the given number and subtract from the original number A.
⇒ A − (20 % × A)

Method 3: If basic ratio is available for the given percentage then
⇒A − (1/5 × A)
⇒4/5 × A

Formula 6:
A % of (B) = B% of (A)

Formula 7:
If several percentages are acting on the same number then we can add all the percentages.
A% of (K) + B% of (K) + C% of (K)... = (A + B + C....)% of (K)

Formula 8:
If a number K got increased by A% and B% successively then the final percentage is given by
[A + B + (AB/100)] %
Note1: If decreased then substitute +A% with -A%

Note2: Any two dimensional diagram like square, rectangle, rhombus, triangle, circle, parrellogram, sides got increased or decreased by certain percentages, then the percentage change in the area can be calculated by the above formula

Profit loss and Discount is an application of percentages.

Cost Price: The rate at which a merchant buys goods. This is his investment
Selling Price: The rate at which a merchant sells his goods.
Marked Price: The rate at which a merchant rises his price above the cost price (may be anticipating some hagglers)

Profit Case:
If selling price is more than the Cost Price.
Loss Case:
If cost price is more than the selling price
Key Formulas:

Profit or Gain = Selling Price - Cost Price = SP - CP
Profit % = (Profit/CP) × 100 % = $\frac{SP-CP}{CP} \times 100\%$

Loss = Cost price - Selling price = CP - SP

Loss % = (Loss/CP) × 100 % = $\frac{CP-SP}{CP} \times 100\%$

Important: Profit or Loss always calculated on Cost price only.

Discount = Marked price - Selling Price = MP - SP

Discount % = (Discount/MP) × 100 % = $\frac{MP-SP}{MP} \times 100\%$

Calculating Selling price from Cost price:
In the profit case selling price is greater than cost price, and this case we gain some profit. That is we are increasing the cost price by some percentage to get the selling price. This can be done in several ways

In profit case
CP + CP × (Profit %) = SP
CP × (100 + Profit) % = SP
In loss case
CP – CP× (Loss %) = SP
CP × (100 – Loss) % = SP

Calculating Selling Price from Marked Price:

MP – MP × (discount) % = SP
MP × (100 – discount) % = SP

Calculating Cost price from Selling Price:

This is the reverse operation of the above
In profit case:
SP/(100 + Profit)% = CP
In loss Case:
SP/(100 – Loss) % = CP

PERCENTAGES, PROFIT, LOSS & DISCOUNT – WORKSHEET (BASIC)

PERCENTAGE:

Q 1. 72% of 16.67 is
   (a) 10   (b) 11   (c) 12   (d) 24

Q 2. If boys make up 65% of a class that has 28 girls, the total strength of the class is
   (a) 72   (b) 80   (c) 96   (d) 100

Q 3. 80% of a number when added to 80, is equal to that number. Find the 50% of that number.

(a) 100   (b) 200   (c) 300   (d) 400

Q 4. A man spends 10% of his income on food and 80% of the remaining income on clothing. If he still has a balance of Rs. 180. What is his total income?
    (a) 500   (b) 800   (c) 1000   (d) 1500

Q 5. 80% of the students are boys in a school of strength 100. Due to bad performance, some boys left the school, so that now boys constitute 50% of the total students. How many boys left the school?
    (a) 60   (b) 50   (c) 48   (c) 20

Q 6. Vino bought some mangoes of which 13 % of them were rotten. He sold 75% of the remaining and was left 522. How many mangoes did he have originally?
    (a) 2400   (b) 1800   (c) 1200   (d) 1000

Q 7. In an election contest between A and B, A wins by a margin of 220 votes. If A gets 60% of the total votes, total votes are
    (a) 880   (b) 990   (c) 1000   (d) 1100

Q 8. The length of a rectangle is increased by 20% whereas breadth is decreased by 10%. Find the change in perimeter of the rectangle?
    (a) Increase by 20%   (b) decrease by 20%   (c) increase by 10   (d) none of these

Q 9. The price of LPG gas is decreased by 30% and so a person increased his consumption by 25%. What percent is the rise or fall in the expenditure incurred by him on LPG?
    (a) Rise by 9%   (b) Fall by 9%   (c) Rise by 13%   (d) Fall by 13%

Q 10. Electricity Tax is increased by 20% but its consumption is decreased by 20%. Then, the increase or decrease in the expenditure of the money is
    (a) 5% decrease   (b) 4% increase   (c) 4% decrease   (d) No change

Q 11. A's salary is 20% more than B. B's salary is 10% less than C. is A's salary is 1080. Find the salary of C
    (a) 800   (b) 1000   (c) 900   (d) 1200

Q 12. Difference of 9% of a number and 5% of other number is equal sum of 8% of first number and 7% of second number. Find the ratio of two numbers?
    (a) 1:12   (b) 12:1   (c) 3:4   (d) 4:3

Q 13. A mixture of water and milk contains 2 kg of water and 150 gm of milk. What percent of milk (by weight) would the remaining solution contains if 20% of water gets evaporated from the solution.
    (a) 9.4   (b) 8.6   (c) 10   (d) 10.2

PROFIT & LOSS:

Q 14.If we increased cost price and selling price with the same percentage, then
    (a) Profit percentage will decrease
    (b) Profit percentage will increase
    (c) Profit percentage remains constant
    (d) Depends upon CP and SP.

