GATE

CRASH COURSE

ALL BRANCH

Subject

General Aptitude

Averages and Percentages (Lec 02)

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Topics *to be covered*

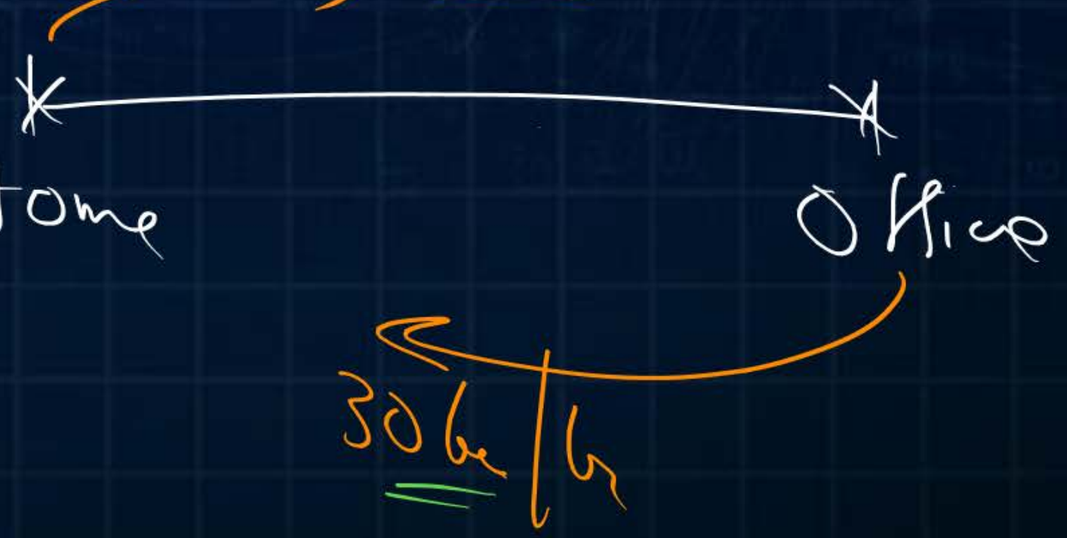
1. Averages
2. Percentages

Average

A. Mean

$$\text{Sum of obs.} \over \text{No. of obs}$$

24 km/hr



Average

Sum / 100

Equal Distribution

25 → +10 → 35

30 → +5 → 35

50 → −15 → 35

$\Sigma n = \frac{n(n+1)}{2}$

$= \frac{n+1}{2}$

1, 2, 3, 4, — — 100

$x = 1+2+3+ \text{— — —} 100$

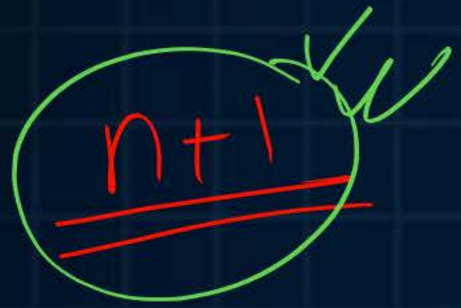
$x = 100+99+98+ \text{— — —} 1$

$2x = 101 \times 100$

$x = \frac{101 \times 100}{2} = 5050$

5050

Average



Even no

→ 2, 4, 6, 8, 10, 12, 14 → 8

→ 2, 4, 6, 8, 10, 12 → 7

odd no

1, 3, 5, 7, 9, 11, 13 → 7

1, 3, 5 → 3

Average

Starting

700 – 900

(O)(N) 701 899

800

(E) 702 898

$A = \frac{Sum}{No.}$

601 – 700

$A \times No. = Sum$

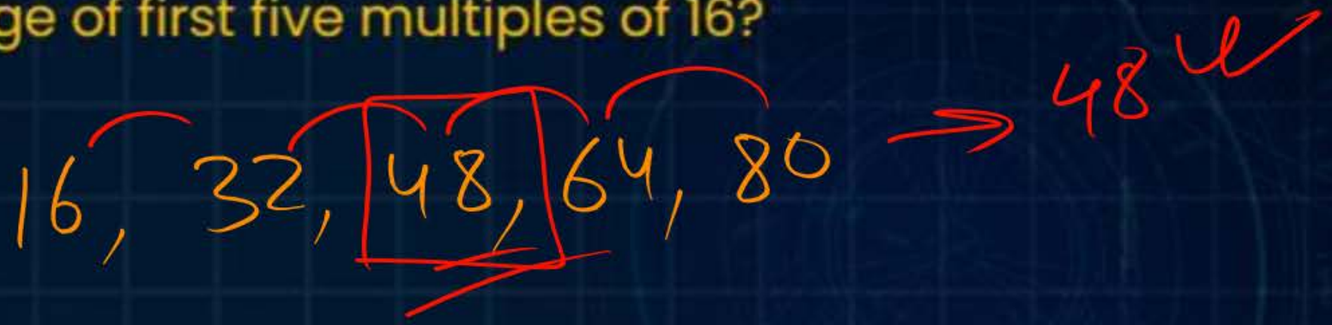
In between

$(n+1) \times n = n(n+1) \Rightarrow$ Sum of Even no.

$n \times n = n^2 \Rightarrow$ Sum of odd no.

Question

What is the average of first five multiples of 16?



Question

The average monthly salary of 20 employees is ₹1500. If the manager's salary is added the average becomes ₹1600. The manager's salary is

A 3500

B 3600

C 3800

D 3900

$1500 + 2100 = 3600$

$A = \frac{Sum}{No.}$

$\Rightarrow A \times No. = Sum$

$1500 \times 20 = 30000$

$1600 \times 21 = 33600$

3600

Question

The average weight of a ~~school~~ class of 40 students is 80 kg. If, however, the weight of the teacher be included, the average decreases by 1 kg. What is the weight of the teacher?

$80 - 41 = 39$

A 49

B 60

C 109

D 39

Question

$\text{Sum} = A \times \text{No.}$

