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Que. 1 If a twelve sided regular polygon is inscribed in a circle of radius 3 centimeters, then the length of each side of the polygon is

1. 3
2. 18 - 9√3
3. 18 + 9√3
4. 9(1 - √3)

Testbook Solution Correct Option **- 2**

Concept:

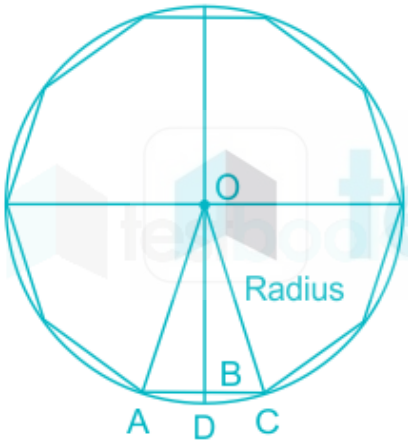
The internal angle of the polygon of side n,

$\theta = \frac{n-2}{n}\pi$

Calculation:

Internal angle of 12 sided polygon $(\theta) = (\frac{12-2}{12})\pi$

$\Rightarrow \theta = \frac{5}{6}\pi = 150^o$



Given OC(radius) = 3cm

∠OCB = θ/2 = 75°

In right angle triangle, OCB

BC = OC cos (∠OCB)

$\Rightarrow BC = 3\cos 75^o$

⇒ BC = 3 cos (45° + 30°)

⇒ BC = 3 (cos 45° cos 30° - sin 45° sin 30°)

$\Rightarrow BC = 3(\frac{1}{\sqrt{2}}\frac{\sqrt{3}}{2} - \frac{1}{\sqrt{2}}\frac{1}{2})$

Now the side of the polygon **AB = 2 BC**

$\Rightarrow AB = 2 \times \frac{3}{2\sqrt{2}}(\sqrt{3}-1)$

$\Rightarrow AB = \frac{3}{\sqrt{2}}(\sqrt{3}-1)$

$\Rightarrow \mathbf{AB \approx 1.553 < 3}$

∵ AB < 3 and only one option 18 - 9 √3 is positive and < 3 so the option is selected.

Que. 2 If C is the midpoint of AB and P in any point outside AB, then

1. $\overline{PA} + \overline{PB} = 2\overline{PC}$
2. $\overline{PA} + \overline{PB} = \overline{PC}$
3. $\overline{PA} + \overline{PB} = 2\overline{PC} = 0$
4. $\overline{PA} + \overline{PB} = \overline{PC} = 0$

Testbook Solution Correct Option **- 1**

Concept:

When vectors are added, the sum can find out graphically. The process is:

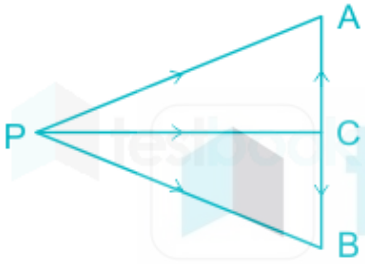
- Draw a line representing a vector and the line length is equal to the magnitude of a vector.
- Draw the other vector to be added by other lines in a way that the head of the previous one joins to the tail of next.
- Draw all the vectors to be added in a similar way
- When all the vectors to be added are drawn, the summation is the line joining the tail of the first vector to the head of the last vector.

Calculation:

As per the diagram,

$\overline{\mathrm{PC}} + \overline{\mathrm{CA}} = \overline{\mathrm{PA}}$ .....(i)

$\overline{\mathrm{PC}} + \overline{\mathrm{CB}} = \overline{\mathrm{PB}}$ .....(ii)



Adding the 2 equations (i) and (ii) we get,

$\mathbf{2\overline{PC} + \overline{CA} + \overline{CB} = \overline{PA} + \overline{PB}}$ .....(iii)

Given that C is the mid-point of AB then,

$\left|\overline{CA}\right| = \left|\overline{CB}\right|$

But, directions are opposite so,

$\boldsymbol{\overline{CA} = -\overline{CB}}$ .....(iv)

By equations (iii) and (iv),

$2\overline{\mathrm{PC}} + (-\overline{\mathrm{CB}}) + \overline{\mathrm{CB}} = \overline{\mathrm{PA}} + \overline{\mathrm{PB}}$

$\mathbf{2\overline{PC} = \overline{PA} + \overline{PB}}$

Que. 3 The average marks of the boys in class is 52 and that of girls is 42. The average marks of the boys and girls combined is 50. The percentage of boys in the class is

1. 80%
2. 60%
3. 40%
4. 20%

Testbook Solution Correct Option **- 1**

Calculation:

Given the avg. marks of boys = 52 and that of girls = 42

Let the no. of boys be x and of girls be y

Sum of marks of boys = **52 x**

Sum of marks of girls = **42 y**

According to the question,

$\Rightarrow 52x + 42y = 50(x + y)$

$\Rightarrow 52x + 42y = 50x + 50y$

$\Rightarrow 2x = 8y$

$\therefore x = 4y$

Total number of students in the class = $x + y = 4y + y = 5y$

% of boys = $\frac{\text{No of boys}}{\text{Total No. of students}} \times 100$

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

$= 80\%$

Que. 4 The number of 5 people groups that can be selected from 9 people when two particular persons are not to be in the same group is

