*** Answer The Following Questions In One Sentence.[1 Marks Each]** [16]

1. The petrol price in 2015 was ₹ 60 and ₹ 100 in 2025. What is the percentage increase in the price of petrol?
   i. 50%
   ii. 40%
   iii. 60%
   iv. 66.66%
   v. 140%
   vi. 160.66%

   Ans. : Increase in price = ₹ $100 -$ ₹ $60 =$ ₹ 40

   Increase $\% = \frac{40}{60} \times 100\% = 66\frac{2}{3}\%$ or 66.66%

2. The population of elephants in a national park increased by 5% in the last decade. If the population of the elephants last decade is p, the population now is
   i. $p \times 0.5$
   ii. $p \times 0.05$
   iii. $p \times 1.5$
   iv. $p \times 1.05$
   v. $p + 1.50$

   Ans. : (iv) $p \times 1.05$

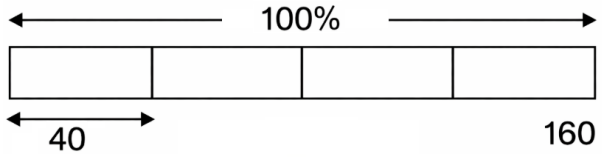
   Population 10 years ago = p

   Increase in population $= \frac{5}{100}p = 0.05p$

   $\therefore$Current population $= p + 0.05p = 1.05p$

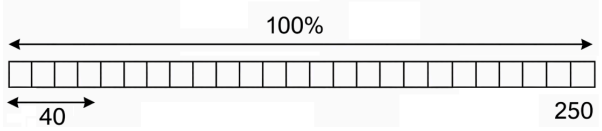
3. Find the value of 25% of 160 and also draw their bar models.

   Ans. : 25% of $160 = \frac{25}{100} \times 160 = 40$



4. Find the value of 16% of 250 and also draw their bar models.

   Ans. : 16% of $250 = \frac{16}{100} \times 250 = 40$



5. Find the value of 62% of 360 and also draw their bar models.

   Ans. : 62% of $360 = \frac{62}{100} \times 360 = 223.2$

6. Find the value of 140% of 40 and also draw their bar models.

Ans. : 140% of $40 = \frac{140}{100} \times 40 = 56$

7. Find the value of 7% of 10 kg and also draw their bar models.

Ans. : 7% of $10kg = \frac{7}{100} \times 10kg = 0.7kg$.

8. 30% of k is 70, 60% of k is _____, 90% of k is _____, 120% of k is _____.

Ans. : (30% of k is 70) × 2 = 60% of k = 140
(30% of k is 70) × 3 = 90% of k = 210
(30% of k is 70) × 4 = 120% of k = 280

9. 100% of m is 215, 10% of m is _____, 1% of m is _____, 6% of m is _____.

Ans. : $(100\%$ of m is 215$) \div 10$
10% of m is 21.5
$(100\%$ of m is 215$) \div 100$
1% of m is 2.15
$(1\%$ of m is 2.15$) \times 6 = 6\%$ of m is 12.9

10. 90% of n is 270, 9% of n is _____, 18% of n is _____, 100% of n is _____.

Ans. : $(90\%$ of n is 270$) \div 10$
9% of n is 27
$(90\%$ of n is 210$) \div 9$
$(10\%$ of n is 30$) \times 10$
100% of n is 300
$(9\%$ of n is 27$) \times 2$
18% of n is 54 .

11. 3 is _____% of 300.

Ans. : $1 \left(\frac{3}{300} \times 100\% = 1\%\right)$

12. _____ is 40% of 4.

Ans. : $1.6 \left(\frac{4}{100} \times 4 = 1.6\right)$

13. 40 is 80% of _____.

Ans. : $50 \left(\frac{40}{80} \times 100 = 50\right)$

14. We can find 50% of a value by multiplying $\frac{1}{2}$ with the value. Will multiplying the value by 0.5 also give the answer for 50% of the value?

Ans. : self

15. A cyclist cycles from Delhi to Agra and completes 40% of the journey. If he has covered 92 km, how many more kilometres does he have to travel to reach Agra?

Ans. : self

16. A farmer harvested 260 kg of wheat last year. This year, they harvested 650 kg of wheat. What percentage of last year's harvest is this year's harvest?

Ans. : self

*** Questions With Calculation.[2 Marks Each]** **[68]**

17. Shambhavi owns a stationery shop. She procures 200 page notebooks at ₹ 36 per book. She sells them with a profit margin of 20%. Find the selling price.

Ans. : self

18. If a shopkeeper buys a geometry box for ₹ 75 and sells it for ₹ 110, what is his profit margin with respect to the cost?

Ans. : Profit $=$ ₹ $110-$ ₹ $75 =$ ₹ 35

Profit % $= \frac{35}{75} \times 100$

$= 0.4667 \times 100$

$= 46.67\%$

19. I am a carpenter and I make chairs. The cost of materials for a chair is ₹ 475 and I want to have a profit margin of 50%. At what price should I sell a chair?