Q 15. Two Phones are sold for Rs. 4800 each, gaining 20% on one and losing 20% on the other. What is the overall total loss or profit?
    (a) No loss, no profit   (b) 4% profit   (c) 4% loss   (d) none of these

Q 16. Ashish wants 40% discount on his shopping. But shopkeeper gives two successive discount of 20 and 20% respectively. Ashish
    (a) Loses   (b) gains   (c) no gain no loss   (d) cannot determined

Q 17. In what ratio must milk be mixed with water (milk: water) so as to gain 16.67% by selling the mixture at cost price?
    (a) 4:1   (b) 8:3   (c) 6:1   (d) cannot be determined

Q 18. Good are purchased for Rs 450 and one third is sold at a loss of 10%. At what profit per cent should the remainder be sold so as to gain 20% on the whole transaction. +35%
    (a) 33%   (b) 35%   (c) 40%   (d) 45%

Q 19. Bob buys 9 books for Rs.100 and sells 8 for Rs.100. What is the net profit or loss percent?
    (a) +12.5%   (b) -12.5%   (c) +11.1%   (d) -11.1%

Q 20. A dishonest dealer sells his goods at the cost price and still earns a profit of 25% by under weighing. What weight does he use for a kilogram?
    (a) 750 grams   (b) 800 grams   (c) 825 grams   (d) 900 grams

Q 21. The spring balance of a trader shows 1 kg for an actual weight of 800 gm. Find the profit or loss percentage if the trader marks the price at 15% above the cost price.
    (a) 39.375%   (b) 40.25%   (c) 35%   (d) 43.75%

Q 22. A merchant sold his goods for Rs. 75 at a profit percent equal to C.P. The was
    (a) Rs. 40   (b) Rs. 50   (c) Rs. 60   (d) Rs. 70

Q 23. If decreasing 70 by X percent yields the same result as increasing 60 by X percent, then X percent of 50 is:
    (a) 3.84   (b) 4.82   (c) 7.10   (d) indeterminate

Q 24. A vendor purchased 1000 bananas at the rate of Rs. 150 per hundred. He sorted them into 3 sizes and sold them as follows: 240 at Rs. 18/dozen, 372 at Rs.24/dozen and 360 at Rs. 30/dozen. The bananas that could not be sold were returned to the wholesaler @Re 1 per banana. What was his profit?
    (a) Rs. 504   (b) Rs. 532   (c) Rs 446   (d) Rs 416

Q 25. A shop keeper makes articles at 30% above the cost price. He offers 20% discount for sale on credit and 10% discount for sale on cash. If he sells 70% of the articles on credit and remaining on cash, then what is his profit percent over the total business?
    (a) 4.2%   (b) 8.4%   (c) 7.9%   (d) 7.6%

Q 26. A shop keeper buys oranges at 7 for a rupee and sells at 40% profit. How many oranges does he sell for a rupee?
    (a) 5 oranges   (b) 6 oranges   (c) 7 oranges   (d) 4 oranges

Q 27. If the height and base radius of a right circular cylinder are both increased by 20%, then its surface area increases by

    (a) 60%   (b) 80%   (c) 72.8%   (d) 44%

Q 28. A man buys balls at 15 for a rupee and the same number at 20 a rupee. He mixes and sells them at 35 for 2 rupees. What is his gain or loss percent?

    (a) 1.96%   (b) 2.04%   (c) 2%   (d) none

Q 29. A rise of 25% in the price of apples compels a person to buy 1.5 kg of apples less for Rs. 240. Find the original price per kg of apples?

    (a) Rs. 40   (b) Rs. 32   (c) Rs. 30   (d) Rs .128

Q 30. The price of LPG gas is decreased by 30% and so a person increased his consumption by 25%. What percent is the rise or fall in the expenditure incurred by him on LPG?

    (a) Rise by 9%   (b) Fall by 9%   (c) Rise by 13%   (d) Fall by 13%

ANSWER KEY - BASIC

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

PERCENTAGES, PROFIT, LOSS & DISCOUNT – WORKSHEET (PROGRESSIVE)

Q 1. A student got 32% marks and has secured 12 marks more than the minimum passing marks. Another student got 40% has obtained 48 marks more than the minimum passing marks. The maximum marks are?

    (a) 400   (b) 450   (c) 540   (d) 600

Q 2. Instead of a meter scale, a cloth merchant uses a 120 cm scale while buying, but uses an 80 cm while selling the same cloth. If he offers a discount of 20% on cash payment, what is his overall profit?

    (a) 10%   (b) 20%   (c) 40%   (d) 50%

Q 3. A reduction of 10% in the price enables a man to buy 25 kg more sugar for rs 225. What is the original price of sugar? (Per kilogram)

    (a) Re 1   (b) Rs 2   (c) Rs. 3   (d) Rs 4

Q 4. A shopkeeper buys some pens. If he sells them at rs13 per pen, his total loss in rs 150. But on selling them 15 Rs per pen, his total profit is Rs 100. How many pens did he sell?