1. 126
2. 35
3. 91
4. 252

Testbook Solution Correct Option **- 3**

Calculation:

We have to select 5 people group from 9 people such that two particular persons are not selected together,
Number of ways = (5 people are selected from 9) - (2 particular people already in the same group)

$= {}^9C_5 - {}^7C_3 = 91$

Que. 5 The solution set of equation $\log_x 2 \log_{2x} 2 = \log_{4x} 2$ is

1. $2^{-\sqrt{2}}, 2^{\sqrt{2}}$
2. $\left\{\frac{1}{2}, 2\right\}$
3. $\left\{\frac{1}{4}, 2^2\right\}$
4. $\left\{\frac{1}{4}, 2\right\}$

Testbook Solution Correct Option **- 1**

Concept:

Logarithm properties:

Product Rule	$\log(mn) = \log(m) + \log(n)$
Quotient Rule	$\log(\frac{m}{n}) = \log(m) - \log(n)$
Power Rule	$\log(m^n) = n \log(m)$
Change of Base	$\mathbf{\log_m(n) = \frac{1}{\log_n(m)} = \frac{\log(n)}{\log(m)}}$

Calculation:

$\log_x 2 \log_{2x} 2 = \log_{4x} 2$

$\because \log_x 2 = \frac{1}{\log_2 x}$, $\log_{2x} 2 = \frac{1}{\log_2 2x}$ and $\log_{4x} 2 = \frac{1}{\log_2 4x}$

$\Rightarrow \frac{1}{\log_2 x} * \frac{1}{\log_2 2x} = \frac{1}{\log_2 4x}$

$\Rightarrow \log_2 x \log_2 2x = \log_2 4x$

$\Rightarrow \log_2 x(\log_2 2 + \log_2 x) = \log_2 4 + \log_2 x$

Let $\log_2 x$ be a,

$\Rightarrow a(1 + a) = \log_2 2^2 + a \quad (\because \log_2 2 = 1)$

$\Rightarrow a + a^2 = 2 + a$

$\Rightarrow \mathbf{a = \pm\sqrt{2}}$

$\Rightarrow \log_2 x = \pm\sqrt{2}$

$\Rightarrow \mathbf{x = 2^{\sqrt{2}}, 2^{-\sqrt{2}}}$

Que. 6 The equation of a circle with diameters are 2x - 3y + 12 = 0 and x + 4y - 5 = 0 and area of 154 sq. units is

1. $x^2 + y^2 + 6x - 4y - 36 = 0$
2. $x^2 + y^2 + 6x - 4y - 36 = 0$
3. $x^2 + y^2 - 6x + 4y + 25 = 0$
4. None of these

Testbook Solution Correct Option **- 1**

Concept:

The standard form of the equation of a circle is:

$(x - h)^2 + (y - k)^2 = R^2$

where (h,k) are the coordinates and the R is the radius of center of the circle

Area of the circle = πR^2

Note: The intersection of the Equation of diameters is center of the circle

Calculation:

Given area of circle = 154 sq.units

$\Rightarrow \pi R^2 = 154$

$\Rightarrow R^2 = 154 * \frac{7}{22}$

$\Rightarrow \mathbf{R = 7}$

Equation of the diameters

$2x - 3y + 12 = 0$ ...(i)

$x + 4y - 5 = 0$ ...(ii)

Intersection of the diameters $\mathbf{(i) - 2 * (ii)}$

$\Rightarrow -11y + 22 = 0$

$\Rightarrow \mathbf{y = 2}$

Putting back in equation (i),

$\Rightarrow 2x - 3(2) + 12 = 0$

$\Rightarrow 2x = 6 \Rightarrow \mathbf{x = -3}$

The center will be (-3, 2)

By the standard equation of circle

$(x - h)^2 + (y - k)^2 = R^2$

$\Rightarrow (x - (-3))^2 + (y - 2)^2 = 7^2$

$\Rightarrow (x+3)^2+(y-2)^2=49$

$\Rightarrow x^2+9+6x+y^2+4-4y-49=0$

$\Rightarrow \mathbf{x^2+6x+y^2-4y-36=0}$

Que. 7 $\int \frac{x^2-1}{x^3\sqrt{2x^4-2x^2+1}}dx$ is equal to

1. $\frac{\sqrt{2x^4-2x^2+1}}{x^2}+C$
2. $\frac{\sqrt{2x^4-2x^2+1}}{x^3}+C$
3. $\frac{\sqrt{2x^4-2x^2+1}}{x}+C$
4. $\frac{\sqrt{2x^4-2x^2+1}}{2x^2}+C$

Testbook Solution Correct Option **- 4**

Concept:

$\int x^n dx=\frac{x^{n+1}}{n+1}+c$

Calculation:

$I=\int \frac{x^2-1}{x^3\sqrt{2x^4-2x^2+1}}dx$

$=\frac{1}{4}\int \frac{4x^2-4}{x^3\sqrt{x^4\left(2-\frac{2}{x^2}+\frac{1}{x^4}\right)}}dx$

$=\frac{1}{4}\int \frac{4x^2-4}{x^5\sqrt{\left(2-\frac{2}{x^2}+\frac{1}{x^4}\right)}}dx$

$=\frac{1}{4}\int \frac{\frac{4}{x^3}-\frac{4}{x^5}}{\sqrt{\left(2-\frac{2}{x^2}+\frac{1}{x^4}\right)}}dx$

Let $2-\frac{2}{x^2}+\frac{1}{x^4}=t$

Differentiating with respect to x, we get

$\left(\frac{4}{x^3}-\frac{4}{x^5}\right)dx=dt$

Now,

$I=\frac{1}{4}\int \frac{dt}{\sqrt{t}}$

$=\frac{1}{4}\int t^{-1/2}\,dt$

$=\frac{1}{4}\times\frac{t^{\frac{1}{2}}}{\frac{1}{2}}+c$

$=\frac{1}{2}t^{\frac{1}{2}}+c$

$=\frac{1}{2}\sqrt{2-\frac{2}{x^2}+\frac{1}{x^4}}+c$

$=\frac{\sqrt{2x^4-2x^2+1}}{2x^2}+C$

Que. 8 If $\vec{a},\vec{b}$ and $\vec{a}+\vec{b}$ are vectors of magnitude α then the magnitude of the vector $\vec{a}-\vec{b}$ is

1. $\sqrt{2}\alpha$

2. $\sqrt{3}\alpha$
3. 2α
4. 3α

Testbook Solution Correct Option **- 2**

Concept:

Let two vectors are $\vec{a}$ and $\vec{b}$

Magnitude of sum of $\vec{a}$ and $\vec{b}$:

$$\left|\vec{a}+\vec{b}\right| = \sqrt{a^2+b^2+2ab\cos\theta}$$

Magnitude of difference of $\vec{a}$ and $\vec{b}$:

$$\left|\vec{a}-\vec{b}\right| = \sqrt{a^2+b^2-2ab\cos\theta}$$

where a, b are magnitude of vectors $\vec{a}$ and $\vec{b}$; and θ is angle between them.

Calculation:

Given:

$|\vec{a}| = \alpha,\ \left|\vec{b}\right| = \alpha$ and $\left|\vec{a}+\vec{b}\right| = \alpha$

As we know,

$$\left|\vec{a}+\vec{b}\right| = \sqrt{a^2+b^2+2ab\cos\theta}$$

$$\Rightarrow \alpha = \sqrt{\alpha^2+\alpha^2+2(\alpha)(\alpha)\cos\theta}$$

$$\Rightarrow \alpha^2 = 2\alpha^2+2\alpha^2\cos\theta$$

$$\Rightarrow -1 = 2\cos\theta$$

$$\Rightarrow \mathbf{\cos\theta = -\frac{1}{2}}$$

Now,

$$\left|\vec{a}-\vec{b}\right| = \sqrt{a^2+b^2-2ab\cos\theta}$$

$$\Rightarrow \left|\vec{a}-\vec{b}\right| = \sqrt{\alpha^2+\alpha^2-2(\alpha)(\alpha)\cos\theta}$$

$\because \cos\theta = -\frac{1}{2}$

$$\Rightarrow \left|\vec{a}-\vec{b}\right| = \sqrt{2\alpha^2-2\alpha^2(\frac{-1}{2})}$$

$$\Rightarrow \left|\vec{a}-\vec{b}\right| = \sqrt{2\alpha^2+\alpha^2}$$

$$\Rightarrow \mathbf{\left|\vec{a}-\vec{b}\right| = \sqrt{3}\alpha}$$

Que. 9 A box contains 2 blue caps, 4 red caps, 5 greens caps and 1 yellow cap. If four caps are picked at random, the probability that none of the is green is

1. 7/99
2. 7/12
3. 5/99
4. 5/12

Testbook Solution Correct Option **- 1**

Concept:

- The number of ways for selecting r from a group of n (n > r) = ${}^{n}C_{r}$
- The probability of particular case = $\frac{\text{Number of ways for the case can be executed}}{\text{Total number of ways for selection}}$

Calculation:

The total number of caps = 2 + 4 + 5 + 1 = 12

The number of ways for selecting four caps = $^{12}C_4$

The total number of caps other than green = 12 - 5 = 7

The number of ways for selecting four caps other than green = $^{7}C_4$

The probability of selecting four caps and none of them are green P(A') = $\frac{\text{The number of ways for selecting four caps other than green}}{\text{The number of ways for selecting four caps}}$