The average score of a class of 40 students is 52. What will be the average score of the rest of the students if the average score of 10 of the students is 61.

$40 \times 52 = \text{Sum}$

$= 2080$

$10 \times 61 = 610$

1470

$52 - 3 = 49$

A, B, C, D $\rightarrow 52$ each

$-3 \quad -3 \quad -3 \rightarrow 61$

$\frac{1470}{30} = 49$

A 47

B 49

C 50

D 48

Question

The average age of Abhijeet and Daya is 32 years. Their average age 5 years hence will be?

37

Question

Three years ago, the average age of a family of 5 members was 17 years. A baby having been born, the average of the family is the same today. What is the age of the baby?

20 yrs

20 − 18

= 2 yrs

A 6 months

B 9 months

C 1 year

D 2 years

Question

A cricketer has certain average of runs for his 64 innings. In his 65th innings, he is bowled out for no score on his part. This brings down his average by 2 runs. His new average is?

A. 130

B. 68

C. 70

D. 128

$A - 2$

$\text{Sum} = A \times 1$

$A \Rightarrow 130$

$130 - 2 = 128$

$$A - 2 = \frac{64A + 0}{65}$$

$$\Rightarrow 65A - 130 = 64A$$

$$A = 130$$

Question

A: $3x+6$, $15+6=21$ | B: $5x+6$, $25+6=31$ | C: $8x+6$, $40+6=46$ (Present)

Six years ago, the ages of three persons were in ratio 3:5:8. If the sum of their ages 8 years from now would be 122, what are their present ages (in years)?

24, 98

$3x+14+5x+14+8x+14=122$

$122-24=98$

(A) 15, 25, 40 $=80$

(B) 21, 31, 46 $=98$

(C) 15, 25, 30 $=70$

(D) 21, 26, 37 $=84$

$16x=80$

$x=\frac{80}{16}=5$

Question

Sec A = 25 Sec (B) = 20

When a student in Section A who scored 100 marks in a subject is exchanged for a student in Section B who scored 0 marks, the average marks of the Section A falls by 4, while that of Section B increases by 5. Which of the following statements is true?

