CAT 2019 Question Paper Slot 2

Quantitative Aptitude

67. The average of 30 integers is 5. Among these 30 integers, there are exactly 20 which do not exceed 5. What is the highest possible value of the average of these 20 integers?

A 3.5

B 5

C 4.5

D 4

68. Amal invests Rs 12000 at 8% interest, compounded annually, and Rs 10000 at 6% interest, compounded semi-annually, both investments being for one year. Bimal invests his money at 7.5% simple interest for one year. If Amal and Bimal get the same amount of interest, then the amount, in Rupees, invested by Bimal is

69. What is the largest positive integer n such that $\frac{n^2+7n+12}{n^2-n-12}$ is also a positive integer?

A 6

B 16

C 8

D 12

70. How many pairs (m, n) of positive integers satisfy the equation $m^2 + 105 = n^2$?

71. Two ants A and B start from a point P on a circle at the same time, with A moving clock-wise and B moving anti-clockwise. They meet for the first time at 10:00 am when A has covered 60% of the track. If A returns to P at 10:12 am, then B returns to P at

A 10:25 am

B 10:45 am

C 10:18 am

D 10:27 am

72. Let $a_1, a_2, ...$ be integers such that
$a_1 - a_2 + a_3 - a_4 + ... + (-1)^{n-1}a_n = n$, for all $n \geq 1$.
Then $a_{51} + a_{52} + ... + a_{1023}$ equals

A 0

B 1

C 10

D -1

73. Two circles, each of radius 4 cm, touch externally. Each of these two circles is touched externally by a third circle. If these three circles have a common tangent, then the radius of the third circle, in cm, is

A $\frac{1}{\sqrt{2}}$

B $\frac{\pi}{3}$

C $\sqrt{2}$

D 1

74. Let A be a real number. Then the roots of the equation $x^2 - 4x - log_2 A = 0$ are real and distinct if and only if

A $A > \frac{1}{16}$

B $A < \frac{1}{16}$

C $A < \frac{1}{8}$

D $A > \frac{1}{8}$

75. The quadratic equation $x^2 + bx + c = 0$ has two roots 4a and 3a, where a is an integer. Which of the following is a possible value of $b^2 + c$?

A 3721

B 361

C 427

D 549

76. The base of a regular pyramid is a square and each of the other four sides is an equilateral triangle, length of each side being 20 cm. The vertical height of the pyramid, in cm, is

A 12

B $10\sqrt{2}$

C $8\sqrt{3}$

D $5\sqrt{5}$

77. Let ABC be a right-angled triangle with hypotenuse BC of length 20 cm. If AP is perpendicular on BC, then the maximum possible length of AP, in cm, is

A 10

B 5

C $8\sqrt{2}$

D $6\sqrt{2}$

78. If x is a real number, then $\sqrt{\log_e \frac{4x-x^2}{3}}$ is a real number if and only if

A $1 \leq x \leq 3$

B $1 \leq x \leq 2$

C $-1 \leq x \leq 3$

D $-3 \leq x \leq 3$

79. If $5^x - 3^y = 13438$ and $5^{x-1} + 3^{y+1} = 9686$, then x + y equals

80. The strength of a salt solution is p% if 100 ml of the solution contains p grams of salt. Each of three vessels A, B, C contains 500 ml of salt solution of strengths 10%, 22%, and 32%, respectively. Now, 100 ml of the solution in vessel A is transferred to vessel B. Then, 100 ml of the solution in vessel B is transferred to vessel C. Finally, 100 ml of the solution in vessel C is transferred to vessel A. The strength, in percentage, of the resulting solution in vessel A is

A 15

B 13

C 12

D 14

81. A cyclist leaves A at 10 am and reaches B at 11 am. Starting from 10:01 am, every minute a motorcycle leaves A and moves towards B. Fortyfive such motorcycles reach B by 11 am. All motorcycles have the same speed. If the cyclist had doubled his speed, how many motorcycles would have reached B by the time the cyclist reached B?

