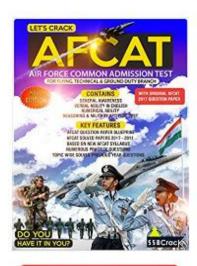# SSBCRACK

AFCAT

MATHS QUESTIONS

Syllabus:

- Decimal Fraction,
- Time and Work,
- Average,
- Profit & Loss,
- Percentage,
- Ratio & Proportion
- Simple Interest,
- Time & Distance (Trains/Boats & Streams)

The students in three classes are in each class in the ratio 2 : 3 : 5. If 40 students are increased in each class the ratio change to 4 : 5 : 7. Originally the total number of student was

(a) 100   (b) 180   **(c) 200**   (d) 400

Let the number of student in three classes be $2x$, $3x$ and $5x$ respectively. Due to increase of 40 students in each class,

we have $\dfrac{2x + 40}{3x + 40} = \dfrac{4}{5} \Rightarrow 10x + 200 = 12x + 160$

$\Rightarrow 2x = 40 \Rightarrow x = 20$

$\therefore$ Total number of students initially $= 2x + 3x + 5x = 10x = 200$

The ratio of incomes of two persons is 5 : 3 and that of their expenditure is 9 : 5. The income of each person if they save Rs 1300 and Rs 900 respectively, is

(a) **Rs 4000, Rs 2400**   (b) Rs 3000, Rs 1800

(c) Rs 5000, Rs 3000   (d) Rs 4500, Rs 2700

Let the income of two persons are ₹ $5x$ and ₹ $3x$ and the expenditure of two persons are ₹ $9y$ and ₹ $5y$ respectively.

$\therefore$ $5x - 9y = 1300$ ...(i)

and $3x - 5y = 900$ ...(ii)

On solving Eqs. (i) and (ii), we get $x = 800$, $y = 300$

Income of first person $= 5 \times 800 = ₹ 4000$

and income of second person $= 3 \times 800 = ₹ 2400$

How much quantity of water must be added to 48 mL of alcohol to make a solution that contain 25% alcohol?

(a) 48 mL   (b) 64 mL   (c) **144 mL**   (d) 192 mL

Let x mL must be added. $\dfrac{48}{x+48} = \dfrac{25}{100} \Rightarrow \dfrac{48}{x+48} = \dfrac{1}{4}$

$\Rightarrow\ x + 48 = 192,\ x = 192 - 48 = 144\,\text{mL}$

Dilip, Ram and Amar started a shop by investing Rs 2700, Rs 8100 and Rs 7200 respectively. At the end of 1 yr, the profit was distributed. If Ram's share was Rs 3600, their total profit was

(a) Rs 10800   (b) Rs 11600

(c) **Rs 8000**   (d) None of these

Ratio of their investment = 2700 : 8100 : 7200 = 3 : 9 : 8
Let the total profit = ₹ x
Then, $3600 = \dfrac{9}{20} \times x\ \therefore\ x = \dfrac{3600 \times 20}{9} = ₹\ 8000$

Find the largest number which when subtracted from 10000, the remainder is divisible by 32, 36, 48 and 50.

(a) 8272   (b) 7408   (c) **9136**   (d) 8674

LCM of 32, 36, 48, 54 = 864
∴ Required number = 10000 − 864 = 9136

A shopkeeper offers his customers 10% discount and still makes a profit of 26%. What is the actual cost to him of an article marked Rs 280?

(a) Rs 175   (b) **Rs 200**   (c) Rs 225   (d) Rs 215

Cost price = ₹ x and marked price = ₹ 280

$SP = 90\% \text{ of } ₹ 280 = \dfrac{90}{100} \times 280 = ₹ 252$

Given, 126% of $x = 252$ ∴ $x = \dfrac{252 \times 100}{126} = ₹ 200$

A 150 m long train crosses a mile-stone in 15 s and a train of same length coming from opposite direction in 12 s. The speed of other train is

(a) 36 km/h   (b) **54 km/h**   (c) 50 km/h   (d) 45 km/h

Speed of first train $= \dfrac{150}{15} = 10 \text{m/s}$, Second case, $\dfrac{150 + 150}{x + 10} = 12$

Where, $x =$ speed of other train

$\Rightarrow 300 = 12x + 120 \Rightarrow x = \dfrac{180}{12} = 15 \text{m/s}$

∴ Required speed $= 15 \times \dfrac{18}{5} = 54$ km/h

A tree increases annually by 1/8th of its height. By how much will it increase after 2 1/2 yr if it stands today 8 m high?

(a) **10.75 m**   (b) 15.60 m   (c) 11.85 m   (d) 12.25 m

Height of tree after 1 yr $= 8 + 8 \times \dfrac{1}{8} = 9$ m

Height of tree after 2 yr $= 9 + 9 \times \dfrac{1}{8} = \dfrac{72 + 9}{9} = \dfrac{81}{8}$ m

Height of tree after $2\dfrac{1}{2}$ yr

$= \dfrac{81}{8} + \dfrac{81}{8} \times \dfrac{1}{16} = \dfrac{81}{8}\left(1 + \dfrac{1}{16}\right) = \dfrac{81}{8} \times \dfrac{17}{16} = \dfrac{1377}{128} = 10.75$ m

The difference between 63% of a number and 45% of the same number is 342. What is 78% of that number?

(a) 1342   (b) **1482**   (c) 1558   (d) 1670

63% of x − 45% of x = 342

$\Rightarrow x \times \dfrac{63}{100} - x \times \dfrac{45}{100} = 342 \Rightarrow \dfrac{63x}{100} - \dfrac{45x}{100} = 342$

$\Rightarrow \dfrac{63x - 45x}{100} = 342 \Rightarrow \dfrac{18x}{100} = 342$

$\Rightarrow 18x = 342 \times 100 \Rightarrow x = \dfrac{342 \times 100}{18} = 1900$

$78\% \text{ of } 1900 = 1900 \times \dfrac{78}{100} = 19 \times 78 = 1482$

What would be the compound interest obtained on an amount of Rs4000 at the rate of 5% per annum after 3 yr?

(a) Rs 612   (b) Rs 578   (c) Rs 525.5   (d) Rs **630.5**

Let x mL must be added. $\dfrac{48}{x + 48} = \dfrac{25}{100} \Rightarrow \dfrac{48}{x + 48} = \dfrac{1}{4}$

$\Rightarrow x + 48 = 192, x = 192 - 48 = 144\,\text{mL}$

Correct spacing

$= P\left[\left(1 + \dfrac{r}{100}\right)^{t} - 1\right] = 4000\left[\left(1 + \dfrac{5}{100}\right)^{3} - 1\right]$

$= 4000\left[\left(\dfrac{105}{100}\right)^{3} - 1\right] = 4000\left[\left(\dfrac{21}{20} \times \dfrac{21}{20} \times \dfrac{21}{20}\right) - 1\right]$

$= 4000\left[\dfrac{9261}{8000} - 1\right] = 4000\left[\dfrac{9261 - 8000}{8000}\right] = 4000 \times \dfrac{1261}{8000}$

$= ₹\,630.50$

What is the least number to be added to 7700 to make it a perfect square?

(a) 131   (b) 121

(c) 77   (d) **None of these**

$$7700 + 221 = \sqrt{7921} = 49$$

The average age of a man and his son is 40 yr. The ratio of their ages is 7 : 3, respectively. What is the man's age?

(a) 70 yr   (b) 63 yr

(c) **56 yr**   (d) 49 yr

The total age of man and his son $= 40 \times 2 = 80$ yr

Total ratio $= 7 + 3 = 10$ Man's age $= \dfrac{80}{10} \times 7 = 56$ yr

A canteen requires 28 dozen bananas for a week. How many dozen bananas will it require for 47 days?

(a) 2256   (b) 322

(c) 196   (d) **None of these**

$\because$ In 7 days, a canteen requires $= 28 \times 12$ bananas

$\therefore$ In 1 day, a canteen requires $= \dfrac{28 \times 12}{7}$ bananas

$\therefore$ In 47 days, a canteen requires $\dfrac{28 \times 12}{7} \times 47 = 2256$ bananas

$= 188$ dozen

A and B can do a piece of work in 72 days, B and C in 120 days and A and C in 90 days. In what time can A alone do it?

(a) 90 days

(b) **120 days**

(c) 150 days

(d) 180 days

Let A, B and C can do a piece of work in x, y and z days respectively.

$\therefore \quad 2\left(\dfrac{1}{x}+\dfrac{1}{y}+\dfrac{1}{z}\right)=\dfrac{1}{72}+\dfrac{1}{120}+\dfrac{1}{90}$

$\Rightarrow \dfrac{1}{x}+\dfrac{1}{y}+\dfrac{1}{z}=\dfrac{1}{2}\left[\dfrac{5+3+4}{360}\right] \Rightarrow \dfrac{1}{x}+\dfrac{1}{y}+\dfrac{1}{z}=\dfrac{12}{2\times 360}$

$\therefore \quad \dfrac{1}{x}+\dfrac{1}{y}+\dfrac{1}{z}=\dfrac{1}{60} \quad \because \dfrac{1}{y}+\dfrac{1}{z}=\dfrac{1}{120}$

$\therefore \quad \dfrac{1}{x}=\dfrac{1}{60}-\dfrac{1}{120}=\dfrac{1}{120}$

Hence, A alone will complete the work in 120 days.

A, B and C can do a piece of work in 20 days, 30 days and 60 days, respectively. In how many days can A do work, if he is assisted by B and C on every third day?

(a) 12 (b) **15** (c) 16 (d) 18

$(A+B+C)$'s 3 days work $=\dfrac{3}{20}+\dfrac{1}{30}+\dfrac{1}{60}$

$=\dfrac{9+2+1}{60}=\dfrac{12}{60}$

$\therefore (A+B+C)$'s can do the whole work

$= 3 \times 5 = 15$ days

(**Note** A is assisted by B and C every third day.)

A man can row 9 1 3 km/h in still water and finds that it takes him thrice as much time to row up than as to row down the same distance in the river. The speed of the current is

(a) 3 (1/3) km/h   (b) 3 (1/9) km/h   (c) **4 (2/3) km/h**   (d) 4 (1/3) km/h

Suppose speed of the current = x km/h

Then, $\left(\dfrac{28}{3} + x\right) = 3 \times \left(\dfrac{28}{3} - x\right)$

$\Rightarrow \left(\dfrac{28 + 3x}{3}\right) = 3 \times \left(\dfrac{28 - 3x}{3}\right)$

$\Rightarrow \quad \dfrac{28 + 3x}{3} = (28 - 3x)$

$\Rightarrow \quad 28 + 3x = 84 - 9x$

$\Rightarrow \quad 12x = 56$

$\Rightarrow \quad x = \dfrac{56}{12}$

$\Rightarrow \quad x = \dfrac{14}{3} = 4\dfrac{2}{3}$ km/h

The speed of a boat in still water is 10 km/h. If it can travel 26 km downstream and 14 km upstream in the same time, the speed of the stream is

(a) 2 km/h   (b) 2.5 km/h   (c) **3 km/h**   (d) 4 km/h

Suppose speed of the current = x km/h

Then, $\dfrac{26}{10 + x} = \dfrac{14}{10 - x}$

($\because$ Speed of the boat = 10 km/h)

$\Rightarrow \quad 260 - 26x = 140 + 14x$

$\Rightarrow \quad 40x = 120$

$\Rightarrow \quad x = \dfrac{120}{40} = 3$ km/h

If a sum become double in 16 yr, how many times will it be in 8 yr?

(a) **1 (1/2) times**   (b) 1 (1/3) times   (c) 1 (¾) times   (d) 1 (¼) times

Suppose principal amount = ₹ P

Then, $2P - P = \dfrac{P \times r \times 16}{100}$

$\Rightarrow \quad P = \dfrac{P \times r \times 16}{100}$

$\Rightarrow \quad r = \dfrac{100}{16}$

$\Rightarrow \quad r = \dfrac{25}{4}\%$

Again, $\quad SI = \dfrac{P \times r \times t}{100}$

$\Rightarrow \quad x = \dfrac{P \times 25 \times 8}{4 \times 100} \quad$ (Suppose SI = ₹ x)

$\Rightarrow \quad x = ₹\dfrac{P}{2}$

∴ Required times $= P + x = P + \dfrac{P}{2} = \dfrac{3P}{2} = 1\dfrac{1}{2} \times P$

In how many years will a sum of Rs 800 at 10% per annum compounded semi-annually become Rs 926.10?

(a) 1 (1/3)   (b) **1 (1/2)**   (c) 2 (1/3)   (d) 2 (1/2)

Given, rate of interest = 10% annually

$\qquad\qquad\qquad = 5\%$ half-yearly

and time $(t) = 2t$ half-yearly

Now, $926.10 = 800\left(1 + \dfrac{5}{100}\right)^{2t}$

$\Rightarrow \quad \dfrac{926.10}{800} = \left(\dfrac{21}{20}\right)^{2t}$

$\Rightarrow \quad \dfrac{9261}{8000} = \left(\dfrac{21}{20}\right)^{2t}$

$\Rightarrow \quad \left(\dfrac{21}{20}\right)^{3} = \left(\dfrac{21}{20}\right)^{2t}$

$\Rightarrow \quad 2t = 3$

$\Rightarrow \quad t = \dfrac{3}{2} = 1\dfrac{1}{2}$ yr

A sells 2 TV sets, one at a loss of 15% and another at a profit of 15%. Find the loss/gain percentage in the overall transaction.

(a) **2.25**   (b) 3   (c) 4   (d) No profit, no loss

When an article is sold at the same per cent of profit and loss then always becomes a loss.

$$\therefore \text{Loss percentage} = \frac{(15)^2}{100} = \frac{225}{100} = 2.25\%$$

A man travelled from a point A to B at the rate of 25 km/h and walked back at the rate of 4 km/h. If the whole journey took 5 h 48 min, the distance between A and B is

(a) 30 km   (b) 24 km   (c) **20 km**   (d) 51.6 km

Suppose distance between A and $B = x$ km

Then, $\quad \dfrac{x}{25} + \dfrac{x}{4} = 5\dfrac{48}{60}$

$\Rightarrow \quad \dfrac{4x + 25x}{100} = \dfrac{29}{5}$

$\Rightarrow \quad \dfrac{29x}{100} = \dfrac{29}{5}$

$\Rightarrow \quad x = \dfrac{100}{5} = 20$ km

A train travelling at a unifrom speed clears a platform 200 m long in 10 s and passes a telegraph post in 5 s. The speed of the train is

(a) 36 km/h (b) 39 km/h (c) 72 km/h (d) **144 km/h**

Suppose length of train = x m

Then, $\dfrac{x + 200}{10} = \dfrac{x}{5}$

$\Rightarrow \qquad 2x = x + 200$

$\Rightarrow \qquad x = 200 \text{ m}$

$\therefore$ Speed of the train $= \dfrac{200}{5}$ m/s

$= 40 \text{ m/s} = 40 \times \dfrac{18}{5} \text{ km/h} = 144 \text{ km/h}$

The price of sugar increases by 20% due to the festive season. By what percentage should a family reduce the consumption of sugar so that there is no change in the expenditure?

(a) 20   (b) 18 (1/3)   (c) **16 (2/3)**   (d) 16 (1/3)

Reduce consumption percentage

$= \dfrac{20}{(100 + 20)} \times 100 = \dfrac{20}{120} \times 100$

$= \dfrac{100}{6} = \dfrac{50}{3} = 16\dfrac{2}{3}\%$

A's salary is 20% lower than B's salary, which is 15% lower than C's salary. By how much per cent is C's salary more than A's salary?

(a) 44.05   (b) 45.05   (c) 46.05   (d) **47.05**

Suppose C's salary = ₹ 100

Then, B's salary $= \dfrac{100 \times 85}{100} = ₹ 85$

and A's salary $= \dfrac{85 \times 80}{100} = ₹ 68$

$\therefore$ Required percentage $= \dfrac{100 - 68}{68} \times 100 = 47.05\%$

The average weight of 5 men is increased by 2 kg when one of the men whose weight is 60 kg is replaced by a new man. The weight of the new man is

(a) 50 kg   (b) 65 kg   (c) 68 kg   (d) **70 kg**

Total increase weight = 5 × 2 kg = 10 kg

∴ Weight of the new man = (60 + 10) = 70 kg

A and B can do a piece of work in 18 days, B and C can do it in 24 days, A and C can do it in 36 days. In how many days B alone can finish the work?

(a) 48   (b) 45   (c) **28 (4/5)** (d) 144

$(A + B)$'s 1 day work = $\dfrac{1}{18}$

$(B + C)$'s 1 day work = $\dfrac{1}{24}$

$(C + A)$'s 1 day work = $\dfrac{1}{36}$

$2(A + B + C)$'s 1 day work $= \dfrac{1}{18} + \dfrac{1}{24} + \dfrac{1}{36}$

$$= \dfrac{4 + 3 + 2}{72} = \dfrac{9}{72} = \dfrac{1}{8}$$

$(A + B + C)$'s 1 day work $= \dfrac{1}{8} \times \dfrac{1}{2} = \dfrac{1}{16}$

∴ B's 1 day work $= \dfrac{1}{16} - \dfrac{1}{36} = \dfrac{9 - 4}{144} = \dfrac{5}{144}$

Hence, B alone can finish the work in $\dfrac{144}{5}$ days or $28\dfrac{4}{5}$ days.

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