Ans. : Cost of material = ₹ 475

Profit $= 50\%$ of 475

$= \frac{50}{100} \times 475$

= ₹ 237.50

Sale price $=$ ₹ $475+$ ₹ $237.50 =$ ₹ 712.50

20. The price of 1 kg of rice was ₹ 38 in 2024. It is ₹ 42 in 2025. What is the rate of inflation? (Inflation is the percentage increase in prices.)

Ans. : Increase in price = ₹ $42-$ ₹ $38 =$ ₹ 4

Rate of inflation $= \frac{4}{38} \times 100\% = 10.52\%$

21. A number increased by 20% becomes 90. What is the number?

Ans. : 120% of a number is 90

$\therefore 1\%$ of the number is $\frac{90}{120}$

100% of the number $= \frac{90}{120} \times 100 = 75$

or the number was 75 .

22. Eesha scored 42 marks out of 50 on an English test and 70 marks out of 80 in a Science test. Since she lost only 8 marks in English but 10 marks in Science, she thinks she has done better at English. Reema does not agree! She argues that since Eesha has scored more marks in Science, she has done better at Science. Vishu thinks we cannot compare the scores because the maximum marks are different. Who do you think is correct?

Ans. : self

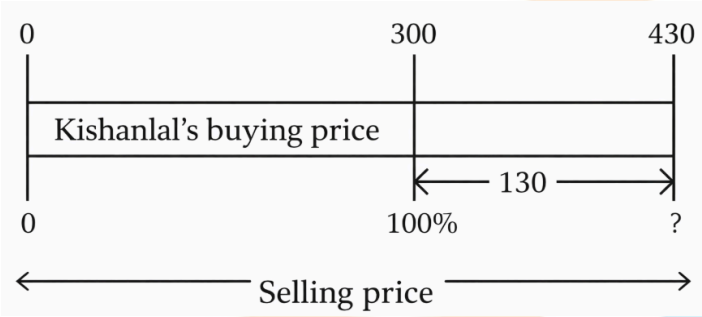
23. Madhu and Madhav recently learnt about the importance of reading labels on processed food before purchase. They are at a shop to buy badam drink mix. They are looking at two products and wondering which has a larger share of badam. Can you figure it out? Which product uses a smaller proportion of food chemicals?

Ans. : self

24. Do the following two statements mean the same thing?
i. The population of this state in 1991 is 165% of that in 1961.
ii. The population of this state has increased by 65% from 1961 to 1991.

Ans. : self

25. Find out the percentage profit Kishanlal made on this sweater.



Ans. : self

26. The rice stock in Raghu's provision store is getting old. He had purchased the rice at ₹ 35 per kg. To clear his stock, he sells 10 kg rice for ₹ 300. Find out the percentage loss.

Ans. : self

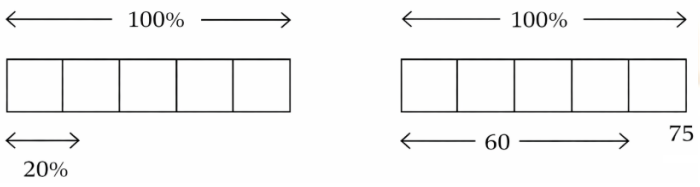
27. Shyamala had procured decorative vases at ₹ 2650 per piece. One of the pieces was slightly damaged. She decides to sell it at a loss of 18%. How much will she get by selling this piece?

Ans. : self

28. A TV is bought at a price of ₹ 21,000. After 1 year, the value of the TV depreciates by 5%. Find the value of the TV after one year.

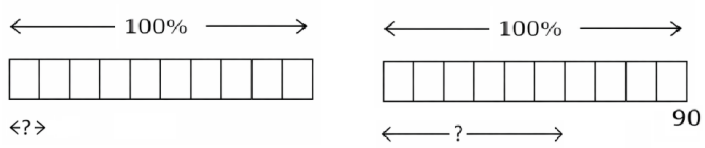
Ans. : self

29. Find the missing numbers.



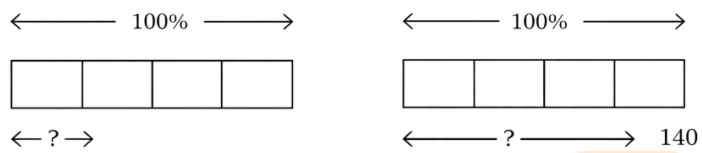
Ans. : 20%; 60

30. Find the missing numbers.



Ans. : 10%; 54

31. Find the missing numbers.



Ans. : 25%; 105

32. Find the value of 1% of 1 hour and also draw their bar models.

Ans. : 1% of 1 hour $= 1\%$ of 60 min

$= 1\%$ of 3600 sec.

$= \frac{1}{100} \times 3600sec.$

$= 36sec.$

33. Surya made 60 ml of deep orange paint, how much red paint did he use if red paint made up $\frac{3}{4}$ of the deep orange paint?