$\Rightarrow P(A') = \frac{^{7}C_4}{^{12}C_4}$

$\Rightarrow P(A') = \frac{7!\,(12-4)!\,4!}{4!\,(7-4)!\,12!}$

$\Rightarrow \mathbf{P(A') = \frac{7}{99}}$

Que. 10 The line $3x + 5y = k$ touches the ellipse $16x^2 + 25y^2 = 400$ if k is

1. $\pm\sqrt{5}$
2. $\pm\sqrt{15}$
3. ± 25
4. ± 35

Testbook Solution Correct Option **- 3**

Concept:

The standard form of the equation of ellipse:

$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

where center coordinates are (0, 0),

a = length of semi-major axis, and

b = length of semi-minor axis

For a line $y = mx + c$ to be tangent of such ellipse

where m is the slope of the line and c is a constant, then: $c^2 = a^2m^2 + b^2$ condition must follow, i.e.,

$\mathbf{y = mx \pm \sqrt{a^2m^2 + b^2}}$ is the standard form of tangent to $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ ellipse

Calculation:

The given ellipse equation:

$16x^2 + 25y^2 = 400$

It can be rewritten in standard form as,

$\frac{x^2}{25} + \frac{y^2}{16} = 1$

$\Rightarrow \mathbf{a = \sqrt{25} = 5}$

$\Rightarrow \mathbf{b = \sqrt{16} = 4}$

The equation of a line given:

$3x + 5y = k,$

$\Rightarrow y = \frac{-3}{5}x + \frac{k}{5}$

$\therefore \mathbf{m = \frac{-3}{5}, c = \frac{k}{5}}$

For the line to be tangent,

$c^2 = a^2m^2 + b^2$

$\Rightarrow (\frac{k}{5})^2 = 5^2(\frac{-3}{5})^2 + 4^2$

$\Rightarrow \frac{k^2}{25} = 9 + 16 = 25$

$\Rightarrow k^2 = 625$

$\Rightarrow \mathbf{k = \pm 25}$

Que. 11 If X = {4^n - 3n - 1, n ∈ N} and Y = {9n - 9, n ∈ N}, then X ∪ Y is equal to

1. Y
2. X
3. N
4. None of these

Testbook Solution Correct Option **- 1**

Concept:

Set theory:

- A ∪ B means set of all the values in the set A and B.
- A ∩ B is the set of common elements of A and B.

Binomial theorm:

- $(a + b)^n = {}^nC_0\, a^n b^0 + {}^nC_1 a^{n-1}b^1 + {}^nC_2 a^{n-2}b^2 + \ldots. + {}^nC_{n-2} a^2 b^{n-2} + {}^nC_{n-1} a^1 b^{n-1} + {}^nC_n a^0 b^n$

Calculation:

Given X = {4^n - 3n - 1, n ∈ N} and Y = {9n - 9, n ∈ N}

$X = 4^n - 3n - 1 = \mathbf{(3 + 1)^n} - 3n - 1$

$\Rightarrow X = ({}^nC_0\, 3^n 1^0 + {}^nC_1 3^{n-1}1^1 + {}^nC_2 3^{n-2}1^2 + \ldots + {}^nC_{n-2}3^2 1^{n-2} + {}^nC_{n-1}3^1 1^{n-1} + {}^nC_n 3^0 1^n) - 3n - 1$

($\because {}^nC_{n-1} = n$ and ${}^nC_n = 1$)

$\Rightarrow X = ({}^nC_0\, 3^n 1^0 + {}^nC_1 3^{n-1}1^1 + {}^nC_2 3^{n-2}1^2 + \ldots + {}^nC_{n-2}3^2 1^{n-2}) + 3n + 1 - 3n - 1$

$\Rightarrow X = 3^2({}^nC_0\, 3^{n-2} + {}^nC_1 3^{n-3} + {}^nC_2 3^{n-4} + \ldots + {}^nC_{n-2})$

$\Rightarrow X = 9({}^nC_0\, 3^{n-2} + {}^nC_1 3^{n-3} + {}^nC_2 3^{n-4} + \ldots + {}^nC_{n-2})$

For $n \geq 2$, X is some multiple of 9.

And $X_{n=1} = 0$

∴ **X = {0, some multiples of 9 but not all}** **…(i)**

Y = 9n - 9 = 9(n - 1)

∴ **Y = {All multiple of 9 starting from 0}** **…(ii)**

From (i) and (ii) we can say, X⊂Y

∴ **X ∪ Y = Y**

Que. 12 $\int \left\{ \frac{(\log x - 1)}{1 + (\log x)^2} \right\}^2 dx$ is equal to

1. $\frac{xe^x}{1 + x^2} + C$
2. $\frac{x}{(\log x)^2 + 1} + C$

3. $\frac{\log x}{(\log x)^2+1}+C$
4. $\frac{x}{x^2+1}+C$

Testbook Solution Correct Option **- 2**

Concept:

$\int e^x [f(x)+f'(x)]\,dx = e^x f(x) + c$

Calculation:

$I = \int \left(\frac{(\log x-1)}{1+(\log x)^2}\right)^2 dx$

Let $\log x = t \Leftrightarrow x = e^t$

Differentiating with respect to x, we get

$\Rightarrow \frac{1}{x}dx = dt$

$\Rightarrow dx = xdt$

$\Rightarrow dx = e^t dt$

Now,

$I = \int \left(\frac{(t-1)}{1+t^2}\right)^2 e^t dt$

$= \int \frac{(t^2+1-2t)}{(1+t^2)^2} e^t dt$

$= \int \left[\frac{t^2+1}{(t^2+1)^2} - \frac{2t}{(t^2+1)^2}\right] e^t dt$

$= \int e^t \left[\frac{1}{(t^2+1)} - \frac{2t}{(t^2+1)^2}\right] dt$

Let $f(t) = \frac{1}{(t^2+1)}$

Differentiating with respect to t, we get

$\Rightarrow f'(t) = \frac{-2t}{(t^2+1)^2}$

$I = \int e^t [f(t)+f'(t)]\,dt$

$= e^t f(t) + c$

$= e^t \frac{1}{(t^2+1)} + c$

Resubstitute the value of t and e^t, we get

$I = \frac{x}{(\log x)^2+1} + C$

Que. 13 The volume of the parallelepiped determined by u = i + 2j - k, v = -2i + 3k and w = 7j - 4k is

1. 21
2. 22
3. 23
4. 24

Testbook Solution Correct Option **- 3**

Concept:

The volume of the parallelepiped determined by $\vec{a}$, $\vec{b}$ and $\vec{c}$is

$$\text{Volume} = \vec{a} \cdot \left(\vec{b} \times \vec{c}\right) = \begin{vmatrix} a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \\ c_1 & c_2 & c_3 \end{vmatrix}$$

Calculation:

Parallelepiped determined by:

u = i + 2j - k

v = -2i + 3k

w = 7j - 4k

$$\text{Volume} = \begin{vmatrix} 1 & 2 & -1 \\ -2 & 0 & 3 \\ 0 & 7 & -4 \end{vmatrix}$$

$\Rightarrow$ Volume $= |1 \times (0 - 21) - 2 \times (8 - 0) + (-1) \times (-14 - 0)|$

$\Rightarrow$ **Volume $= |-23| = 23$ units**

Que. 14 The vector perpendicular to the plane passing through (1, -1, 0) (2, 1, -2) and (-1, 1, 2) is

1. $6\hat{j} + 6\hat{k}$
2. $6\hat{i} + 7\hat{k}$
3. $7\hat{i} + 6\hat{k}$
4. $7\hat{i} + 8\hat{k}$

Testbook Solution Correct Option **- 1**

Concept:

To find a vector perpendicular to the find two plane, first find the vectors in the plane and then take their cross product.

Calculations:

Given, the plane is passing through the point (1, -1, 0) (2, 1, -2) and (-1, 1, 2)

Step 1) Find two vectors in the plane.

We will do this by finding the vector from (1, -1, 0) (2, 1, -2) and from(1, -1, 0) (-1, 1, 2). As all three points are in the plane, so will each of those vectors.

$\vec{u}_1$ = (1, -1, 0) - (2, 1, -2) = (-1, -2, 2)

$\vec{u}_2$ = (1, -1, 0) - (-1, 1, 2) = (2, - 2, 2)

Step 2) Find a vector perpendicular to the plane.

If a vector is perpendicular to two vectors in a plane, it must be perpendicular to the plane itself. As the cross product of two vectors produces a vector perpendicular to both, we will use the cross product of $\vec{u1}$ and $\vec{u2}$ to find a vector $\vec{u}$ perpendicular to the plane containing them.

$\Rightarrow \vec{u} = \vec{u}_1 \times \vec{u}_2$

$$\Rightarrow \vec{u} = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ -1 & -2 & 2 \\ 2 & -2 & 2 \end{vmatrix}$$

$\Rightarrow \vec{u} = \vec{i}(-4 + 4) - \vec{j}(-2 - 4) + \vec{k}(2 + 4)$

$\Rightarrow \vec{u} = 6\vec{j} + 6\vec{k}$

Hence, the vector perpendicular to the plane passing through (1, -1, 0) (2, 1, -2) and (-1, 1, 2) is $\vec{u} = 6\vec{j} + 6\vec{k}$.