A. A has the same strength as B

B. A has 5 more students than B

C. B has 5 more students than A

D. The relative strengths of the classes cannot be assessed from the data

Question

The average of 5 consecutive integers starting with x is y. What is the average of 6 consecutive numbers starting with (x+2)?

$y \Leftarrow x, x+1, x+2, x+3, x+4$

$y = x+2$

A $y+3$

B $\frac{2y+9}{2}$

C $y+2$

D $\frac{2y+5}{2}$

$y, y+1, y+2, y+3, y+4, y+5$

$\frac{y+2+y+3}{2} = \frac{2y+5}{2}$

Percentages

fraction | Decimal

$33\frac{1}{3}\% = \frac{1}{3} = 0.\overline{3}$

$5\% \rightarrow$

$10\% \rightarrow$

$15\% \rightarrow$

$20\% \rightarrow$

$66\frac{2}{3}\% = \frac{2}{3} = 0.\overline{6}$

$100\% = 1 = 1$

Percentages

$1 - 0.25 = 0.75$

Successive

100

0.25 = 0.5×0.5

50% ↓ + 50% ↓ = 75% ↓

0.75 = 1.5×0.5

50% ↑ + 50% ↓ = 25% ↓

.3311

1331

10% ↑ + 10% ↑ + 10% ↑ = 33.1% ↑

$= 1.1 \times 1.1 \times 1.1$

Question

$1 - 0.684$

A trader offers three successive discounts of 20%, 10% and 5% to a customer. How much is overall single discount?

$= 0.316$

$0.8 \times 0.9 \times 0.95$

31.6

$= 0.72 \times 0.95$

$= 0.684$

A 30%

B 35%

C 31.6%

D 68.4%

Question

When the price of mobile reduced by 25%, the number of mobile sold increased by 60%. The effect on the revenue was?

0.75×1.6

$= 1.2$

.2

20% ↑

A 12%

B 50%

C 15%

D 20%

Question

8% of the people eligible to vote are between 20 and 25 years of age. In an election 85% of those eligible to vote, who were between 20 and 25 actually voted. In that election number of person between 20 and 25, who actually voted, was what percentage of those eligible to vote?

A 4.2%

B 6.4%

C 8%

D 6.8%

$0.85 \times 0.08 \times T.E.V$

$= 0.068 \times T.E.V$

6.8% of T.E.V.

Question

The wholesale price per unit of an item is C_0 up to first 19 units. The unit price falls by **10%** if **20** to 29 units are purchased, and by another 10% if 30 or more units are purchased. If 120 units are bought, the unit price paid is

A $0.89C_0$

B $0.97C_0$

C $0.91C_0$

D $0.81C_0$

$0.9 \times 0.9 \times C_0$

$0.81C_0$

Question

Amar drinks 20% of the milk present in a bottle in one sip. How much milk will remain in the bottle after the first 3 sips, if it contained 1 litre milk to begin with?

$0.8 \times 0.8 \times 0.8 \times 1000\ ml$

$= 0.512 \times 1000$

$= 512\ ml$

A. 400ml

B. 625 ml

C. 600ml

D. 512 ml

Question

A rectangular tray of 30 cm × 60 cm size is used for baking circular biscuits. The diameter of each biscuit is 3 cm before baking, which increases by 10% on baking. What is the maximum number of biscuits that can be baked in the tray such that the base of each biscuit is in contact with the tray?

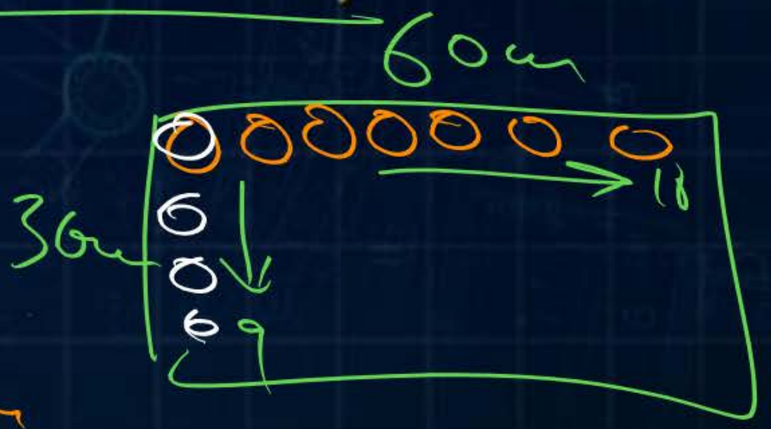
A. 171

B. 162

C. 180

D. 200

After baking each
B dia
$= 3 \times 1.1$
$= 3.3$ cm



$\text{Length} = \frac{60}{3.3} = 18.18$

$\text{Breadth} = \frac{30}{3.3} = 9.09$ (9)

(18)

No. of Biscuits
$= 18 \times 9$
$= 162$

Question

Among 1000 squirrel babies, 200 have three stripes on their back, 500 have two stripes on their back and the rest have four stripes on their back. While 90% of the three-striped babies survive to adulthood, only 80% of the two-striped and 70% of the four-striped babies survive to adulthood. The fraction of four-striped squirrels among the adults is nearest to

A 0.21

B 0.226

C 0.3

D 0.228

$A \Rightarrow 0.9 \times 0.2 = 0.18$

$B \Rightarrow 0.8 \times 0.5 = 0.4$

$C \Rightarrow 0.7 \times 0.3 = 0.21$

$$\frac{0.21}{0.79}$$

$$\frac{0.21}{0.79} = \frac{21}{79}$$

$$= 0.2658$$

0.3

Question (PYQ GATE Exam 2022 ME)

For the past m days, the average daily production at a company was 100 units per day. If today's production of 180 units changes the average to 110 units per day, what is the value of m?

$m = 7$

A 18

B 10

C 7

D 5

Question (PYQ GATE Exam 2022 ME)

The average of the monthly salaries of M, N and S is ₹4000. The average of the monthly salaries of N, S and P is ₹5000. The monthly salary of P is ₹6000. What is the monthly salary of M as a percentage of the monthly salary of P?

A 50%

B 75%

C 100%

D 125%

$M + N + S = 3 \times 4000 = 12000$

$N + S + P = 3 \times 5000 = 15000$

$P = 6000$

$N + S = 9000$

$M = 12,000 - 9000$

$= 3000$

$\frac{3000}{6000} \times 100$

$= 50\%$

Question (PYQ GATE Exam 2019 EC)

The current population of a city is 11,02,500. If it has been increasing at the rate of 5% per annum, what was its population 2 years ago?

A 9,92,500

B 9,95,006

C 10,00,000

D 12,51,506

$1.05 \times 1.05 \times x = 11,02,500$

$x = \frac{11,02,500}{1.1025}$

$\therefore x = 10,00,000$

Question (PYQ GATE Exam 2019 ME)

The product of the three integers X, Y and Z is 192. Z is equal to 4 and P is equal to average of X and Y. What is the minimum value of P?

A 6

B 7

C 8

D 9.5

$$X \times Y \times Z = 192$$

$$Z = 4$$

$$X \times Y = \frac{192}{4} = 48$$

$1 \times 48 \Rightarrow A = 24.5$

$2 \times 24 \Rightarrow A = 13$

$3 \times 16 \Rightarrow A = 9.5$

$4 \times 12 \Rightarrow A = 8$

$6 \times 8 \Rightarrow A = 7$

Question (PYQ GATE Exam 2024 CE)

If the sum of the first 20 consecutive positive odd numbers is divided by 20^2, the result is

n^2

$$\frac{20^2}{20^2} = 1$$

A 1

B 20

C 2

D 1/2

Question (PYQ GATE Exam 2016 CE)

(x% of y) + (y% of x) is equivalent to,

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

$= \frac{xy}{100} + \frac{xy}{100} = \frac{2xy}{100}$

$= 2x \times xy/.$

$= 2/. \text{ of } xy$

$= 2x/. \text{ of } y$

A 2% of xy

B 2% of (xy/100)

C xy% of 100

D 100% of xy

Summary

Average

Percentage


Thank
THANK
Keep Hustling!