Ans. : Quantity of red paint $= \frac{3}{4} \times 60ml = 45ml$

34. Pairs of quantities are shown below. Identify and write appropriate symbols '>', '<', '=' in the boxes. Visualising or estimating can help. Compute only if necessary or for verification.

i. 50% of $510 \square 50\%$ of 515

ii. 37% of $148 \square 73\%$ of 148

Ans. : i. 50% of $510 < 50\%$ of $515 (510 < 515)$

ii. 37% of $148 < 73\%$ of 148 ($37 < 73$)

35. Pairs of quantities are shown below. Identify and write appropriate symbols '>', '<', '=' in the boxes. Visualising or estimating can help. Compute only if necessary or for verification.

i. 29% of $43 \square 92\%$ of 110

ii. 30% of $40 \square 40\%$ of 50

Ans. : i. 29% of $43 < 92\%$ of $110 (29 < 92; 43 < 110)$

ii. 30% of $40 < 40\%$ of $50 (30 < 40; 40 < 50)$

36. Pairs of quantities are shown below. Identify and write appropriate symbols '>', '<', '=' in the boxes. Visualising or estimating can help. Compute only if necessary or for verification.

i. 45% of 200 □ 10% of 490

ii. 30% of 80 □ 24% of 64

Ans. : i. 45% of $200 > 10\%$ of $490 (90 > 49)$

ii. 30% of $80 > 24\%$ of $64 (24 > 15.36)$

37. Is 10% of a day longer than 1% of a week?

Ans. : Yes, 10% of a day $= \frac{10}{100} \times 24hrs = 2.4hr$

1% of week $= \frac{1}{100} \times (24 \times 7)hrs = 1.68hrs$

10% of a day > 1% of a week.

Is 10% of a month $(30$ days $) < 50\%$ of a week?

Is 50% of a dozen $(12) > 10\%$ of a score (20)?

Is 80% of a century $< 45\%$ of a double century?

38. An estimated 90% of the world's population lives in the Northern Hemisphere. Find the (approximate) number of people living in the Northern Hemisphere based on this year's worldwide population.

Ans. : World population as of Jan 1, 2026 = 8.3 billion

90% of 8.3 billion $= \frac{90}{100} \times 8.3$ billion $= 7.47$

Hence, 7.47 billion people live in northern hemisphere.

39. Madhu and Madhav each ate biscuits of a different variety. Madhu's biscuits had 25% sugar, while Madhav's had 35% sugar. Can you tell who ate more sugar?

Ans. : self

40. To prepare a particular millet kanji (porridge), suppose the ratio of millet to water to be mixed for boiling is 2:7. What percentage does the millet constitute in this mixture? If 500 ml of the mixture is to be made, how much millet should be used?

Ans. : self

41. Express the $\frac{3}{5}$ fraction as a percentage.

Ans. : $\frac{3}{5} = \frac{3}{5} \times 100\% = 60\%$

42. Express the $\frac{7}{14}$ fraction as a percentage.

Ans. : $\frac{7}{14} = \frac{7}{14} \times 100\% = 50\%$

43. Express the $\frac{9}{20}$ fraction as a percentage.

Ans. : $\frac{9}{20} = \frac{9}{20} \times 100\% = 45\%$

44. Express the $\frac{72}{150}$ fraction as a percentage.

Ans. : $\frac{72}{150} = \frac{72}{150} \times 100\% = 48\%$

45. Express the $\frac{1}{3}$ fraction as a percentage.

Ans. : $\frac{1}{3} = \frac{1}{3} \times 100\% = 33\frac{1}{3}\%$

46. Express the $\frac{5}{11}$ fraction as a percentage.

Ans. : $\frac{5}{11} = \frac{5}{11} \times 100\% = \frac{500}{11}\% = 45\frac{5}{11}\%$

47. Nandini has 25 marbles, of which 15 are white. What percentage of her marbles are white?
    i. 10%
    ii. 15%
    iii. 25%
    iv. 60%
    v. 40%
    vi. None of these

Ans. : iv. 60%

Percentage of white marbles $= \frac{15}{25} \times 100\% = 60\%$

48. In a school, 15 of the 80 students come to school by walking. What percentage of the students come by walking?

Ans. : Percentage of students coming by walking $= \frac{15}{80} \times 100\% = 18.75\%$

49. Surya wants to use a deep orange colour to capture the sunset. He mixes some red paint and yellow paint to make this colour. The red paint makes up $\frac{3}{4}$ of this mixture. What percentage of the colour is made with red?

Ans. : self

50. Given a percentage, can you express it as a fraction? For example, express 24% as a fraction.

Ans. : self

*** Questions With Calculation.[3 Marks Each]** **[63]**

51. The total sales of a company (also called revenue) was ₹ 2.5 crore last year. They had a healthy profit margin of 25%. What was the total expenditure (costs) of the company last year?