Que. 15 The value of a, for which the sum of the square of the roots of the equation x^2 - (a - 2)x - (a + 1) = 0, assumes the least value is

1. 3
2. 2
3. 0
4. 1

Testbook Solution Correct Option **- 4**

Concept:

For the least value of the function, the sum of the square of the roots of the equation x^2 - (a - 2)x - (a + 1) = 0 is zero

Calculations:

Consider, the roots of the equation x^2 - (a - 2)x - (a + 1) = 0 are α and β

$\Rightarrow \alpha + \beta = a - 2$ and $\alpha.\beta = -(a + 1)$

Given, the sum of the square of the roots of the equation x^2 - (a - 2)x - (a + 1) = 0, is the least value

$\Rightarrow \alpha^2 + \beta^2 = 0$

$\Rightarrow (\alpha + \beta)^2 - 2\alpha\beta = 0$

$\Rightarrow (a - 2)^2 + 2(a + 1) = 0$

$\Rightarrow a^2 - 2a + 6 = 0$

$\Rightarrow a^2 - 2a + 1 + 5 = 0$

$\Rightarrow (a - 1)^2 + 5 = 0$

$\Rightarrow a = 1$

Hence, the value of a, for which the sum of the square of the roots of the equation x^2 - (a - 2)x - (a + 1) = 0, assumes the least value is 1.

Que. 16 For any two events A and B, the probability that at least one of them occur is 0.6. If A and B occur simultaneously with a probability 0.3, then P(A') + P(B') is

1. 0.9
2. 1.15
3. 1.1
4. 1.0

Testbook Solution Correct Option **- 3**

Concept:

we know that,

$P(A) + P(B) = P(A \cup B) + P(A \cap B)$

P(A') = 1 - P(A)

Calculations:

Given, For any two events A and B, the probability that at least one of them occur is 0.6

$\Rightarrow P(A \cup B) = 0.6$

and A and B occur simultaneously with a probability 0.3

$\Rightarrow P(A \cap B) = 0.3$

we know that,

$P(A) + P(B) = P(A \cup B) + P(A \cap B)$

$\Rightarrow P(A) + P(B) = 0.6 + 0.3 = 0.9$

Also, we know that

P(A') + P(B') = 1 - P(A) + 1 - P(B)

$\Rightarrow$ P(A') + P(B') = 2 - 0.9

$\Rightarrow$ P(A') + P(B') = 1.1

Hence, For any two events A and B, the probability that at least one of them occur is 0.6. If A and B occur simultaneously with a probability 0.3, then P(A') + P(B') is 1.1

Que. 17 Two finite sets A and B are having m and n elements. The total number of subsets of the first set is 56 more than the total number of subsets of the second set. The value of m and n are

1. 7, 6
2. 6, 3
3. 5, 3
4. 8, 7

Testbook Solution Correct Option **- 2**

Concept:

- If a set contains n elements, then the total number of subsets will be 2^n

Calculation:

Total number of subsets of the first is 2^m while total number of subsets of the second is 2^n.

Now it is given that

$2^m = 2^n + 56$

$\Rightarrow 2^m - 2^n = 56$

$\Rightarrow 2^3(2^{m-3} - 2^{n-3}) = 56$

$\Rightarrow (2^{m-3} - 2^{n-3}) = 7$

$\Rightarrow (2^{m-3} - 2^{n-3}) = 8 - 1$

$\Rightarrow (2^{m-3} - 2^{n-3}) = 2^3 - 2^0$

Hence compare the terms,

m - 3 = 3 thus m = 6 and

n - 3 = 0 giving n = 3.

Hence, (m, n) = (6, 3)

Que. 18 Which of the following statements is FALSE?

1. $2 \in A \cup B$ implies that $2 \notin A$ then $2 \in B$
2. $\{2, 3\} \subseteq A$ implies that $2 \subseteq A$ and $3 \subseteq A$
3. $A \cap B \supseteq \{2, 3\}$ implies that $\{2, 3\} \subseteq A$ and $\{2, 3\} \subseteq B$
4. $\{2\} \in A$ and $\{3\} \in A$ implies that $\{2, 3\} \subseteq A$

Testbook Solution Correct Option **- 2**

Concept:

For a set A and B:

- A ∪ B is a set containing all the elements of set A and set B.
- A ∩ B is a set containing only the common elements in the set A and set B
- Subset (⊂) is the set such that all the elements of the subset are in the set from which the subset is taken from.

Calculation:

{2, 3} ⊆ A implies that 2 ⊆ A and 3 ⊆ A is false because it implies 2 ∈ A and 3 ∈ A

Que. 19 If $2x^2 + 7xy + 3y^2 + 8x + 14y + \lambda = 0$ represents a pair of straight lines, the value of λ is

1. 2
2. 4
3. 6
4. 8

Testbook Solution Correct Option **- 4**

Concept:

Let second-degree equation be $ax^2 + by^2 + 2hxy + 2gx + 2fy + c = 0$

It will represent a **pair of straight lines,** If discriminant (Δ) of this equation equal to zero (Δ = 0)

Discriminant = Δ = $\begin{vmatrix} a & h & g \\ h & b & f \\ g & f & c \end{vmatrix} = abc + 2fgh - af^2 - bg^2 - ch^2$

Calculation:

Given: Second degree equation, $2x^2 + 7xy + 3y^2 + 8x + 14y + \lambda = 0$

Compare with second-degree equation $ax^2 + by^2 + 2hxy + 2gx + 2fy + c = 0$

So, a = 2, b = 3, h = $\frac{7}{2}$, g = 4, f = 7 and c = λ

Given equation represents a pair of straight lines

So, Δ = abc + 2fgh - af^2 - bg^2 - ch^2 = 0

⇒ $2 \times 3 \times \lambda + 2 \times 7 \times 4 \times \frac{7}{2} - 2 \times (7)^2 - 3 \times (4)^2 - \lambda \times (\frac{7}{2})^2 = 0$

