PU M Sc 5 Year Int Prog Mathematics, Computer Science and Statistics

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128 PU_2015_384
If f(x) = ax + b and g(x) = cx + d then f(g(x)) = g(f(x)) if and only if:-

- f(d) = g(b)
- f(b) = g(b)
- f(a) =g(c)
- f(c) = g(a)

2 of 100
161 PU_2015_384
The difference between the greatest and least values of the function

$$f(x+y) = \cos x + \frac{1}{2}\cos 2x - \frac{1}{3}\cos 3x \text{ is:-}$$

- 3/8
- 8/7
- 2/3
- 9/4

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201 PU_2015_384
If A and B are skew symmetric matrices then:-

- AB is skew symmetric
- AB is equal to BA
- AB is equal (BA)', the transpose of BA
- AB is symmetric

4 of 100
112 PU_2015_384

Let $f(x) = \begin{cases} x^2 + 1 & \text{if } x \geq 0 \\ A\sin x + B\cos x & \text{if } x < 0 \end{cases}$. For what values of A and B, f is differentiable at x=0.

- 1, 1
- 0,-1
- 0,1
- 0,any real number

5 of 100
173 PU_2015_384
If arg(z) < 0, then arg (-z) – arg (z) is

- $\frac{\pi}{2}$
- π
- $-\pi$
- $-\frac{\pi}{2}$

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120 PU_2015_384

The system of homogeneous equations:

$$(a-1)x+(a+2)y+az=0$$
$$(a+1)x+ay+(a+2)z=0$$
$$ax+(a+1)y+(a-1)z=0$$

has a non-trivial solution if a equals

- -1
- 1/2
- -1/2
- 2

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124 PU_2015_384

Let R be a relation on the set of positive numbers defined as : x related y if 2x +y = 35. Then R is:-

- Symmetric
- Transitive
- Reflexive
- none of these

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134 PU_2015_384

In how many ways is it possible to make 7 persons A, B, C, D, E, F, G sit at a round table if C, D, G insist on sitting together?

- 3!4!
- $\frac{7!}{4!}$
- 3!5!
- $\frac{7!}{3!}$

9 of 100

225 PU_2015_384

Let A and B be sets such that $|A| = m$ and $|B| = n$. The set of all functions from A to B is denoted by B^A. Then $|B^A| =$

- mn
- m^n
- n^m
- m+n

10 of 100

171 PU_2015_384

The complex number z is such that $|z| = 1, |z| \neq 1$ and $w = \frac{z-1}{z+1}$, then real part of w is:-

- 0
- $\frac{\sqrt{2}}{|z+1|^2}$
- $\frac{-1}{|z+1|^2}$
- $\frac{1}{|z+1|^2}$

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194 PU_2015_384

The radius of the circle in which the sphere $x^2+y^2+z^2+2x-2y-4z-19=0$ is cut by the plane x+2y+2z+7=0 is:-

- 1
- 4
- 2
- 3

12 of 100

195 PU_2015_384

The number of bijections from a set containing 20 elements to itself is:-

- 20^2
- 20
- 20!
- 2^{20}

13 of 100

118 PU_2015_384

The solution of the equation $\frac{d^3y}{dx^3} - 3\frac{d^2y}{dx^2} + 3\frac{dy}{dx} - y = 0$ is $y = ?$

- $e^x(c_1x^2 + x(c_2 + c_3))$
- $e^x(c_1x^2 + c_2)$
- $e^x(c_1x^2 + c_2x + c_3)$
- $e^{2x}(c_1x^2 + c_2x + c_3)$

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223 PU_2015_384

Which of the following is correct?