Ans. : Let the cost be ₹ x

Then profit $= ₹\frac{25x}{100}$ or ₹ $0.25x$

$\therefore$ Revenue $= x + 0.25x = 2.5$ crores

$\Rightarrow 1.25x = 2.5$

$\Rightarrow x = \frac{2.5}{1.25} = \frac{250}{125} = 2$

$\therefore$ Cost is ₹ 2 crore

52. A clothing shop offers a 25% discount on all shirts. If the original price of a shirt is ₹ 300, how much will Anwar have to pay to buy this shirt?

Ans. : Marked price = ₹ 300

Discount $= ₹\frac{25}{100} \times 300 = ₹75$

Sale price $=$ ₹ $300-$ ₹ $75=$ ₹ 225

53. Samson bought a car for ₹ 4,40,000 after getting a 15% discount from the car dealer. What was the original price of the car?

Ans. : Let the marked price of the car be ₹ x

Discount $=\frac{15}{100}x=0.15x$

Sale price $=x-0.15x=0.85x$

Now $0.85x=4,40,000$

$x=\frac{4,40,000}{0.85}=517647$

Marked price of the car is ₹ $5,17,647$.

54. The population of a city is rising by about 3% every year. If the current population is 1.5 crore, what is the expected population after 3 years?

Ans. : Population after 3 years $=1.5\times\left(1+\frac{3}{100}\right)^3$ crores

$=1.5\times(1.03)^3$ crores

= 1.639 crores

55. In a laboratory, the number of bacteria in a certain experiment increases at the rate of 2.5% per hour. Find the number of bacteria at the end of 2 hours if the initial count is 5,06,000.

Ans. : No of bacteria after 2 hours $=5,06,000\left(1+\frac{2.5}{100}\right)^2$

$=506000\times(1.025)^2$

= 5,31,616

56. The population of Bengaluru in 2025 is about 250% of its population in 2000. If the population in 2000 was 50 lakhs, what is the population in 2025?

Ans. : Population in $2000=50$ Lakhs

Population in $2025=\frac{250}{100}\times 50L=125L$ or 1 crore 25 L

57. The population of the world in 2025 is about 8.2 billion. The populations of some countries in 2025 are given. Match them with their approximate percentage share of the worldwide population

Germany 83 million	India 1.46 billion	Bangladesh 175 million	USA 347 million

13%	8%	18%	10%	1%	35%	2%	2%	0.1%

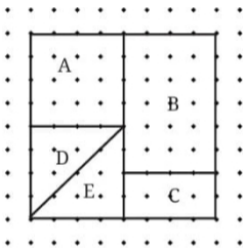
Ans. : Germany $=\frac{83}{8200}\times 100\%\sim 1\%$

India $=\frac{1.46}{8.20}\times 100\%\sim 18\%$

Bangladesh $=\frac{175}{8200}\times 100\%\sim 2\%$

USA $=\frac{347}{8200}\times 100\%\sim 4\%$

58. What percentage of area is occupied by the region marked 'E' in the figure?



Ans. : Total area $= 8 \times 8 = 64$ sq. units

And area of $E = 8$ sq. units

$\therefore$ Required $\% = \frac{8}{64} \times 100\% = 12.5\%$

59. The bus fares were increased by 3% last year and by 4% this year. What is the overall percentage price increase in the last 2 years?

Ans. : Let the bus fare 2 years ago be ₹ 100

Present bus fare $= ₹100 \times 1.03 \times 1.04 = ₹107.12$

Increase = ₹ 7.12

Increase% $= \frac{7.12}{100} \times 100\% = 7.12\%$

60. In a room of 100 people, 99% are left-handed. How many left-handed people have to leave the room to bring that percentage down to 98%?

Ans. : No. of people in room = 100

No. of left handers $= 99\%$ of $100 = 99$

No. of right-handers $= 1$

Let x people leave.

No. of left-handers is 98%.

and no. of right-handers is 2%.

Then $\frac{99-x}{100-x} = \frac{98}{100}$

$\Rightarrow 100(99 - x) = 98(100 - x)$

$\Rightarrow 9900 - 100x = 9800 - 98x$

$\Rightarrow 9900 - 9800 = 100x - 98x$

$\Rightarrow 2x = 100$

$\Rightarrow x = 50$

$\therefore 50$ left-handers must leave the room.

61. What percent is the total amount received with respect to the amount deposited in both the options?

Ans. : self

62. What is the amount we get back if we invest ₹ 6000 at an interest rate of 10% p.a. for 't' years?

Ans. : self

63. The population of a village was observed to be reducing by about 10% every decade. If the current population is 1250, what is the expected population after 3

decades?

Ans. : self

64. A bakery called Cakely is offering a 30% + 20% discount on all cakes. Another bakery called Cakify is offering a 50% discount on all cakes. Would you rather choose Cakely or Cakify if you want the cheaper cost?

Ans. : self

65. After Surbhi bought cookware from the wholesaler, she kept a profit margin of 50% on all the products. To clear off the remaining stock, she thought she would offer a 50% discount and come out without any loss.
i. Do you think she didn't make any loss?
ii. If she had sold goods (originally) for ₹ 12,000 after discount, how much loss did she incur? What is the percentage loss?
iii. What should have been the percentage discount offered so that she sold the goods at the price she had bought (i.e., no profit or loss)?

