## PERCENTAGE

Percent means share for every hundred or per hundred. A per cent is a fraction whose denominator is 100 and the numerator of the fraction is called the rate per cent.**" Per cent is denoted by the sign '%'.**
**Ex. Find the X% of Y.**

Sol: Formula = Y×$\frac{X}{100}$

To express 20% in fraction = $\frac{20}{100} = \frac{1}{5}$

To express 25% in fraction = $\frac{25}{100} = \frac{1}{4}$

**1. If the price of a commodity increases by X%, then the reduction in consumption so as not to increase the expenditure is = $\frac{X}{100+x}$×100**

**Ex. If the price of petrol increases by 20%, then find the reduction in consumption when expenditure is the same.**

Sol: $\frac{20}{100+20}$×100 = $\frac{50}{3}$%

**2. If the price of the commodity decreases by X%, then the increase in consumption so as to decrease the expenditure is**
**= $\frac{X}{100-x}$×100**

**Ex. If the price of petrol decreases by 20%, then find the increase in consumption when expenditure is the same.**

Sol: $\frac{20}{100-20}$×100 = 25%

**3. If Ram got 450 marks out of the total 500 marks. What percentage of marks he got?**

Sol: marks % = $\frac{450}{500}$×100 = 90 %

**4. If Ravi and Mani got 500 and 600 marks respectively. How much percent more marks Mani got?**
Sol: Ravi's marks = 500
Mani's Marks = 600
Diff = 600–500 = 100
Diff % = $\frac{100}{500}$ ×100 = 20 %

**5. If Ravi and Mani got 500 and 600 marks respectively. How much percent marks Mani got as compare to Ravi's marks?**
Sol: Ravi's marks = 500
Mani's Marks = 600
Mani's Marks % = $\frac{600}{500}$×100 = 120%

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## Questions for Practice

**1.** In a school, there are 40% girls students and rest is boys. 75% of the boys passed in the examination. The total 80% of passed out of 1200 students. What is the number of girl students passed in the examination?
(A) 360      (B) 400      (C) 420      (D) 450      (E) None of these

**2.** The reduction of 16.67% in the price of sugar enables a person to buy 2.5 kg more sugar for Rs. 560. What is the original price of sugar?
(A) 28      (B) 32      (C) 36      (D) 38      (E) None of these

**3.** The population of a village in the first year increases by 10%, in the next year it decreases by 10%. Once again it increases in the third year by 10% and in the fourth year it decrease by 10%. If the present population is 30,000 then what will be the population after four years from now?
(A) 28654      (B) 29204      (C) 29403      (D) 31523      (E) None of these

**4.** In an election, Ajay and Vijay are the two candidates from the same place. Vijay got 8% more votes than Ajay and declared the winner. If Ajay got 1, 15,000 votes and there are no invalid votes, by how many votes did Ajay lose the election?
(A) 20000      (B) 25,000      (C) 30,000      (D) 35,000      (E) None of these

**5.** The price of fuel is increased by 20%, but instead of decreasing the usage of fuel, Rita increased it by 15%. What is the percentage change in his monthly expenditure on fuel?
(A) 25%      (B) 32%      (C) 35%      (D) 38%      (E) None of these

**6.** Mr. Sanjay invests 9% i.e. Rs. 2880 of his monthly salary in recurring deposits. Later he invests 15% of his monthly salary in sukanya samridhi yojna and he also invests 25% of his remaining monthly salary in mutual funds. What is the total annual amount invested by Mr. Sanjay in the whole year?
(A) 154420      (B) 158660      (C) 165120      (D) 167480      (E) None of these

**7.** A Raman sells 40% of apples he had and throws away 25% of the remainder. Next day he sells $55\frac{5}{9}$% of the remainder and throws away the rest. What percent of his apples does the Raman throw?
(A) 25%      (B) 28%      (C) 32%      (D) 35%      (E) None of these

**8.** Ajay decided to donate 10% of his salary to a charitable institution. On the day of donation, he changed his mind and donated Rs. 1594.50 instead, which was 60% of what he had decided earlier. How much is Ajay's salary?
(A) 24560      (B) 26575      (C) 27875      (D) 28975      (E) None of these

**9.** On adding 14 to a number X, we get 55% of number Y and on Subtracting 6 the number X we get 30% of Y. Find the value of X?
(A) 30      (B) 35      (C) 40      (D) 45      (E) 48