A 22

B 23

C 15

D 20

82. A man makes complete use of 405 cc of iron, 783 cc of aluminium, and 351 cc of copper to make a number of solid right circular cylinders of each type of metal. These cylinders have the same volume and each of these has radius 3 cm. If the total number of cylinders is to be kept at a minimum, then the total surface area of all these cylinders, in sq cm, is

A $1026(1+\pi)$

B 8464π

C 928π

D $1044(4+\pi)$

83. The real root of the equation $2^{6x} + 2^{3x+2} - 21 = 0$ is

A $\log_2 9$

B $\frac{\log_2 3}{3}$

C $\log_2 27$

D $\frac{\log_2 7}{3}$

84. How many factors of $2^4 \times 3^5 \times 10^4$ are perfect squares which are greater than 1?

85. In a six-digit number, the sixth, that is, the rightmost, digit is the sum of the first three digits, the fifth digit is the sum of first two digits, the third digit is equal to the first digit, the second digit is twice the first digit and the fourth digit is the sum of fifth and sixth digits. Then, the largest possible value of the fourth digit is

86. John jogs on track A at 6 kmph and Mary jogs on track B at 7.5 kmph. The total length of tracks A and B is 325 metres. While John makes 9 rounds of track A, Mary makes 5 rounds of track B. In how many seconds will Mary make one round of track A?

87. In 2010, a library contained a total of 11500 books in two categories fiction and nonfiction. In 2015, the library contained a total of 12760 books in these two categories. During this period, there was 10% increase in the fiction category while there was 12% increase in the non-fiction category. How many fiction books were in the library in 2015?

A 6160

B 6600

C 6000

D 5500

88. John gets Rs 57 per hour of regular work and Rs 114 per hour of overtime work. He works altogether 172 hours and his income from overtime hours is 15% of his income from regular hours. Then, for how many hours did he work overtime?

89. If $(2n+1)+(2n+3)+(2n+5)+...+(2n+47)=5280$, then whatis the value of $1+2+3+ .. + n$?

90. A shopkeeper sells two tables, each procured at cost price p, to Amal and Asim at a profit of 20% and at a loss of 20%, respectively. Amal sells his table to Bimal at a profit of 30%, while Asim sells his table to Barun at a loss of 30%. If the amounts paid by Bimal and Barun are x and y, respectively, then (x − y) / p equals

A 1

B 1.2

C 0.50

D 0.7

91. In a triangle ABC, medians AD and BE are perpendicular to each other, and have lengths 12 cm and 9 cm, respectively. Then, the area of triangle ABC, in sq cm, is

A 78

B 80

C 72

D 68

92. The number of common terms in the two sequences: 15, 19, 23, 27, ... , 415 and 14, 19, 24, 29, . . . , 464 is

A 21

B 20

C 18

D 19

93. Let a, b, x, y be real numbers such that $a^2 + b^2 = 25, x^2 + y^2 = 169$, and $ax + by = 65$. If $k = ay - bx$, then

A $0 < k \leq \frac{5}{13}$

B $k > \frac{5}{13}$

C $k = \frac{5}{13}$

D k = 0

94. Mukesh purchased 10 bicycles in 2017, all at the same price. He sold six of these at a profit of 25% and the remaining four at a loss of 25%. If he made a total profit of Rs. 2000, then his purchase price of a bicycle, in Rupees, was

A 6000

B 8000

C 4000

D 2000

95. In an examination, the score of A was 10% less than that of B, the score of B was 25% more than that of C, and the score of C was 20% less than that of D. If A scored 72, then the score of D was

96. The salaries of Ramesh, Ganesh and Rajesh were in the ratio 6:5:7 in 2010, and in the ratio 3:4:3 in 2015. If Ramesh's salary increased by 25% during 2010-2015, then the percentage increase in Rajesh's salary during this period is closest to

A 10

B 7

C 9

D 8

97. Let A and B be two regular polygons having a and b sides, respectively. If b = 2a and each interior angle of B is $\frac{3}{2}$ times each interior angle of A, then each interior angle, in degrees, of a regular polygon with a + b sides is

98. Let f be a function such that f (mn) = f (m) f (n) for every positive integers m and n. If f (1), f (2) and f (3) are positive integers, f (1) < f (2), and f (24) = 54, then f (18) equals

99. Anil alone can do a job in 20 days while Sunil alone can do it in 40 days. Anil starts the job, and after 3 days, Sunil joins him. Again, after a few more days, Bimal joins them and they together finish the job. If Bimal has done 10% of the job, then in how many days was the job done?