Ans. : self

66. Mariam's farm has a peculiar bull. One day, she gave the bull 2 units of fodder, and the bull ate 1 unit. The next day, she gave the bull 3-units of fodder, and the bull ate 2 units. The day after, she gave the bull 4 units, and the bull ate 3 units. This continued, and on the 99th day, she gave the bull 100 units, and the bull ate 99 units. Represent these quantities as percentages. This task can be distributed among the class. What do you observe?

Ans. : $\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{98}{99}, \frac{99}{100}$,
$50\%, 66\frac{2}{3}\%, 75\%, 80\%, \ldots . 98\frac{98}{99}\%, 99\%$
It follows the pattern $\left(\frac{n}{n+1}\right) \times 100$ where n is the day number.
As n increases, the percentage gets closer and closer to 100%, but never quite reaches it.

67. The badminton coach has planned the training sessions such that the ratio of warm up : play : cool down is 10% : 80% : 10%. If he wants to conduct a training of 90 minutes. How long should each activity be done?

Ans. : Warm-up time $= 10\%$ of 90 min
$= \frac{10}{100} \times 90$
$= 9min$
Play time $= 80\%$ of 90 min
$= \frac{80}{100} \times 90$
$= 72min$
Cool down time = 10% of $90min = 9min$.

68. The maximum marks in a test are 75. If students score 80% or above in the test,

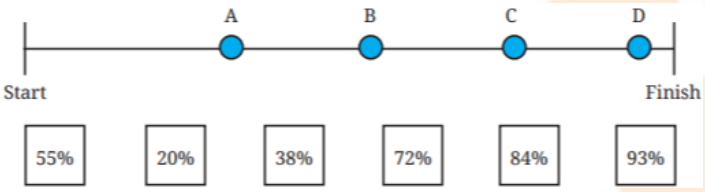
they get an A grade. How much should Zubin score at least to get an A grade?

Ans. : self

69. Kishanlal recently opened a garment shop. He aims to achieve a daily sales of at least ₹ 5000. The sales on the first 2 days were ₹ 2000 and ₹ 3500. What percentage of his target did he achieve?

Ans. : self

70. A group of friends is participating in a long-distance run. The positions of each of them after 15 minutes are shown in the following picture. Match (among the given options) what percentage of the race each of them has approximately completed.



Ans. : A = 20%
B = 38%
C = 72%
D = 93%

71. Surya won some prize money in a contest. He wants to save $\frac{2}{5}$ of the money to purchase a new canvas. Express this quantity as a percentage.

Ans. : self

*** Questions With Calculation.[5 Marks Each]** **[120]**

72. A utensil store is offering a 35% discount on the cooker with an MRP ₹ 1800. What is the selling price? If the cost price was ₹ 900, what is the percentage profit made after the sale?

Ans. : self

73. 1600 people voted in an election, and the winner got 500 votes. What percent of the total votes did the winner get? Can you guess the minimum number of candidates who stood for the election?

Ans. : Vote $\%($ winner $)=\frac{500}{1600} \times 100\% = 31.25\%$
and $100 \div 31.25 = 3.2$
$\therefore$ In all, there were at least 4 candidates.
This means at least 3 more candidates.

74. A milkman sold two buffaloes for ₹ 80,000 each. On one of them, he made a profit of 5% and on the other a loss of 10%. Find his overall profit or loss.

Ans. : SP of 1 st buffalo $= ₹80,000$
Profit% = 5%

$\therefore CP = ₹\frac{100}{100+5} \times 80,000 = ₹76,190$

SP of 2nd buffalo $= ₹80,000$

Loss % = 10 %

$\therefore CP = ₹\frac{100}{100-10} \times 80,000 = ₹88,889$

Total CP $= ₹76,190 + ₹88,889 = ₹1,65,079$

Total SP = ₹ 80,000 + ₹ 80,000 = ₹ 1,60,000

Loss $= ₹1,65,079 - ₹1,60,000 = ₹5,079$

Loss $\% = \frac{5079}{165079} \times 100\% = 3\%$

75. Which of the following statement(s) mean the same as - "The demand for cameras has fallen by 85% in the last decade"?
i. The demand now is 85% of the demand a decade ago.
ii. The demand a decade ago was 85% of the demand now.
iii. The demand now is 15% of the demand a decade ago.
iv. The demand a decade ago was 15% of the demand now.
v. The demand a decade ago was 185% of the demand now.
vi. The demand now is 185% of the demand a decade ago.

Ans. : Statement: The demand for cameras has fallen by 85% in last decade.
Only (iii) means the same.

76. Bank of Yahapur offers an interest of 10% p.a. Compare how much one gets if they deposit ₹ 20,000 for a period of 2 years with compounding and without compounding annually.