- $(a * b)^{-1} = a^{-1} * b^{-1}$ for all a, b in a group G
- If every element of a group is its own inverse, then the group is abelian
- An element of a group can more than one inverse
- The set of all 2x2 real matrix forms a group under matrix multiplication

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140 PU_2015_384

The equation of the line tangent to the curve $y=x^3+1$ at the point (1,2) is:-

- y = 2x
- y = 3x + 1
- y = x + 1
- y = 3x - 1

16 of 100

133 PU_2015_384

A line makes an angle of 60° with each of x and y axis, the angle which it makes with z axis is

- 90°
- 30°
- 45°
- 60°

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145 PU_2015_384

The distance of that point on $y=x^4+3x^2+2x$ which is nearest to the line y=2x-1 is:-

- $\frac{3}{\sqrt{5}}$

- $\frac{2}{\sqrt{5}}$
- $\frac{1}{\sqrt{5}}$
- $\frac{4}{\sqrt{5}}$

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179 PU_2015_384

If the polar equation of a curve is $r = 1 - 2\sin\theta, \textit{for } 0 \le \theta \le 2\pi$. Find the Cartesian coordinate corresponding to $\theta = \frac{3\pi}{2}$.

- (0,-3)
- (1,3)
- (0,3)
- (1,-3)

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116 PU_2015_384

On straight road XY, 100 meters long, five heavy stones are placed two meters apart beginning at the end X. A worker, starting at X, has to transport all the stones to Y, by carrying only one stone at a time. The minimum distance he has to travel (in meters) is:-

- 744
- 422
- 472
- 860

20 of 100

143 PU_2015_384

The image of the interval $[-1,1]$ under the map $f(x) = \frac{|x+1|}{2} + 1$ is:-

- [1,2]
- [0,1]
- [-1,1]
- [1,3]

21 of 100

246 PU_2015_384

If $\Delta_1 = \begin{vmatrix} x & b & b \\ a & x & b \\ a & a & x \end{vmatrix}$ and $\Delta_2 = \begin{vmatrix} x & b \\ a & x \end{vmatrix}$, then:-

- $\frac{d}{dx}(\Delta_1) = 3\Delta_2{}^2$
- $\Delta_1 = 3(\Delta_2)^2$
- $\Delta_1 = 3(\Delta_2)^{3/2}$
- $\frac{d}{dx}(\Delta_1) = 3\Delta_2$

22 of 100

163 PU_2015_384

Adjacent sides of a parallelogram are 36cm and 27 cm in length. FI the perpendicular distance between the shorter side is 12 cm which is the distance between the longer side?

- 16
- 9
- 12
- 18

23 of 100

191 PU_2015_384

If (l_1, m_1, n_1) and (l_2, m_2, n_2) represent the direction cosines of two lines which are perpendicular then:-

- $l_1 l_2 + m_1 m_2 + n_1 n_2 = 0$
- $\frac{l_1}{l_2} = \frac{m_1}{m_2} = \frac{n_1}{n_2}$
- $l_1 l_2 + m_1 m_2 + n_1 n_2 = 1$
- $(l_1 + m_1 + n_1)(l_1 + m_1 + n_1) = 0$

24 of 100

237 PU_2015_384

$\int_{-2}^{2} |1 - x| dx =$

- 3

- 0
- 2
- 5

25 of 100

136 PU_2015_384

The ratio in which the plane 2x-1=0 divides the line joining (-2,4,7) and (3,-5,8) is:-

- 4:5
- 7:8
- 2:3
- 1:1

26 of 100

200 PU_2015_384

If A is an orthogonal matrix and if the transpose of A is denoted as A' then AA'A equals to:-

- I, identity matrix
- 0 matrix
- A'
- A

27 of 100

184 PU_2015_384

If r = 5 z then 15 z = 3 y, then r =

- 5 y
- 2 y
- y
- 10

28 of 100

207 PU_2015_384

Let $f(x) = \frac{\sqrt{\tan x}}{\sin x \cos x}$ and F(x) is its antiderivative. If F(π/4)=6, then F(x) is equal to:-

- $2\left(\sqrt{\tan x}+1\right)$
- $2\left(\sqrt{\tan x}+3\right)$
- $2\left(\sqrt{\tan x}+4\right)$
- $2\left(\sqrt{\tan x}+2\right)$

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242 PU_2015_384

For what value of α, $81^{sin^2\alpha} + 81^{cos^2\alpha} = 30°$?