A 12

B 13

C 15

D 14

100. In an examination, Rama's score was one-twelfth of the sum of the scores of Mohan and Anjali. After a review, the score of each of them increased by 6. The revised scores of Anjali, Mohan, and Rama were in the ratio 11:10:3. Then Anjali's score exceeded Rama's score by

A 26

B 32

C 35

D 24

Answers

Quantitative Aptitude

67.**C**	68.**20920**	69.**D**	70.**4**	71.**D**	72.**B**	73.**D**	74.**A**
75.**D**	76.**B**	77.**A**	78.**A**	79.**13**	80.**D**	81.**C**	82.**A**
83.**B**	84.**44**	85.**7**	86.**48**	87.**B**	88.**12**	89.**4851**	90.**A**
91.**C**	92.**B**	93.**D**	94.**C**	95.**80**	96.**B**	97.**150**	98.**12**
99.**B**	100.**B**						

Explanations

Quantitative Aptitude

67.**C**

It is given that the average of the 30 integers = 5

Sum of the 30 integers = 30*5=150

There are exactly 20 integers whose value is less than 5.

To maximise the average of the 20 integers, we have to assign minimum value to each of the remaining 10 integers

So the sum of 10 integers = 10*6=60

The sum of the 20 integers = 150-60= 90

Average of 20 integers = $\frac{90}{20}$ = 4.5

68.**20920**

The amount with Amal at the end of 1 year = 12000*1.08+10000*1.03*1.03=23569

Interest received by Amal = 23569-22000=1569

Let the amount invested by Bimal = 100b

Interest received by Bimal = 100b*7.5*1/100=7.5b

It is given that the amount of interest received by both of them is the same

7.5b=1569

b=209.2

Amount invested by Bimal = 100b = 20920

69.**D**

$\frac{n^2+3n+4n+12}{n^2-4n+3n-12}$

= $\frac{n(n+3)+4(n+3)}{n(n-4)+3(n-4)}$

= $\frac{(n+4)(n+3)}{(n-4)(n+3)}$

= $\frac{(n+4)}{(n-4)}$

= $\frac{(n-4)+8}{(n-4)}$

= $1+\frac{8}{(n-4)}$ which will be maximum when n-4 =8

n=12

D is the correct answer.

70.**4**

$n^2-m^2=105$

(n-m)(n+m) = 1*105, 3*35, 5*21, 7*15, 15*7, 21*5, 35*3, 105*1.

n-m=1, n+m=105 ==> n=53, m=52

n-m=3, n+m=35 ==> n=19, m=16

n-m=5, n+m=21 ==> n=13, m=8

n-m=7, n+m=15 ==> n=11, m=4

n-m=15, n+m=7 ==> n=11, m=-4

n-m=21, n+m=5 ==> n=13, m=-8

n-m=35, n+m=3 ==> n=19, m=-16

n-m=105, n+m=1 ==> n=53, m=-52

Since only positive integer values of m and n are required. There are 4 possible solutions.

71.**D**

When A and B met for thefirst time at 10:00 AM, A covered 60% of the track.

So B must have covered 40% of the track.

It is given that A returns to P at 10:12 AM i.e A covers 40% of the track in 12 minutes

60% of the track in 18 minutes

B covers 40% of track when A covers 60% of the track.

B covers 40% of the track in 18 minutes.

B will cover the rest 60% in 27 minutes, hence it will return to B at 10:27 AM

72.**B**

$a_1 - a_2 + a_3 - a_4 + ... + (-1)^{n-1}a_n = n$

It is clear from the above equation that when n is odd, the co-efficient of a is positive otherwise negative.