Ans. : Without compounding

Amount $= P\left(1 + \frac{rt}{100}\right)$

$= 20,000 \times P\left(1 + \frac{10 \times 2}{100}\right)$

= 20,000(1 + 0.20)

$= 20,000 \times 1.20$

= ₹ 24, 000

With compounding

Amount $= P(1 + r)^t$

$= 20,000 \times \left(1 + \frac{10}{100}\right)^2$

$= 20,000 \times 1.21$

$= 24,200$

Comparison:

Without compounding $=$ ₹ 24,000

With compounding = ₹ 24,200

Difference = ₹ 24,200 - ₹ 24,000 = ₹ 200

Hence, with compounding, one gets ₹ 200 more than without compounding.

77. Bank of Wahapur offers an interest of 5% p.a. Compare how much one gets if one deposits ₹ 20,000 for a period of 4 years with compounding and without

compounding annually.

Ans. : $P = ₹20,000; t = 4, r = 5$

$SI = \frac{20,000 \times 5 \times 4}{100} = ₹4,000$

$A = ₹20,000 \times \left(1 + \frac{5}{100}\right)^4$

$= ₹20,000 \times \left(\frac{21}{20}\right)^4$

$= ₹20,000 \times \frac{21}{20} \times \frac{21}{20} \times \frac{21}{20} \times \frac{21}{20}$

= ₹ 24310.13

$CI =$ ₹ $24,310.13 -$ ₹ $20,000 =$ ₹ $4,310.13$

SI (without compounding) < CI (with compounding)

78. Jasmine invests amount 'p' for 4 years at an interest of 6% p.a. Which of the following expression(s) describe the total amount she will get after 4 years when compounding is not done?

i. $p \times 6 \times 4$

ii. $p \times 0.6 \times 4$

iii. $p \times \frac{0.6}{100} \times 4$

iv. $p \times \frac{0.06}{100} \times 4$

v. $p \times 1.6 \times 4$

vi. $p \times 1.06 \times 4$

vii. $p + (p \times 0.06 \times 4)$

Ans. : $P = p, R = 6, T = 4$

Amount = p + I

$= p + \frac{p \times 6 \times 4}{100}$

$= p + p \times 0.06 \times 4$

$= p + 0.24p$

= 1.24 p

$= p \times 1.06 \times 4$

Hence (vi) and (vii) are correct.

79. The post office offers an interest of 7% p.a. How much interest would one get if one invests ₹ 50,000 for 3 years without compounding? How much more would one get if it was compounded?

Ans. : Without compounding

$P = ₹50,000; R = 7\%pa; T = 3$ years

$I = ₹\frac{50,000 \times 7 \times 3}{100} = ₹10,500$

Amount $= ₹50,000 + ₹10,500 = ₹60,500$

With compounding

$A = 50,000(1.07)^3 = 61252.15$

Difference $= 61252.15 - 50,000 = 11252.15$

Extra interest = $11252.15 - 10500 =$ ₹ 752.15

80. Giridhar borrows a loan of ₹ 12,500 at 12% per annum for 3 years without compounding, and Raghava borrows the same amount for the same time period at 10% per annum, compounded annually. Who pays more interest and by how much?

Ans. : | (Giridhar) $= \frac{12,500 \times 12 \times 3}{100} = ₹4,500$

For Raghava

$A = 12,500\left(1 + \frac{10}{100}\right)^3$

$= 12,500 \times \frac{1331}{1000}$

= ₹ 16637.5

I (Raghava) = ₹ 16,637.5 - ₹ 12,500 = ₹ 4137.50

₹ 4500 - ₹ $4137.50 =$ ₹ 362.50

Giridhar pays ₹ 362.5 more than Raghava.

81. Consider an amount ₹ 1000. If this grows at 10% p.a., how long will it take to double when compounding is done vs. when compounding is not done? Is compounding an example of exponential growth and not-compounding an example of linear growth?

Ans. : ₹ 1000 becomes ₹ 2,000

Interest = ₹ 1000

Without compounding

$1000 = \frac{1000 \times 10 \times t}{100}$

t = 10 years

With compounding

$1000\left(1 + \frac{10}{100}\right)^n = 2000$

$(1.1)^n = 2$

This can be done by hit and trial

$1.1^2 = 1.21$

$1.1^3 = 1.331$

$1.1^4 = 1.4641$

$1.1^5 = 1.6$

$1.1^6 = 1.77$

$1.1^7 = 1.94$

$1.1^8 = 2.14$

1.94 < 2 < 2.14

Time would be between 7 and 8 years (The nearest answer is 7.2 years)

82. The price of a mobile phone is ₹ 8,250. A GST of 18% is added to the price. Which of the following gives the final price of the phone including the GST?

i. $8250 + 18$

ii. $8250 + 1800$

iii. $8250 + \frac{18}{100}$

iv. 8250×18

v. 8250×1.18

vi. $8250 + 8250 \times 0.18$

vii. 1.8×8250

Ans. : Price of mobile phone $= ₹8,250$

GST @ $18\% = ₹\frac{8250 \times 18}{100} = ₹8250 \times 0.18$

Total cost $= ₹(8250 + 8250 \times 0.18)$

Options (v) and (vi) are correct.