    (a) 100   (b) 125 pen   (c) 140   (d) 150

Q 5. A milkman makes a profit of 20% on the sale of milk. If we were to add 10% water to milk, what is the percentage increase in profit %, assuming water is free of cost?

    (a) 22%   (b) 20%   (c) 32%   (d) 60%

Q 6. An article is made up of 5 components X, Y, Z, P and R, contributing in the ratio 2:3:4:5:6 respectively to its manufacturing cost. If there is a change of -10%, -20%, +30%, -40% and +50% in the contribution of X,Y,Z,P and R respectively, then by what percentage would the total cost of manufacturing the article change?
    (a) 7%   (b) 14%   (c) 140%   (d) Cannot be determined

Q 7.Fresh watermelon contains 90% water and dried watermelon contains 20% water. From 20 kg of fresh watermelon, how many dried watermelon can be obtained?
    (a) 2.4 kg   (b) 2.5 kg   (c) 2 kg   (d) none of these

Q 8. The population of a town is 5500. If the number of females was to decrease by 20% and the number of males in the village was to increase by 11%, then population would become 5175. How many females were there in the village?
    (a) 3000   (b) 2500   (c) 3175   (d) 2400

Q 9. On a certain day, Rohit started with m newspaper. From morning till noon, he sold 40% of the papers and between noon and evening he sold 60% of the remaining. Then he realized that had he sold double the number of newspaper than he sold in the afternoon, he would have had to borrow 12 papers from another vendor. Find m,
    (a) 108   (b) 100   (c) 96   (d) 72

Q 10. A shop keeper gives a discount of 20 % and still manages to get a profit of 20%. What would be the mark up percentage and marked up price of that item?
    (a) 40% and 150   (b) 50% and 150   (c) 44% and 150   (d) none of these

Q 11. Upon selling 15 articles, Bob recovers a cost of 20 articles. What should be the mark up% so that upon selling 18 articles, he recovers the cost of 27 articles?
    (a) 50%   (b) 16.67%   (c) 12.5%   (d) 33.33%

Q 12. Last year Mr. John bought 2 scooters. This year he sold both of them for Rs. 30,000 each. On one, he earns 20% profit, and on the other 20% loss. What was his net profit or loss?
    (a) He gained less than 2000   (b) He gained more than 2000
    (c) He lost less than 2000   (d)He lost more than 2000

Q 13. The selling price of fuel is Rs 66 and the petrol pump has a gain of 10%. However due to inflation, the selling price increased to Rs. 75. What is the gain percentage if the cost price remains the same?
    (a) 25%   (b)15%   (c) 33.33%   (d) 52%

Q 14. During an election, 70% of the people who polled said that they would vote for BJP of those who said that, only 60% actually voted for BJP. Out of those who did not say that would vote for BJP, 70% actually voted for BJP. What percent of those who polled did vote for BJP?
    (a) 63%   (b) 42%   (c) 74%   (d) cannot be determined

Q 15. According to the new tax proposal, John has to pay tax at the rate of 10% on taxable portion (income left after deducting the standard deduction from the complete income) of his pay and an additional 5% special surcharge on the amount of income tax levied. He pays a total tax of 21000 assuming standard deduction rate as 20% of gross pay, the gross of John is
    (a) 2 lakh   (b) 2.5 lakh   (c) 3 lakh   (d) none of these

Q 16. On a particular day, a vendor sells 70% of mangoes and throws away 20% of the remaining mangoes; next day he sells 50% of the mangoes remaining from the first day, and throws away the rest. What percent of the mangoes does the vendor throw away?
    (a) 18%   (b) 20%   (c) 70%   (d) 30%

Q 17. By selling an article at 80% of its marked price, a merchant makes a loss of 12%. What will be the percent profit made by the merchant if he sells the article at 95% of its marked price?

(a) 5% profit   (b) 1% loss   (c) 4.5% profit   (d) 10% profit

Q 18. The population of a town is 5500. If the number of females was to decrease by 20% and the number of males in the village was to increase by 11%, then population would become 5175. How many females were there in the village?

    (a) 3000   (b) 2500   (c) 3175   (d) 2400

Q 19. On a particular day, a vendor sells 70% of mangoes and throws away 20% of the remaining mangoes; next day he sells 50% of the mangoes remaining from the first day, and throws away the rest. What percent of the mangoes does the vendor throw away?

    (a) 18%   (b) 20%   (c) 70%   (d) 30%

Q 20. If 90% of A = 30% of B, then what percent is B greater than A?

    (a) 200   (b) 300   (c) 50   (d) 33.33

ANSWER KEY - MODERATE

Q 1:	Q 2:	Q 3:	Q 4:	Q 5:
Q 6:	Q 7:	Q 8:	Q 9:	Q 10:
Q 11:	Q 12:	Q 13:	Q 14:	Q 15:
Q 16:	Q 17:	Q 18:	Q 19:	Q 20: