

# AFCAT MBT 9 Aug 2024

## AFCAT Garud 1.0 2025

### Numerical Aptitude

- Q1** The sum of squares of two numbers is 90 and their difference is 6. What are the two numbers?  
 (A) 9,6 (B) 9,3  
 (C) 6,6 (D) 5,4
- Q2** At a village trade fair a man buys a horse and a camel together for Rs 51,250 . He sold the horse at a profit of 25 % and the camel at a loss of 20 %. If he sold both the animals at the same price, then the cost price of the cheaper animal was Rs \_\_\_\_\_.  
 (A) 6600 (B) 7500  
 (C) 25000 (D) 20000
- Q3** A student multiplied a number by  $\frac{3}{5}$  instead of  $\frac{5}{3}$ . What is the percentage error in the calculation?  
 (A) 44% (B) 34%  
 (C) 54% (D) 64%
- Q4** A girl calculates that the probability of her winning the first prize in a lottery is 0.08. If 6000 tickets are sold, then the number of tickets she bought, is  
 (A) 480 (B) 240  
 (C) 120 (D) 960
- Q5** By selling 90 ball pens for Rs 160 a person loses . How many ball pens should be sold for Rs 96 so as to have a profit of ?  
 (A) 48 (B) 12  
 (C) 36 (D) 96
- Q6** The compound interest on 8000 in 1 years at 8% per annum, the interest being compounded half-yearly, is:  
 (A) 652.8 (B) 640.4  
 (C) 700 (D) 720
- Q7** At what rate of interest should Kumar invest a sum of Rs 1200 so that it becomes Rs 1348.32 in 2 years  
 (A) 6% (B) 7%  
 (C) 8% (D) 9%
- Q8** Find the largest four-digit number which when divided by 4, 7 and 13 leaves a remainder of 3 in each case.  
 (A) 9897 (B) 1111  
 (C) 9999 (D) 9831
- Q9** A runner completes a 10 km race in 45 minutes. If they increase their speed by 2 km/h for a second race of the same length, how much less time (apparently) will it take them to finish?  
 (A) 5 minutes  
 (B) 6 minutes  
 (C) 7 minutes  
 (D) 8 minutes
- Q10** What is the angle between the two hands of a clock when the time shown by the clock is 5:30 pm.?  
 (A) 00 (B) 50  
 (C) 30 (D) 15
- Q11** If the ratio of income of Geeta and Sita is 5:4 and the ratio of expenditure of Geeta and Sita is 7:3 respectively. If the savings of Geeta is Rs 800 more than that of Sita and Expenditure of Geeta is Rs 1400. Find the total income of Geeta and Sita?  
 (A) 10800 (B) 14000


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- (C) 14400 (D) 11200
- Q12** From a container, full of pure milk, 20% is replaced by water and this process is repeated three times. At the end of third operation, the quantity of pure milk reduces to  
 (A) 40.0% (B) 50.0%  
 (C) 51.2% (D) 58.8%
- Q13** A can complete a work in 20 days, while B can complete the same work in 25 days. Both worked together for 10 days and then C alone completed the remaining work in 10 days. In how many days will A, B and C together complete the same work?  
 (A) 5 days (B) 10 days  
 (C) 12 days (D) 8 days
- Q14** A is 50% as efficient as B. C does half the work done by A and B together. If C alone does the work together in 20 days, then A, B and C together Will Do The Work In?  
 (A) 20/3 (B) 10/3  
 (C) 20/7 (D) 24/5
- Q15** A boat's speed in still water is  $45\text{ km/h}$ , while the river is flowing at a speed of  $15\text{ km/h}$ . The time taken to cover a certain distance upstream is  $9h$  more than the time taken to cover the same distance downstream. Find the distance (in  $\text{km}$  ).  
 (A) 340 (B) 540  
 (C) 100 (D) 250
- Q16** A person goes from place A to B with a speed of  $15\text{ km/h}$  and comes back with a speed of  $10\text{ km/h}$  then what will be the average speed of the person.  
 (A) 10 km/h (B) 12 km/h  
 (C) 12.5 km/h (D) 15 km/h
- Q17** If the length of one side and the diagonal of a rectangle are 15cm and 25cm, then find its perimeter?  
 (A) 80 (B) 60  
 (C) 50 (D) 70

- Q18** For three numbers, the ratio of the first and the second number is 2: 3 and that of the second and the third number is 4 :5. If the sum of the three numbers is 140 , then what is the second number?  
 (A) 60 (B) 48  
 (C) 96 (D) 32
- Q19** The sides of a rectangle of perimeter 40 cm are in the ratio 1 : 4. What is the perimeter of a square whose area is the same as that of the rectangle?  
 (A) 30 cm (B) 32 cm  
 (C) 34 cm (D) 36 cm
- Q20** What is the value of  $36 \div 8 \times 4 + 2 \div 4 - 1 + 5$  of  $3 \div (4 \times 2 - 3) - 3 = ?$   
 (A) 18  
 (B) 16  
 (C)  $\frac{35}{2}$   
 (D)  $\frac{31}{2}$



## Answer Key

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Q1 (B)  
Q2 (D)  
Q3 (D)  
Q4 (A)  
Q5 (C)  
Q6 (A)  
Q7 (A)  
Q8 (D)  
Q9 (B)  
Q10 (D)

Q11 (C)  
Q12 (C)  
Q13 (B)  
Q14 (A)  
Q15 (B)  
Q16 (B)  
Q17 (D)  
Q18 (B)  
Q19 (B)  
Q20 (C)

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## Hints & Solutions

### Q1 Text Solution:

Sure! Here's a shorter solution:

Given:

$$1. x^2 + y^2 = 90$$

$$2. x - y = 6$$

Rewrite  $x$  as  $x = y + 6$ , then substitute into the first equation:

$$(y + 6)^2 + y^2 = 90$$

$$y^2 + 12y + 36 + y^2 = 90$$

$$2y^2 + 12y + 36 = 90$$

$$2y^2 + 12y - 54 = 0$$

$$y^2 + 6y - 27 = 0$$

Solve the quadratic equation:

$$y = \frac{-6 \pm \sqrt{6^2 + 4 \cdot 27}}{2}$$

$$y = \frac{-6 \pm 12}{2}$$

$$y = 3 \text{ or } -9$$

If  $y = 3$ , then  $x = 9$ .

If  $y = -9$ , then  $x = -3$ .

So, the two numbers are  $(9, 3)$  or  $(-3, -9)$ .

### Q2 Text Solution:

Given:

$$1. H + C = 51250$$

2. The horse was sold at a profit of 25%, and the

camel at a loss of 20%.

3. Both animals were sold at the same price.

First, we need to express the selling prices of the horse and the camel.

The horse's selling price:

$$\text{Selling price of the horse} = H + 0.25H = 1.25H$$

The camel's selling price:

$$\text{Selling price of the camel} = C - 0.20C = 0.80C$$

Since both animals were sold at the same price:

$$1.25H = 0.80C$$

We now have two equations:

$$1. H + C = 51250$$

$$2. 1.25H = 0.80C$$

From the second equation, solve for  $C$  in terms of  $H$ :

$$1.25H = 0.80C$$

$$C = \frac{1.25H}{0.80}$$

$$C = \frac{1.25}{0.80}H$$

$$C = \frac{5}{4}H$$

$$C = 1.5625H$$

Substitute  $C = 1.5625H$  into the first equation:

$$H + 1.5625H = 51250$$

$$2.5625H = 51250$$



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$$H = \frac{51250}{2.5625}$$

$$H = 20000$$

Now, substitute  $H = 20000$  back into the equation for  $C$ :

$$C = 1.5625 \times 20000$$

$$C = 31250$$

Therefore, the cost price of the horse is  $H = 20000$  and the cost price of the camel is  $C = 31250$ .

### Q3 Text Solution:

Suppose the number =  $x$

$$\therefore \frac{\frac{5x}{3} - \frac{3x}{5}}{\frac{5x}{3}} \times 100 = \frac{15x-9x}{15} \times \frac{3}{5x} \times 100$$

$$= \frac{16x}{25x} \times 100 = 64\%$$

### Q4 Text Solution:

Given, the total number of sold tickets = 6000

Let she bought  $x$  tickets.

Then, the probability of her winnings the first

$$\text{prize} = \frac{x}{6000} = 0.08$$

$$\Rightarrow x = 0.08 \times 6000$$

$$\Rightarrow x = 480$$

Hence, she bought 480 tickets.

### Q5 Text Solution:

Given that: Jerson sold 90 ball pens for Rs 160 at a lose of 20%

SP of 90 ball pens = Rs 160

$$\text{SP of 1 ball pen} = \frac{160}{90}$$

$$= Rs \frac{16}{9}$$

$$\text{Then, } CP = \left( \frac{100}{100-\text{loss}\%} \right) \times SP$$

$$CP = \left( \frac{100}{100-20} \right) \times \frac{16}{9}$$

$$= \frac{100}{80} \times \frac{16}{9}$$

$$= Rs \frac{20}{9}$$

Now, if ball pens are sold at 20% profit.

$$\text{Then SP of 1 pen} = \left( \frac{100+\text{profit}\%}{100} \right) \times CP$$

$$= \left( \frac{100+20}{100} \right) \times \frac{20}{9}$$

$$= \frac{120}{100} \times \frac{20}{9}$$

$$= Rs \frac{8}{3}$$

By unitary method,

For Rs  $\frac{24}{9}$ , number of ball pens sold = 1

For Re 1, number of ball pens sold =  $\frac{9}{24}$

For Rs 96, number of ball pens sold =  $\frac{9}{24} \times 96$   
= 36

### Q6 Text Solution:

Interest = half yearly

Rate = 4% per half yearly

$$C.I. = P \left[ \left( 1 + \frac{r}{100} \right)^T - 1 \right]$$

$$= 8000 \left[ \left( 1 + \frac{4}{100} \right)^2 - 1 \right]$$

$$= 8000 \times \frac{51}{625}$$

$$= 652.8.$$

### Q7 Text Solution:

To find the rate of interest at which Kumar should invest the sum, we can use the formula for compound interest, since it is not specified otherwise. The compound interest formula is:

$$A = P \left( 1 + \frac{r}{100} \right)^t$$

Where:

- $A$  is the amount of money accumulated after  $n$  years, including interest (Rs 1348.32).
- $P$  is the principal amount (Rs 1200).
- $r$  is the rate of interest per annum.
- $t$  is the time the money is invested for (2 years).



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Given:

-  $A = 1348.32$

-  $P = 1200$

-  $t = 2$  years

We need to find  $r$ .

Let's plug in the values and solve for  $r$ :

$$1348.32 = 1200 \left( 1 + \frac{r}{100} \right)^2$$

Dividing both sides by 1200:

$$\frac{1348.32}{1200} = \left( 1 + \frac{r}{100} \right)^2$$

$$1.1236 = \left( 1 + \frac{r}{100} \right)^2$$

Taking the square root of both sides:

$$\sqrt{1.1236} = 1 + \frac{r}{100}$$

$$1.06 = 1 + \frac{r}{100}$$

Subtracting 1 from both sides:

$$\frac{r}{100} = 0.06$$

Multiplying by 100:

$$r = 6\%$$

So, Kumar should invest the sum at an interest rate of **6% per annum**.

#### Q8 Text Solution:

Determine the Least Common Multiple (LCM) of 4, 7, and 13:

Prime factorization:

-  $4 = 2^2$

-  $7 = 7^1$

-  $13 = 13^1$

LCM calculation:

- The LCM is the product of the highest powers of all prime factors involved.

-  $\text{LCM} = 2^2 \times 7^1 \times 13^1 = 4 \times 7 \times 13 = 364$

Find the number that leaves a remainder of 3:

Any number  $x$  that leaves a remainder of 3 when divided by 4, 7, and 13 can be expressed as:

$$x = 364k + 3$$

where  $k$  is an integer.

Determine the largest four-digit number fitting this form:

The largest four-digit number is 9999. We need to find the largest  $k$  such that:

$$364k + 3 \leq 9999$$

Solving for  $k$ :

$$364k + 3 \leq 9999$$

$$364k \leq 9996$$

$$k \leq \frac{9996}{364} \approx 27.47$$

Since  $k$  must be an integer, the largest possible  $k$  is 27.

Calculate the corresponding number:

Substitute  $k = 27$  into the expression:

$$x = 364 \times 27 + 3 = 9828 + 3 = 9831$$

So, the largest four-digit number that leaves a remainder of 3 when divided by 4, 7, and 13 is 9831.

#### Q9 Text Solution:

Original speed:  $\frac{10 \text{ km}}{0.75 \text{ hours}} \approx 13.33 \text{ km/h}$ .

Increased speed:  $13.33 + 2 = 15.33 \text{ km/h}$ .

Time at increased speed:

$\frac{10 \text{ km}}{15.33 \text{ km/h}} \approx 0.652 \text{ hours} \approx 39.15 \text{ minutes}$ .



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Time saved:  $45 - 39.15 \approx 5.85$  minutes.

Correct answer: 6 minutes

**Q10 Text Solution:**

(d)

$$\begin{aligned}\text{Angle} &= \left| 30H - \frac{11m}{2} \right| \\ &= \left| 30 \times 5 - 11 \times \frac{30}{2} \right| \\ &= \left| 150 - 165 \right| = 15^\circ\end{aligned}$$

**Q11 Text Solution:**

Let the incomes of Geeta and Sita be  $5x$  and  $4x$  respectively

And the expenditures of Geeta and Sita be  $7y$  and  $3y$  respectively.

ATQ,

$$(5x - 7y) = 800 + (4x - 3y)$$

$$\text{i.e. } x = 800 + 4y \dots\dots(1)$$

$$\text{Also, } 7y = \text{Rs } 1400$$

$$y = \text{Rs } 200.$$

$$\text{From (1), } x = 800 + 4(200) = 1600.$$

$$\text{So, the total income of Geeta and Sita} = (5x + 4x) = 9 \times 1600 = 14400.$$

**Q12 Text Solution:**

Let the initial quantity of pure milk in the vessel be 100 litres.

Remaining milk after  $n$  operations

$$\text{Initial quantity of milk} \times \left( 1 - \frac{y}{x} \right)^n$$

Here,  $n = 3$

$\therefore$  Quantity of milk remained

$$= 100 \left( 1 - \frac{20}{100} \right)^3 = 100 \left( \frac{4}{5} \right)^3$$

$$= 100 \times \frac{4}{5} \times \frac{4}{5} \times \frac{4}{5}$$

$$= 51.2 \text{ litres or } 51.2\%$$

**Q13 Text Solution:**

A can complete a work in 20 days, while B can complete the same work in 25 days.

Let total work = LCM (20, 25) = 100 unit

Efficiency of A = 5 unit

Efficiency of B = 4 unit

Efficiency of (A+B) =  $5 + 4 = 9$  unit/days

Both worked together for 10 days and then C alone completed the remaining work in 10 days.

Work done by A and B together in 10 days =

$$10 \text{ days} \times 9 \text{ unit} = 90 \text{ unit}$$

Remaining work = 100 unit - 90 unit = 10 unit

$$\text{Efficiency of C} = \frac{10 \text{ unit}}{10 \text{ days}} = 1 \text{ unit}$$

Efficiency of (A+B+C) =  $5 + 4 + 1 = 10$  unit/days

Number of days taken by A, B and C together to complete the same work =  $\frac{100 \text{ days}}{10 \text{ unit}} = 10 \text{ days}$

**Q14 Text Solution:**

Let work done by B in 1 day be 2 units.

So, work done by A in 1 day =  $\frac{2}{2} = 1 \text{ unit}$

Work done by C in 1 day =  $\frac{2+1}{2} = 1.5 \text{ units}$

Total work done by c alone in 20 days

$$= 20 \times 1.5 = 30 \text{ unit}$$

Time taken by all of them to complete the work together

$$= \frac{30}{2+1+1.5} = \frac{30}{4.5} = \frac{20}{3} \text{ days}$$

**Q15 Text Solution:**

Speed of boat in still water = 45 km/h

Speed of stream = 15 km/h

Upstream speed km/h

$$= (45 - 15) = 30 \text{ km/h}$$

Downstream speed km/h

$$= (45 + 15) = 60 \text{ km/h}$$

According to the question,

The time taken to cover the upstream distance is 9 hours more than the downstream

$$\Rightarrow \frac{d}{30} - \frac{d}{60} = 9$$

$$\Rightarrow \frac{2d-d}{60} = 9$$

$$\Rightarrow d = 540 \text{ km}$$

**Q16 Text Solution:**

To find the average speed for the entire journey, you need to use the formula for average speed when the speeds for the two parts of the journey are different.

The formula for average speed when traveling a distance  $d$  at speed  $v_1$  for one part of the trip and at speed  $v_2$  for the return part is:

$$\text{Average Speed} = \frac{2 \cdot v_1 \cdot v_2}{v_1 + v_2}$$

In this case:

$$- v_1 = 15 \text{ km/h}$$



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$$-v_2 = 10 \text{ km/h}$$

Plugging in these values:

$$\begin{aligned} \text{Average Speed} &= \frac{2 \cdot 15 \cdot 10}{15 + 10} = \frac{300}{25} \\ &= 12 \text{ km/h} \end{aligned}$$

So, the average speed for the entire journey is 12 km/h.

**Q17 Text Solution:**

$$25^2 = 15^2 + x^2$$

$$625 - 225 = x^2$$

$$400 = x^2$$

$$x = 20$$

$$\text{perimeter} = 2(l + b) \cdot 2$$

$$= 2 \times (15 + 20)$$

$$= 2 \times 35$$

$$= 70$$

**Q18 Text Solution:**

Let the numbers be a, b and c then

$$a : b = 2 : 3$$

$$\text{And } b : c = 4 : 5$$

$$\text{Then } a : b : c = 8 : 12 : 15$$

$$\text{Total } 8 + 12 + 15 = 35 \text{ units} = 140$$

$$\text{Hence } 1 \text{ unit} = 140/35 = 4$$

$$\text{Hence the second number } b \text{ is } 12 \times 4 = 48$$

**Q19 Text Solution:**

Given,

$$\text{Perimeter of rectangle} = 40 \text{ cm}$$

Let, the length and breadth of the rectangle be  $4x$  and  $x$ .

$$2(x + 4x) = 40$$

$$5x = 20$$

$$x = 4 \text{ cm}$$

So,

$$\text{breadth} = 4 \text{ cm}$$

$$\text{length} = 4x = 16 \text{ cm}$$

Let, the side of the square be a.

$$\text{Area of square} = \text{Area of the rectangle}$$

$$a^2 = 4 \times 16$$

$$a = \sqrt{4 \times 16}$$

$$a = 8 \text{ cm}$$

Perimeter of square

$$= 4 \times 8$$

$$= 32 \text{ cm}$$

Hence, Option B is the correct answer.

**Q20 Text Solution:**

$$36 \div 8 \times 4 + 2 \div 4 - 1 + 5 \text{ of } 3 \div (4 \times 2 - 3) - 3$$

Using BODMAS,

$$\Rightarrow 36 \div 8 \times 4 + 2 \div 4 - 1 + 5 \text{ of } 3 \div (5) - 3$$

$$\Rightarrow 36 \div 8 \times 4 + 2 \div 4 - 1 + 15 \div 5 - 3$$

$$\Rightarrow 36 \div 8 \times 4 + 2 \div 4 - 1 + 3 - 3$$

$$\Rightarrow \frac{36}{8} \times 4 + \frac{2}{4} - 1 + 3 - 3$$

$$\Rightarrow 18 + \frac{1}{2} - 1 + 3 - 3$$

$$\Rightarrow \frac{35}{2}$$







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