- (a) $n\pi \pm (-1)^n \frac{\pi}{3}$
- (b) $n\pi \pm (-1)^n \frac{\pi}{6}$
- (c) Both (a) and (b)
- (d) $\pi/2$

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196 PU_2015_384

If A and B are subsets of E having same number of elements then:-

- $|A \setminus B| = |B \setminus A|$
- $|A \cup B'| = |A|$
- $|A \cap B'| = |A|$
- $|A \cup B| = |A \cap B|$

31 of 100

213 PU_2015_384

The value of $\int_0^{\pi^2/4} \sin\sqrt{x}\,dx$ is:-

- 1
- 3
- 0
- 2

32 of 100

243 PU_2015_384

If the side lengths a, b and c of a triangle ABC are in Arithmetic Progression (A.P.) , then find the value of $\cos\frac{1}{2}(A\text{-}C)$?

- cos B
- $\sin\frac{B}{2}$
- $2\sin\frac{B}{2}$

None of these

33 of 100

209 PU_2015_384

If M and N are positive integers where $\sqrt{MN} = 8$, then which of the following can not be the value of M + N

20

16

65

35

34 of 100

149 PU_2015_384

A binary operation on *A* is a function from:-

$A \times A \to A \times A$

$A \times A \to A$

$A \to A \times A$

$A \to A$

35 of 100

181 PU_2015_384

The y coordinates of all the points of intersection of the parabola $y^2=x+2$ and the circle $x^2+y^2=4$ are given by:-

$0, \sqrt{3}, -\sqrt{3}$

0,3,-3

0,2,-2

0,1,-1

36 of 100

199 PU_2015_384

Let A and B are two n × n matrices.

i) AB = 0 implies either A = 0 or B =0
ii) AB = I, the identity matrix then A^{-1} = B and B^{-1} =A
iii) $(A+B)^2 = A^2 + 2AB + B^2$

i), ii) and iii) are true

i) and iii) are not true but ii) is true

i) is not true ii)and iii) are true

ii) is not true but i) and iii) are true

37 of 100

147 PU_2015_384

The value of the integral $\int_{-1}^{1} x^{10} \sin x \; dx$ is:-

- 2π
- 0
- 1
- π

38 of 100

221 PU_2015_384

If A and B are any two matrices such that AB=0 and A is nonsingular, then:-

- B=A
- B=0
- B is non singular
- B is orthogonal

39 of 100

177 PU_2015_384

If $\log_x \left(\frac{1}{8}\right) = -\frac{3}{4}$, then $x=$

- 16
- 32
- 4
- 8

40 of 100

126 PU_2015_384

In a group of 100 people who drink either tea or coffee, 55 people drink coffee and 67 people drink tea. Then the number of people who drink tea but not coffee is:-

- 33
- 12
- 22
- 45

41 of 100

138 PU_2015_384

The value of $\lim_{x\to 0} \frac{\log(1+x)^{1+x} - x}{x^2}$ is:-

- 1

0

$\frac{1}{2}$

Does not exist

42 of 100

228 PU_2015_384

The point of the curve $y = x^2$ that is closest to $(4, \frac{-1}{2})$ is:-

(1,1)

(2,4)

$(\frac{2}{3}, \frac{4}{9})$

$\left(\frac{4}{3}, \frac{16}{9}\right)$

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131 PU_2015_384

The total number of permutations of n (>1) different things taken not more that r at a time, when a thing may be repeated any number of times, is:-

$\frac{n}{n-1}(n^r - 1)$

$\frac{n^r + 1}{n-1}$

$\frac{n^r + 1}{n+1}$

$\frac{n^r - 1}{n-1}$

44 of 100

192 PU_2015_384

How many ways can five cards be selected from a standard deck of 52 playing cards such that all are of the same suit?