⇒ $6\lambda + 196 - 98 - 48 - \frac{49\lambda}{4} = 0$

⇒ $50 - \frac{25\lambda}{4} = 0$

⇒ $200 - 25\lambda = 0$

∴ λ = 8

Que. 20 The area of the region bounded by the lines y = |x - 1| and y = 3 - |x| is

1. 3 sq. units
2. 4 sq. units
3. 6 sq. units
4. 2 sq. units

Testbook Solution Correct Option **- 2**

Concept:

The **area between the curves** $y_1 = f(x)$ and $y_2 = g(x)$ is given by:

Area enclosed = $\int_{x_1}^{x_2} (y_1 - y_2)dx$

Where, x_1 and x_2 are the intersections of curves y_1 and y_2

Calculation:

Shaded area has to be calculated

Curve 1: $y = |x - 1|$

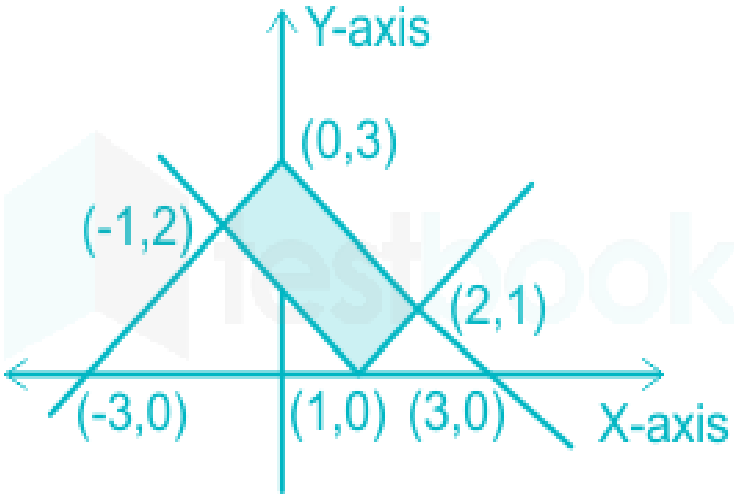
$\Rightarrow y = 1 - x$ for $x < 1$

$\Rightarrow y = x - 1$ for $x \geq 1$

Curve 2: $y = 3 - |x|$

$\Rightarrow y = 3 + x$ for $x < 0$

$\Rightarrow y = 3 - x$ for $x \geq 0$



Area enclosed (A) = $\int_{x_1}^{x_2}(y_1 - y_2)dx$

$\Rightarrow A = \int_{-1}^{2} 3 - |x| - |x - 1|\, dx$

$\Rightarrow A = \left|\int_{-1}^{0} 3 + x - (1 - x)dx\right| + \left|\int_{0}^{1} 3 - x - (1 - x)dx\right| + \left|\int_{1}^{2} 3 - x - (x - 1)dx\right|$

$\Rightarrow A = \left|\int_{-1}^{0}(2 + 2x)dx\right| + \left|\int_{0}^{1} 2dx\right| + \left|\int_{1}^{2}(4 - 2x)dx\right|$

$\Rightarrow A = \left|[2x + x^2]_{-1}^{0}\right| + \left|[2x]_{0}^{1}\right| + \left|[4x - x^2]_{1}^{2}\right|$

$\Rightarrow \mathbf{A = 1 + 2 + 1 = 4}$ **sq. units**

Que. 21 In a triangle ABC, a = 4, b = 3, ∠BAC = 60°, then the education for which c is the root, is

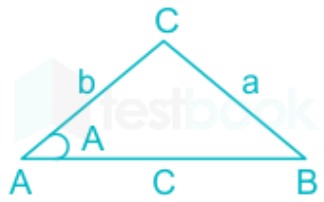
1. $c^2 + 3c + 7 = 0$
2. $c^2 + 3c - 7 = 0$
3. $c^2 - 3c + 7 = 0$
4. $c^2 - 3c - 7 = 0$

Testbook Solution Correct Option **- 4**

Concept:

Cosine formula or cosine rule

- $a^2 = b^2 + c^2 - 2bc \cos A \Leftrightarrow \cos A = \frac{b^2 + c^2 - a^2}{2bc}$
- $b^2 = a^2 + c^2 - 2ac \cos B$
- $c^2 = a^2 + b^2 - 2ab \cos C$



Calculation:

Given: a = 4, b = 3, ∠BAC = 60°

Using cosine formula, we get

$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$

$\Rightarrow \cos 60 = \frac{3^2 + c^2 - 4^2}{2 \times 3 \times c}$

$\Rightarrow \frac{1}{2} \times 6c = 9 + c^2 - 16$

$\Rightarrow c^2 - 3c - 7 = 0$

Que. 22 If $\cos\theta = \frac{5}{13}, \frac{3\pi}{2} < \theta < 2\pi$, then tan 2θ is