**10.** In an election only two persons A and B contested 20% of the voters did not vote and 1600 votes were declared as invalid. The winning candidate, A got 1920 votes more than his opponent thus he secured 54% votes of the total voters who voted. What are the total voters on the voter list?
(A) 28000      (B) 30000      (C) 32000      (D) 34000      (E) 35000

**SOLUTIONS**

**1. Answer is option C**
**Explanation:**
Total students = 1200
Let total = 100x
girls = 40X
boys = 60X
Total pass = 80x
75% of boys passed = $\frac{75}{100}$×60X = 45X
Girls Passed = 80x –45x = 35x
100x = 1200
35x = $\frac{1200}{100} \times 35$
Girls Passed = 420

**2. Answer is option B**
**Explanation:**
Reduction of 16.67% = 2.5 kg sugar
Reduction of 100% = 2.5×8 = 20 kg
So, reduced price allow him to buy 20 kg sugar
Original quantity = 20–2.5 = 17.5 kg
Total cost = 560
Original price = $\frac{560}{17.5}$ = 32 rs

**3. Answer is option C**
**Explanation:**
Present population = 30000
Population after four years
= 30000×$\frac{110}{100} \times \frac{90}{100} \times \frac{110}{100} \times \frac{90}{100}$
= 3×11×9×11×9
= 29403

**4. Answer is option A**
**Explanation:**
Total votes = 100%
Ajay = x votes
Vijay = x+8% of total
Now,
x+x+8% of total = Total
2x = 100+8
2x = 92
X = 46%
Ajay got 46% voted
Vijay got 54% votes
Actual votes of Ajay = 115000
So, we can say

46% = 115000
8% = $\frac{115000}{46} \times 8 = 20000$

**5. Answer is option D**
**Explanation:**
Let petrol = 100
Consumption = 100
Expense = 100×100 = 10000
Increased price = 100×$\frac{120}{100}$ = 120
Increased = 100×$\frac{115}{100}$ = 115
Increased expense = 115×120 = 13800
Inc = 13800–10000= 3800
Inc% = $\frac{3800}{10000} \times 100$ = 38%

**6. Answer is option C**
**Explanation:**
9% of his salary invests in recurring deposit
= 2880
Total monthly salary = 100%
9% = 2880
100% = 2880×$\frac{100}{9}$ = 32000
Sukanaya samridhi yojna = 15% of monthly salary.
Remaining = 100–9–15 = 76%
Mutual funds = 76×$\frac{25}{100}$ = 19%
Total investment = 9+15+19 = 43%
Monthly = 32000×$\frac{43}{100}$ = 13760
Yearly = 13760×12 = 165120

**7. Answer is option D**
**Explanation:**
Let total apples = 100x
Sale = 40% of 100x = 40x
Remaining = 60x
Throw away = 60x ×$\frac{25}{100}$ = 15x
Remaining = 60x–15x = 45x
Next day sale = 45x$\frac{5}{9}$ = 25x
Throw away = 45x–25x = 20x
Total throw away = 15x+20x = 35x
Percentage = $\frac{35x}{100x} \times 100$ = 35%

**8. Answer is option B**
**Explanation:**
Let total monthly salary = X
Decided to donate = 10% of x
In the end, donates 60% of 10% of x
Which is 1594.50
60% of 10% of x = 1594.50
X = 26575

**9. Answer is option A**
**Explanation:**
(Equation 1)
$X+14 = \frac{55}{100}Y$
$X+14 = \frac{11}{20}Y$
$Y = \frac{20}{11}(X+14)$

(Equation 2)
$X-6 = \frac{30}{100}Y$
$X-6 = \frac{3}{10}Y$
$Y = \frac{10}{3}(X-6)$
From Equation 1 and 2
$\frac{20}{11}(X+14) = \frac{10}{3}(X-6)$
6x +84 = 11x-66
5x = 150
X= 30

**10. Answer is option C**
**Explanation:**
Let total voter on the voter's list = 100x
Voters didn't cast votes = 20% of 100x = 20x
Remaining = 80x
Invalid votes = 1600
Total valid votes = 80x–1600
Winner = 54%
Loser = 46%
Difference = 54–46 = 8%
8% = 1920
$(80x-1600)\times\frac{8}{100} = 1920$
$(80x-1600) = 1920\times\frac{100}{8}$
80x–1600 = 24000
80x = 25600
Total voters = 100x
So,
$100x = 25600\times\frac{100}{80} = 32000$