$a_1 - a_2 = 2$

$a_1 = a_2 + 2$

$a_1 - a_2 + a_3 = 3$

On substituting the value ofa_1 in the above equation, we get

a_3 = 1

$a_1 - a_2 + a_3 - a_4 = 4$

On substituting the values ofa_1, a_3 in the above equation, we get

a_4 = -1

$a_1 - a_2 + a_3 - a_4 + a_5 = 5$

On substituting the values ofa_1, a_3, a_4 in the above equation, we get

a_5 = 1

So we can conclude that$a_3, a_5, a_7....a_{n+1}$ = 1 and $a_2, a_4, a_6....a_{2n}$ = -1

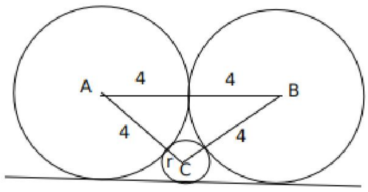
Now we have tofind the value of$a_{51} + a_{52} + ... + a_{1023}$

Number of terms = 1023=51+(n-1)1

n=973

There will be 486 even and 487 odd terms, so the value of$a_{51} + a_{52} + ... + a_{1023}$ = 486*-1+487*1=1

73. **D**



Let 'h' be the height of the triangle ABC, semiperimeter(S)= $\frac{4+4+r+4+4+r}{2} = 8 + r$,
$a = 4 + r, b = 4 + r, c = 8$

Area of triangle ABC= $\sqrt{s \cdot (s-a)(s-b)(s-c)} =$
$= \sqrt{(8+r) \times 4 \times 4 \times r}$ = $\frac{1}{2} \times (4+4) \times height$

Height (h) = $\sqrt{(8+r)r}$

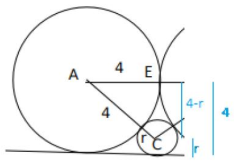
Now, $h + r = 4 \longrightarrow \sqrt{(8+r)r} + r = 4$ (Considering the height of the triangle)

$\sqrt{(8+r)r}$=4-r

16r=16

r=1

Alternatively,



$$\text{AE}^{@} + \text{EC}^2 = \text{AC}^2 \longrightarrow 4^2 + (4-r)^2 = (4+r)^2 \longrightarrow \longrightarrow \longrightarrow r = 1$$

74. **A**
The roots of $x^2 - 4x - log_2 A = 0$ will be real and distinct if and only if the discriminant is greater than zero

16+4*$log_2 A$ > 0

$log_2 A$ > -4

A> 1/16

75. **D**
Given,

The quadratic equation $x^2 + bx + c = 0$ has two roots 4a and 3a

7a=-b

$12a^2$ = c

We have to find the value of $b^2 + c$ = 49a^2+ 12a^2=61a^2

Now lets verify the options

61a^2 = 3721 ==> a= 7.8 which is not an integer

61a^2 = 361 ==> a= 2.42 which is not an integer

61a^2 = 427 ==> a= 2.64 which is not an integer

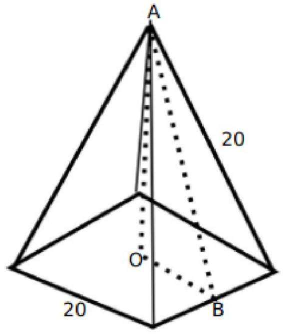
61a^2 = 549 ==> a= 3 which is an integer

76.**B**

It is given that the base of the pyramid is square and each of the four sides are equilateral triangles.

Length of each side of the equilateral triangle = 20cm

Since the side of the triangle will be common to the square as well, the side of the square = 20cm



Let h be the vertical height of the pyramid ie OA

OB = 10 since it is half the side of the square

AB is the height of the equilateral triangle i.e $10\sqrt{3}$

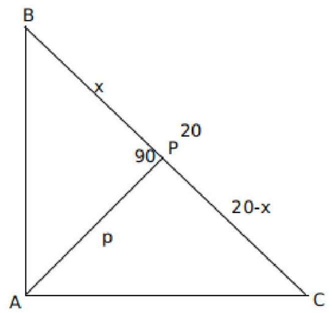
AOB is a right angle, so applying the Pythagorean formula, we get

$OA^2 + OB^2 = AB^2$

h^2 + 100= 300

h=$10\sqrt{2}$

77.**A**



Let p be the length of AP.