83. The monthly percentage change in population (compared to the previous month) of mice in a lab is given: Month 1 change was +5%, Month 2 change was -2%, and Month 3 change was -3%. Which of the following statement(s) are true? The initial population is p.

i. The population after three months was p$\times$ 0.05$\times$ 0.02$\times$ 0.03.

ii. The population after three months was p$\times$ 1.05$\times$ 0.98$\times$ 0.97.

iii. The population after three months was p + 0.05 - 0.02 - 0.03.

iv. The population after three months was p.

v. The population after three months was more than p.

vi. The population after three months was less than p.

Ans. : Population after 3 months $= p\left(1 + \frac{5}{100}\right)\left(1 - \frac{2}{100}\right)\left(1 - \frac{3}{100}\right)$

$= p \times 1.05 \times 0.98 \times 0.97$

= 0.99813p

Options (ii) and (vi) are correct.

84. A shopkeeper initially set the price of a product with a 35% profit margin. Due to poor sales, he decided to offer a 30% discount on the selling price. Will he make a profit or a loss? Give reasons for your answer.

Ans. : Let CP be ₹ 100.

$P\% = 35\%$

$P = ₹35$

MP = ₹ 135

Discount $= 30\%$ of $135 = ₹40.50$

New MP = ₹ 135 - ₹ 40.50 = ₹ 94.50

New MP < CP

∴ Loss

Reason: Although he initially added a 35% profit margin, the 30% discount is calculated on the increased selling price (not the cost price), which results in a larger absolute discount amount that exceeds the original profit.

85. What is 5% of 40? What is 40% of 5? What is 25% of 12? What is 12% of 25? What is 15% of 60? What is 60% of 15? What do you notice? Can you make a general

statement and justify it using algebra, comparing x% of y and y% of x?

Ans. : 5% of $40 = \frac{5}{100} \times 40 =$

40% of $5 = \frac{40}{100} \times 5 = 2$

25% of $12 = \frac{25}{100} \times 12 = 3$

12% of $25 = \frac{12}{100} \times 25 = 3$

15% of $60 = \frac{15}{100} \times 60 = 9$

60% of $15 = \frac{60}{100} \times 15 = 9$

$x\%$ of $y = y\%$ of x

86. A school is organising an excursion for its students. 40% of them are Grade 8 students and the rest are Grade 9 students. Among these Grade 8 students, 60% are girls.
i. What percentage of the students going to the excursion are Grade 8 girls?
ii. If the total number of students going to the excursion is 160, how many of them are Grade 8 girls?

Ans. : Let no. of students be 100.

Then, no. of students of grade $8 = \frac{40}{100} \times 100 = 40$

No. of students of grade $9 = 100 - 40 = 60$

i. No.of grade 8 girls $= \frac{60}{100} \times 40 = 24$

ii. $100 : 24 :: 160 : x$

$100x = 24 \times 160$

$\Rightarrow x = 38.4$

No. of grade 8 girls is 38.4

87. A shopkeeper sells pencils at a price such that the selling price of 3 pencils is equal to the cost of 5 pencils. Does he make a profit or a loss? What is his profit or loss percentage?

Ans. : SP of 3 pencils = CP of 5 pencils

Let SP of 3 pencils = CP of 5 pencils

$= 3 \times 5$

$= 15$

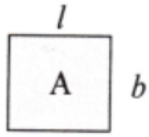
Then SP = ₹ 5; CP = ₹ 3

Profit = ₹ 2

Profit% $= \frac{2}{3} \times 100\% = 66\frac{2}{3}\%(\sim 67\%)$

88. If the length of a rectangle is increased by 10% and the area is unchanged, by what percentage (exactly) does the breadth decrease by?

Ans. :



$l \times b = A$

$\left(l+\frac{10}{100}l\right)\left(b-\frac{x}{100}b\right)=A$

$1.1l\times\frac{(100-x)b}{100}=A$

$1.1l\times\frac{100-x}{100}b=l\times b$

$1.1l\times\left(\frac{100-x}{100}\right)=1$

$100-x=\frac{1\times100}{1.1}$

$100-x=\frac{1000}{11}$

$x=100-\frac{1000}{11}$

$x=\frac{1100-1000}{11}$

$=\frac{100}{11}=9\frac{1}{11}$

Breadth is decreased by $9\frac{1}{11}\%$.

89. The percentage of ingredients in a 65 g chips packet is shown in the picture. Find out the weight each ingredient makes up in this packet.