$\binom{4}{1}\binom{13}{5}$

$\binom{52}{1}\binom{12}{4}$

$\binom{52}{4}$

none of these

45 of 100

197 PU_2015_384

Let L be the set of all lines in a plane and R be a relation on L defined by a R b if and only if a is perpendicular to b. Then R is:-

transitive

reflexive

transitive but not symmetric

symmetric

46 of 100

198 PU_2015_384

If n(A) = 3 and n(B)=5 then the number of one to one functions we can define from A to B is:-

60

30

243

10

47 of 100

152 PU_2015_384

If Let $G = \left\{ \begin{pmatrix} x & x \\ x & x \end{pmatrix} \mid x \ in R^* \right\}$. Under the matrix multiplication G is:-

group with $e = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

abelian group

not a group

non abelian group

48 of 100

101 PU_2015_384

If N = 1421 x 1423 x 1425, what is the reminder when N is divided by 12?

0

3

- 9
- 6

49 of 100

103 PU_2015_384

The sum and product of the roots of $x^4 - x^3 - 3x - 2 = 0$ are respectively:-

- -1,-2
- 1,2
- 1,-2
- -1,2

50 of 100

158 PU_2015_384

The set onto which the derivative of the function $f(x) = x\log x - x$ maps the ray $[1,\infty)$ is:-

- $[1,\infty)$
- $[0,\infty)$
- $(0,\infty)$
- $(2,\infty))$

51 of 100

204 PU_2015_384

If f and g are two functions such that f '= g and g'= f for all x then

- f-g is a constant
- f^3-g^3 is a constant
- fg is a constant
- f^2-g^2 is a constant

52 of 100

202 PU_2015_384

If A,B and C are three square matrices of the same order, such that whenever AB = AC then B = C if A is:-

- symmetric
- skew symmetric
- singular
- non-singular

53 of 100

156 PU_2015_384

The rank of the matrix $\begin{pmatrix} 1 & 0 & 2 & 1 \\ 0 & 2 & 4 & 2 \\ 0 & 2 & 2 & 1 \end{pmatrix}$ is:-

- 3
- 1
- 2
- 0

54 of 100

234 PU_2015_384

Let $f: R \to R$ be a function defined by $f(x) = \min\{x+1, |x|+1\}$. Then which of the following is true?

- *f* is differentiable everywhere.
- *f* is differentiable at x = 0
- *f* is not differentiable at x = 1
- $f(x) \geq 1$ for all $x \in R$

55 of 100

211 PU_2015_384

Let $f(x) = \int_1^x \sqrt{2-t^2}\,dt$. Then the real roots of the equation $x^2 - f'(x) = 0$ are:-

- ± 1
- 0 and 1
- $\frac{\pm 1}{\sqrt{2}}$
- $\frac{\pm 1}{2}$

56 of 100

189 PU_2015_384

The number of ways in which we can arrange the digits 1,2,3,...,9 such that the product of five digits at any of the five consecutive positions is divisible by 7 is:-

- 7!
- P(9,7)
- 5(7!)
- 8!

57 of 100

105 PU_2015_384

Solve for x: $9^x - 3^x - 8 = 0$

- $\log_3(\frac{1+\sqrt{33}}{2})$
- $\log_3(\frac{1\pm\sqrt{33}}{2})$
- $\log_3(\frac{1}{4})$
- $\log_3(\frac{1}{2})$

58 of 100

239 PU_2015_384

If A:B: C =1:2: 3, then sin A: sin B: sin C =?

- $1 : 2 : 3$
- $1:\sqrt{3}:2$
- $\sqrt{3}:1:2$
- $1: 2: \sqrt{3}$

59 of 100

165 PU_2015_384

If z and w be two complex numbers such that |z|≤1,|w| ≤ 1 and |z+iw|= |z-iw|=2 then z equals:-

- i or –i
- 1 or -1
- i or -1
- 1 or i

60 of 100

185 PU_2015_384

If a plane meets the coordinates axes in A,B, C such that the centroid of the triangle is the point $(1,r,r^2)$, then equation of the plane is:-

- $x+ry+r^2z=3r^2$
- $r^2x+ry+z=3$
- $x+ry+r^2z=3$
- $r^2x+ry+z=3r^2$

61 of 100

114 PU_2015_384

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

- 100 days
- 90 days
- 120 days
- 150 days

62 of 100

109 PU_2015_384

Evaluate $\int_0^{\pi} \cos^{2n+1} x dx$

- $2\pi + 1$
- $\frac{\pi}{2n+1}^{2n+1}$
- 0
- $\frac{\pi^{2n+1}}{2}$

63 of 100

219 PU_2015_384

Pick out false statement. In the set of even integers *E* define $a * b = \frac{ab}{2}$

- * is a binary operation
- *E* has identity 1
- * is associative
- * is commutative

64 of 100

175 PU_2015_384

If $xy^m = yx^3$, then solve for m.

- $2\log_x y + 1$
- $2\log_x y$
- $2\log_y x$
- $2\log_y x + 1$

65 of 100
130 PU_2015_384
Let $x_1x_2x_3x_4x_5 = 2310$, where $x_1, x_2, x_3, x_4, x_5 \in Z$. Then the number of integral solution greater than one is:-

- 5^5
- 120
- 60
- 250

66 of 100
110 PU_2015_384
$$\lim_{x\to 0}\frac{1-\cos x}{x} =$$

- 0
- ∞
- -1
- 1

67 of 100
217 PU_2015_384
The number of relations on a set with *n* elements is:-

- n^2
- $2n$
- 2^{n^2}
- 2^n

68 of 100
170 PU_2015_384
What is $\sqrt{-6}\,\sqrt{-6}$?

- 6
- -6i
- 6i
- -6

69 of 100
122 PU_2015_384
If A and B are two subsets of a set E, then $(A \cup B)' \cup (A' \cap B)$ equals:-

- Ø
- A
- B'
- A'

70 of 100
203 PU_2015_384
If A and B are skew symmetric matrices then AB -BA is:-

- diagonal matrix
- symmetric matrix
- skew symmetric matrix
- 0 matrix

71 of 100
107 PU_2015_384
The value of $\cos h\left(\frac{i\pi}{2}\right)$ is:-

- 0
- 1
- -1
- i

72 of 100
215 PU_2015_384
On straight road XY, 100 meters long, five heavy stones are placed two meters apart beginning at the end X. A worker, starting at X, has to transport all the stones to Y, by carrying only one stone at a time. The minimum distance he has to travel (in meters) is:-

- 472
- 422
- 744
- 860

73 of 100
154 PU_2015_384
If the matrix $\begin{pmatrix} -1 & 3 & 2 \\ 1 & n & -3 \\ 1 & 4 & 5 \end{pmatrix}$ has an inverse then the value of n

- n ≠ - 4.
- n is any real number
- n= - 4

- n ≠ 4

74 of 100

168 PU_2015_384

The complex number z_1, z_2 and z_3 satisfying $\frac{z_1 - z_3}{z_2 - z_3} = \frac{1 - i\sqrt{3}}{2}$ are the vertices of a triangle which is:-

- Equilateral
- Right angled isosceles triangle
- Of area zero
- Obtuse angle isosceles triangle

75 of 100

187 PU_2015_384

Distance between two parallel planes 2x+y+2z=8 and 4x+2y+4z+5=0 is:-

- 5/2
- 7/2
- 3/2
- 9/2

76 of 100

254 PU_2015_384

An urn contains 9 balls, two of which are red, three blue and four black. Three balls are drawn at random. The probability that they are of the same colour is:-

- 7/17
- 3/9
- 5/84
- 6/84

77 of 100

256 PU_2015_384

A player tosses two fair coins. He wins Rs. 5 if two Head occurs, Rs. 22 if one Head occurs and Rs. 1 if no head occurs. Then his expected value is:-

- Rs. 35/2
- Rs. 7/2
- Rs. 27/2
- Rs. 25/2

78 of 100

252 PU_2015_384

If two dice are thrown then the probability of getting a sum greater than 8 is:-

- 11/36
- 9/36
- 10/36
- 12/36

79 of 100

250 PU_2015_384

If A and B are any two events in a sample space. Then P $(A \cap B^c)$ is equal to:-

- P(A) – P(A ∪ B)
- P(A)
- Zero
- P(A) – P(A ∩ B)

80 of 100

258 PU_2015_384

An urn contains 3 red, 5 black and 7 yellow balls. If a ball is selected at random, then the probability that the ball drawn is not yellow is:-

- 8/15
- 7/15
- 1/7
- 7/8

81 of 100

261 PU_2015_384

The probability density function of Normal distribution is:

$$f(x) = \frac{2\sqrt{2}}{\sqrt{\pi}} e^{-2(2x-1)^2}; -\infty < x < \infty$$

Then the mean and variance are:-

- (1/3, 1/5)
- (1/5, 1/3)
- (1/16, 1/2)
- (1/2, 1/16)

82 of 100

269 PU_2015_384

What is the shape of the frequency curve of Poisson distribution?

- Bath tub
- Symmetric
- Negatively Skewed

- Positively Skewed

83 of 100
263 PU_2015_384
Let X follow Normal distribution with mean 2 and variance 3 [N(2, 3)]. Then Y = 2X+3 is:-

- N(7, 24)
- N(7, 17)
- N(7, 22)
- N(7, 12)

84 of 100
265 PU_2015_384
If X is a random variable with the following probability distribution, then $E(X^2)$=

X:	-3	0	6	9
P(X)	1/6	0	1/2	1/3

- 45/4
- 90/3
- 45/93
- 93/2

85 of 100
267 PU_2015_384
Mean and Variance are equal for the following probability distribution:-

- Poisson
- Binomial
- Normal
- Uniform

86 of 100
274 PU_2015_384
A continuous random variable has the following p.d.f.
$F(x) = 3x^2$; $0 \le x \le 1$
If $P(X \le a) = P(X > a)$, then the value of a^3 is:-

- 1/8
- 1/2
- 1/4
- 1/16

87 of 100
272 PU_2015_384

Given Var X_1 = 4, Var X_2 = 2 and Var (X_1 + 2 X_2) = 32, then Cov(X_1,X_2) is equal to:-

- 4
- 6
- 2
- 5

88 of 100

271 PU_2015_384
If X is a random variable having the probability density function

$$f(x) = \begin{cases} \frac{1}{3}e^{-\frac{x}{3}} & ; x > 0 \\ 0 & otherwise \end{cases}$$

then P(X > 3) is:-

- $1/e^2$
- 1/3
- 1/e
- 0.75

89 of 100

276 PU_2015_384
The mean of 5 observations is 4.4 and their variance is 8.24. If three of the observations are 1, 2 and 6, then the other two observations are:-

- (3, 10)
- (7, 6)
- (8, 5)
- (4, 9)

90 of 100

278 PU_2015_384
The variance of first *n* natural numbers is

- $(n^2 + 1)/_{12}$
- $(n + 1)^2/_{12}$
- $(n^2 - 1)/_{12}$
- $(2n^2 - 1)/_{12}$

91 of 100

283 PU_2015_384
A lot of 10 items contains 3 defective items. A sample (without replacement) of 4 items is drawn at random. Let X denote the number of defective items in the sample. The P ($X \le 1$) is:-

- 1/2
- 1/3
- 3/10
- 2/3

92 of 100

285 PU_2015_384
If M_d , Q, D and P stand for median, quartile, decile and percentile respectively, then which of the following relation between them is true?

- $M_d = Q_2 = D_6 = P_{50}$
- $M_d = Q_3 = D_5 = P_{75}$
- $M_d = Q_2 = D_5 = P_{50}$
- $M_d = Q_2 = D_4 = P_{50}$

93 of 100

281 PU_2015_384
The sum of 10 items is 12 and the sum of their squares is 16.9. The standard deviation is:-

- 0.4
- 0.6
- 0.5
- 0.3

94 of 100

287 PU_2015_384
The median of the values 48, 35, 36, 40, 42, 54, 58, 60 is:-

- 41
- 45
- 40
- 44

95 of 100

288 PU_2015_384
The formula for calculating coefficient of variation (C.V.) is:-

- C.V. = (Mean x Standard deviation) / 100
- C.V. = (100) / (Mean x Standard deviation)
- C.V. = (Standard deviation / Mean) x 100
- C.V = (Mean/Standard deviation) x 100

96 of 100

295 PU_2015_384

If a + b = 3 (c + d), which one of the following is the average of a, b, c and d?

- c + d/4
- 3(c+d) /4
- 3(c+d)/8
- c + d

97 of 100

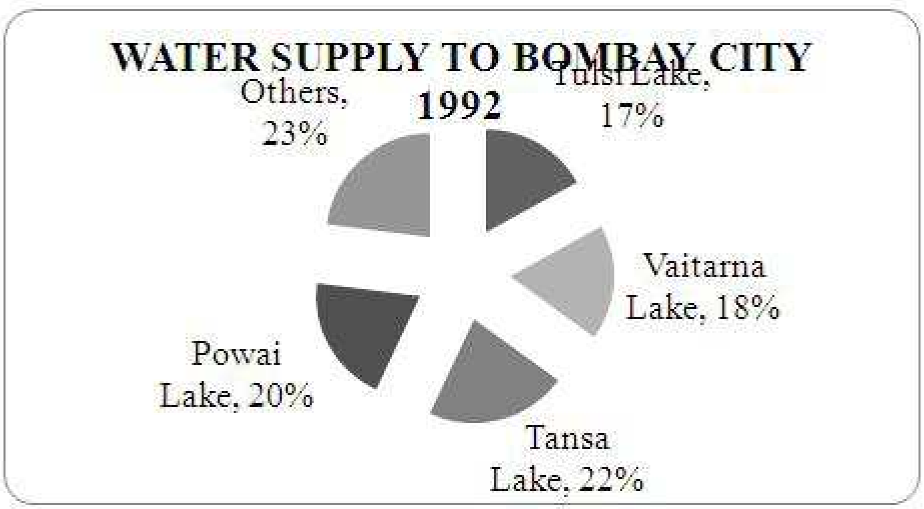
298 PU_2015_384

The data given as 5, 7, 12, 17, 79, 84, 91 will be called as:-

- A discrete series
- Time series
- An individual series
- A continuous series

98 of 100

291 PU_2015_384



Total water supply in 1992 =7200 Million gallons per month

The total water supplied by "others" in 1992 (in m. gallons)is:-

- 1728
- 1656
- 19872
- 19008

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Given that in a code language, ‘645’ means ‘day is warm’, ‘42’ means ‘warm spring’ and ‘634’ means ‘spring in sunny’ which digit represents ‘sunny’?

- 2
- 3
- 5
- 4

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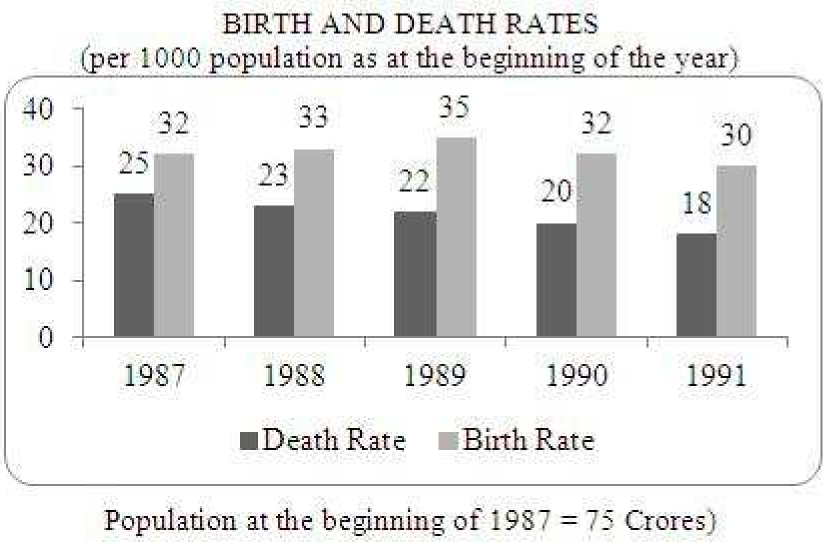

What is the population at the beginning of 1989?

- 76,44,24,500
- 76,16,28,000
- 76,28,02,500
- 75,52,50,000