It is given that $\angle BAC = 90$ and $\angle APC = 90$

Let $\angle ABC = \theta$, then $\angle BAP = 90 - \theta$ and $\angle BCA = 90 - \theta$

So $\angle PAC = \theta$

Triangles BPA and APC are similar

$p^2 = x\,(20 - x)$

We have to maximize the value of p, which will be maximum when x=20-x

x=10

78. **A**

$\sqrt{\log_e \frac{4x-x^2}{3}}$ will be real if $\log_e \frac{4x-x^2}{3} \geq 0$

$\frac{4x-x^2}{3} >= 1$

$4x - x^2 - 3 >= 0$

$x^2 - 4x + 3 =< 0$

1=< x=< 3

79. **13**

$5^x - 3^y = 13438$ and $5^{x-1} + 3^{y+1} = 9686$

$5^x + 3^y * 15 = 9686 * 5$

$5^x + 3^y * 15 = 48430$

16*3^y=34992

3^y = 2187

y = 7

5^x=13438+2187=15625

x=6

x+y = 13

80. **D**

Each of three vessels A, B, C contains 500 ml of salt solution of strengths 10%, 22%, and 32%, respectively.

The amount of salt in vessels A, B, C = 50 ml, 110 ml, 160 ml respectively.

The amount of water in vessels A, B, C = 450 ml, 390 ml, 340 ml respectively.

In 100 ml solution in vessel A, there will be 10ml of salt and 90 ml of water

Now, 100 ml of the solution in vessel A is transferred to vessel B. Then, 100 ml of the solution in vessel B is transferred to vessel C. Finally, 100 ml of the solution in vessel C is transferred to vessel A

i.e after the first transfer, the amount of salt in vessels A, B, C = 40, 120, 160 ml respectively.

after the second transfer, the amount of salt in vessels A, B, C =40, 100, 180 ml respectively.

After the third transfer, the amount of salt in vessels A, B, C = 70, 100, 150 respectively.

Each transfer can be captured through the following table.

Salt solution		Initial Conc.(ml)	After 1st transfer	After 2nd transfer	After 3rd transfer
A	Total Conc.	500	400	400	500
	Salt Conc.	50	40	40	70
	Water	450	360	360	430
B	Total Conc.	500	600	500	500
	Salt Conc.	110	120	100	100
	Water	390	480	400	400
C	Total Conc.	500	500	600	500
	Salt Conc.	160	160	180	150
	Water	340	340	420	350

Percentage of salt in vessel A =$\frac{70}{500} \times 100$

=14%

81.**C**
It is given that starting from 10:01 am, every minute a motorcycle leaves A and moves towards B.

Forty-five such motorcycles reach B by 11 am.

It means that the fortyfifth motorcycle starts at 10:45 AM at A and reaches B by 11:00 AM i.e 15 minutes.

Since the speed of all the motorcycles is the same, all the motorcycles will take the same duration i.e 15 minutes.
If the cyclist doubles the speed, then he will reach B by 10:30 AM. (Since if the speed is doubled, time is reduced by half)

Since each motorcycle takes 15 minutes to reach B, 15 motorcycles would have reached B by the time the cyclist reaches B

82.**A**
It is given that the volume of all the cylinders is the same, so the volume of each cylinder = HCF of (405, 783, 351)

=27

The number of iron cylinders = $\frac{405}{27}$ = 15

The number of aluminium cylinders = $\frac{783}{27}$ = 29

The number of copper cylinders = $\frac{351}{27}$ = 13

15*$\pi\ r^2h =$ 405

15*$\pi\ 9 * h =$ 405

$\pi\ h = 3$

Now we have to calculate the total surface area of all the cylinders

Total number of cylinders = 15+29+13 = 57

Total surface area of the cylinder = 57*($2\pi\ rh + 2\pi\ r^2$)

=57(2*3*3 + 2*9*π)

=$1026(1 + \pi)$

83.**B**
Let 2^{3x} = v

$2^{6x} + 2^{3x+2} - 21 = 0$

= $v^2 + 4v - 21 = 0$

=(v+7)(v-3)=0

v=3, -7

2^{3x} = 3 or 2^{3x} = -7(This can be negated)

3x=$\log_2 3$

x=$\log_2 3/3$

84.**44**

$2^4 \times 3^5 \times 10^4$

=$2^4 \times 3^5 \times 2^4 * 5^4$

=$2^8 \times 3^5 \times 5^4$

For the factor to be a perfect square, the factor should be even power of the number.

In 2^8, the factors which are perfect squares are $2^0, 2^2, 2^4, 2^6, 2^8$ = 5

Similarly, in 3^5, the factors which are perfect squares are $3^0, 3^2, 3^4$ = 3

In 5^4, the factors which are perfect squares are $5^0, 5^2, 5^4$ = 3

Number of perfect squares greater than 1 = 5*3*3-1

=44

85.**7**

Let the six-digit number be ABCDEF

F = A+B+C, E= A+B, C=A, B= 2A, D= E+F.

Therefore D = 2A+2B+C = 2A + 4A + A= 7A.

A cannot be 0 as the number is a 6 digit number.

A cannot be 2 as D would become 2 digit number.

Therefore A is 1 and D is 7.

86.**48**

Speed of John = 6kmph

Speed of Mary = 7.5 kmph

Lengths of tracks A and B = 325 m

Let the length of track A be a, then the length of track B = 325-a

9 rounds of John on track A = 5 rounds of Mary on track B

$\frac{9\times a}{6\times \frac{5}{18}} = \frac{5\cdot(325-a)}{7.5\times \frac{5}{18}}$

On solving we get , 13a=1300

a=100

The length of track A = 100m, track B = 225m

Mary makes one round of track A = $\frac{100}{7.5\times \frac{5}{18}}$

= 48 sec

87.**B**

Let the number offiction and non-fiction books in 2010 = 100a, 100b respectively

It is given that the total number of books in 2010 = 11500

100a+100b = 11500 -------Eq 1

The number offiction and non-fiction books in 2015 = 110a, 112b respectively

110a+112b = 12760 -------Eq 2

On solving both the equations we get, b=55, a= 60

The number offiction books in 2015 = 110*60=6600

88.**12**

It is given that John works altogether 172 hours i.e including regular and overtime hours.

Let a be the regular hours, 172-a will be the overtime hours

John's income from regular hours = 57*a

John's income for working overtime hours = (172-a)*114

It is given that his income from overtime hours is 15% of his income from regular hours

a*57*0.15 = (172-a)*114

a=160

The number of hours for which he worked overtime = 172-160=12 hrs

89.**4851**

Let us first find the number of terms

47=1+(n-1)2

n=24

24*2n+1+3+5+....47=5280

48n+576=5280

48n=4704

n=98

Sum of first 98 terms = 98*99/2

=4851

90.**A**

CP of the table at which the shopkeeper procured each table = p

It is given that shopkeeper sold the tables to Amal and Asim at a profit of 20% and at a loss of 20%, respectively

The selling price of the tables = 1.2p and 0.8p to Amal and Asim respectively.

Amal sells his table to Bimal at a profit of 30%

So, CP of the table by Bimal (x)= 1.2p*1.3 = 1.56p

Asim sells his table to Barun at a loss of 30%

So, CP of the table by Barun (y)= 0.7*0.8p = 0.56p

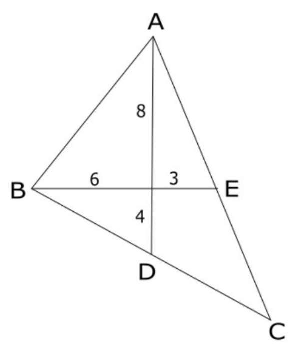
(x-y)/p = (1.56p-0.56p)/p = p/p=1

91.**C**

It is given that AD and BE are medians which are perpendicular to each other.

The lengths of AD and BE are 12cm and 9cm respectively.

It is known that the centroid G divides the median in the ratio of 2:1



Area of △ ABC = 2* Area of the triangle ABD

Area of △ ABD = Area of △ AGB + Area of △ BGD

Since $\angle AGB = \angle BGD = 90$ (Given)

Area of △ AGB = $\frac{1}{2} \times 8 \times 6$ = 24

Area of △ BGD = $\frac{1}{2} \times 6 \times 4$ = 12

Area of △ ABD = 24+12=36

Area of △ $ABC = 2 \times 36 = 72$

92. **B**

A: 15, 19, 23, 27, ... , 415

B: 14, 19, 24, 29, . . . , 464

Here the first common term = 19

Common difference = LCM of 5, 4=20

19+(n-1)20 $\leq$ 415

(n-1)20 $\leq$ 396

(n-1) $\leq$ 19.8

n=20

93. **D**

$(ax + by)^2 = 65^2$

$a^2x^2 + b^2y^2 + 2abxy = 65^2$

$k = ay - bx$

$k^2 = a^2y^2 + b^2x^2 - 2abxy$

$(a^2 + b^2)(x^2 + y^2) = 25 * 169$

$a^2x^2 + a^2y^2 + b^2x^2 + b^2y^2 = 25 \times 169$

$k^2 = 65^2 - (25 \times 169)$

k = 0

D is the correct answer.