Ans. : Potato $=\frac{70}{100}\times65g=45.5g$

Veg oil $=\frac{24}{100}\times65g=15.6g$

Salt $=\frac{3}{100}\times65g=1.95g$

Spice $=\frac{3}{100}\times65g=1.95g$

Verification: $45.5+15.6+1.95+1.95=65.05g$

90. Three shops sell the same items at the same price. The shops offer deals as follows:
Shop A: "Buy 1 and get 1 free"
Shop B: "Buy 2 and get 1 free"
Shop C: "Buy 3 and get 1 free"
Answer the following:
i. If the price of one item is ₹ 100, what is the effective price per item in each shop? Arrange the shops from cheapest to costliest.
ii. For each shop, calculate the percentage discount on the items.
[**Hint:** Compare the free items to the total items you receive.]
iii. Suppose you need 4 items. Which shop would you choose? Why?

Ans. : i. Effective price per item at shop $A=₹\frac{100}{2}=₹50$

Effective price per item at shop $B=₹\frac{200}{3}=₹66\frac{2}{3}$

Effective price per item at shop $C = ₹\frac{300}{4} = ₹75$

Cheapest to costliest: A; B; C.

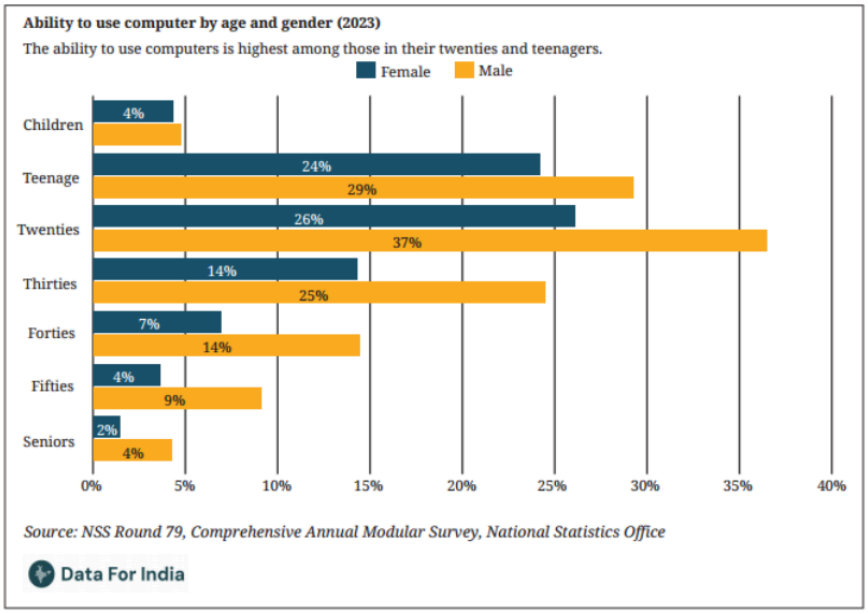
ii. Discount at shop $A = \frac{1}{2} \times 100\% = 50\%$

Discount at shop B $= \frac{1}{3} \times 100\% = 66\frac{2}{3}\%$

Discount at shop $C = \frac{1}{4} \times 100\% = 25\%$

iii. To buy 4 items, we choose shop A. Pay for 2, and the other 2 are free.

91. Look at the following graph.



Based on the graph, which of the following statement(s) are valid?

i. People in their twenties are the most computer-literate among all age groups.

ii. Women lag behind in the ability to use computers across age groups.

iii. There are more people in their twenties than teenagers.

iv. More than a quarter of people in their thirties can use computers.

v. Less than 1 in 10 aged 60 and above can use computers.

vi. Half of the people in their twenties can use computers.

Ans. : i. True

ii. True

iii. True

iv. False

v. True

vi. False

92. If one deposits ₹ 6000 in the bank, what is the amount after 3 years?

Ans. : self

93. Workers in a coffee plantation take 18 days to pick coffee berries in 20% of the plantation. How many days will they take to complete the picking work for the entire plantation, assuming the rate of work stays the same? Why is this assumption necessary?

Ans. : (20% work in 18 days) × 5 = 100% work in 90 days.
The work will be completed in 90 days.
Necessary Assumptions

- Weather conditions might change.
- Workers might get tired over time. This reduces their efficiency.
- Some workers might take leave or breaks.

94. A recipe for the dish, halwa, for 4 people has the following ingredients in the given proportions- Rava: 40%, Sugar: 40%, and Ghee: 20%.
i. If you want to make halwa for 8 people, what is the proportion of each of the above ingredients?
ii. If the total weight of the ingredients is 2 kg, how much rava, sugar and ghee are present?

Ans. : i. Proportion remains the same.

ii. Rava $= \frac{40}{100} \times 2kg = 0.8kg$

Sugar $= \frac{40}{100} \times 2kg = 0.8kg$

Ghee $= \frac{20}{100} \times 2kg = 0.4kg$

95. Pairs of quantities are shown below. Identify and write appropriate symbols '>', '<', '=' in the blanks. Try to do it without calculations.
i. 50% _____ 5%
ii. $\frac{5}{10}$ _____ 50%
iii. $\frac{3}{11}$ _____ 61%
iv. 30% _____ $\frac{1}{3}$

Ans. : i. $50\% > 5\%$
ii. $\frac{5}{10} = 50\%$
iii. $\frac{3}{11} < 61\%$
iv. $30\% < \frac{1}{3}$

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