94. **C**

Let the cost of each bicycle= 100b

CP of 10 bicycles = 1000b

It is given that he sold six of these at a profit of 25% and the remaining four at a loss of 25%

SP of 10 bicycles = 125b*6+75b*4

=1050b

Profit = 1050b-1000b =50b

50b=2000

CP = 100b = 4000

95. **80**

Let the score of D = 100d

The score of C = 20% less than that of D = 80d

The score of B = 25% more than C = 100d

The score of A = 10% less than B =90d

90d=72

100d= 72*100/90

= 80

96. **B**

Let the salaries of Ramesh, Ganesh and Rajesh in 2010 be 6x, 5x, 7x respectively

Let the salaries of Ramesh, Ganesh and Rajesh in 2015 be 3y, 4y, 3y respectively

It is given that Ramesh's salary increased by 25% during 2010-2015,3y = 1.25*6x

y=2.5x

Percentage increase in Rajesh's salary = 7.5-7/7=0.07

=7%

97. **150**

Each interior angle in an n-sided polygon =$\frac{(n-2)180}{n}$

It is given that each interior angle of B is$\frac{3}{2}$ times each interior angle of A and b = 2a

$\frac{(b-2)180}{b}$ = $\frac{3}{2}\times$ $\frac{(a-2)180}{a}$

$$2\times\ (b-2)\times\ a\ =\ 3\times\ (a-2)\times\ b$$

2(ab-2a) = 3(ab-2b)

ab-6b+4a=0

a*2a-12a+4a=0

$$2a^2-8a=0$$

a(2a-8) = 0

a cannot be zero so 2a=8

a=4, b = 4*2=8

a+b = 12

Each interior angle of a regular polygon with 12 sides =$\frac{(12-2)\times\ 180}{12}$

=150

98. **12**

Given, f(mn) = f(m)f(n)

when m= n= 1, f(1) = f(1)*f(1) ==> f(1) = 1

when m=1, n= 2, f(2) = f(1)*f(2) ==> f(1) = 1

when m=n= 2, f(4) = f(2)*f(2) ==> f(4) =$[f(2)]^2$

Similarly f(8) = f(4)*f(2) =$[f(2)]^3$

f(24) = 54

$[f(2)]^3$ * $[f(3)]$ = $3^3 * 2$

On comparing LHS and RHS, we get

f(2) = 3 and f(3) = 2

Now we have tofind the value of f(18)

f(18) = $[f(2)]$ * $[f(3)]^2$

= 3*4=12

99.**B**

Let the total work be LCM of 20, 40 = 40 units

Efficiency of Anil and Sunil is 2 units and 1 unit per day respectively.

Anil works alone for 3 days, so Anil must have completed 6 units.

Bimal completes 10% of the work while working along with Anil and Sunil.

Bimal must have completed 4 units.

The remaining 30 units of work is done by Anil and Sunil

Number of days taken by them 30/3=10

The total work is completed in 3+10=13 days

100.**B**

Let the scores of Rama, Anjali and Mohan be r, a, m.

It is given that Rama's score was one-twelfth of the sum of the scores of Mohan and Anjali

r= $\frac{m+a}{12}$ ———-(1)

The scores of Rama, Anjali and Mohan after review = r+6, a+6, m+6

a+6:m+6:r+6 = 11:10:3

Let a+6 = 11x => a= 11x-6

m+6=10x => m=10x-6

r+ 6 =3x => r = 3x-6

Substituting these values in equation (1), we get

3x-6= $\frac{21x-12}{12}$

12(3x-6) = 21x-12

x=4

Anjali's score exceeds Rama's score by (a-r)=8x=32