1. $-\frac{120}{119}$
2. $-\frac{120}{169}$
3. $\frac{120}{169}$
4. $\frac{120}{119}$

Testbook Solution Correct Option - **4**

Concept:

$\tan 2\theta = \frac{2\tan\theta}{1-\tan^2\theta}$

$\cos\theta = \frac{\text{base}}{\text{hypotenuse}}$

$\tan\theta = \frac{\text{perpendicular}}{\text{base}}$

$\text{Hypotenuse}^2 = \text{Perpendicular}^2 + \text{Base}^2$

Calculation:

Given

$\cos\theta = \frac{5}{13}, \frac{3\pi}{2} < \theta < 2\pi$

From above θ lies in the fourth quadrant

so the tan θ will be negative

Hypotenuse = 13

Base = 5

Perpendicular = $\sqrt{13^2 + 5^2} = \pm 12$

$\tan\theta = \frac{\text{perpendicular}}{\text{base}}$

$\tan\theta = \frac{-12}{5}$, **tan θ is negative in the fourth quadrant**

$\tan 2\theta = \frac{\frac{2\times -12}{5}}{1-\frac{-12^2}{5^2}}$

$\tan 2\theta = \frac{120}{119}$

Que. 23 An experiment has 10 equally likely outcomes. Let A and B be two non-empty events of the experiment. If A consists of 4 outcomes, the number of outcomes that B must have so that A and B are independent, is

1. 2, 4 and 8
2. 3, 6 or 9
3. 4 or 8
4. 5 or 10

Testbook Solution Correct Option **- 4**

Concept:

Let S be the sample space. A be any event then

$$P(A) = \frac{n(A)}{n(S)}$$

The experiment A and B are independent.

$\Rightarrow P(A \cap B) = P(A).P(B)$

Calculations:

Given, An experiment has 10 equally likely outcomes. Let A and B be two non-empty events of the experiment.

n(B) and $n(A \cap B)$ be the number of outcomes of experiment B and $A \cap B$ respectively.

As the experiment A and B are independent.

$\Rightarrow P(A \cap B) = P(A).P(B)$

$$\Rightarrow \frac{n(A \cap B)}{10} = \frac{n(A)}{10}.\frac{n(B)}{10}$$

$$\Rightarrow \frac{n(A \cap B)}{10} = \frac{4}{10}.\frac{n(B)}{10}$$

$$\Rightarrow n(A \cap B) = \frac{2}{5}.n(B)$$

$\Rightarrow 5\, n(A \cap B) = 2\, n(B)$

$\Rightarrow$ n(B) = 5 or 10.

Hence, An experiment has 10 equally likely outcomes. Let A and B be two non-empty events of the experiment. If A consists of 4 outcomes, the number of outcomes that B must have so that A and B are independent, is 5 or 10.

Que. 24 Let $\vec{a}, \vec{b}$ and $\vec{c}$ be three non-zero vectors, no two of which are collinear. If the vector $\vec{a} + 2\vec{b}$ is collinear with $\vec{c}$ and $\vec{b} + 3\vec{c}$ is collinear with $\vec{a}$, then $\vec{a} + 2\vec{b} + 6\vec{c}$ is equal to

1. $\lambda\vec{a}$
2. $\lambda\vec{b}$
3. $\lambda\vec{c}$
4. $\vec{0}$

Testbook Solution Correct Option **- 4**

Calculations:

Given, Let $\vec{a}, \vec{b}$ and $\vec{c}$ be three non-zero vectors, no two of which are collinear.

Let the vector $\vec{a} + 2\vec{b}$ is collinear with $\vec{c}$

$\Rightarrow \vec{a} + 2\vec{b} = x\vec{c}$ .... (1)

$\vec{b} + 3\vec{c}$ is collinear with $\vec{a}$

$\Rightarrow \vec{b} + 3\vec{c} = y\vec{a}$

$\Rightarrow \vec{b} = y\vec{a} - 3\vec{c}$

Put the value of $\vec{b}$ in equation 1st, we get

$\Rightarrow \vec{a} + 2(y\vec{a} - 3\vec{c}) = x\vec{c}$

$\Rightarrow (1 + 2y)\vec{a} - (6 + x)\vec{c} = 0$

Compare both sides, we get

$1 + 2y = 0$ and $6 + x = 0$

$\therefore x = -6$

Put the value of x in equation (1), we get

$\vec{a} + 2\vec{b} = -6\vec{c}$

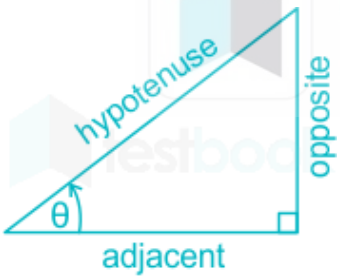
$\vec{a} + 2\vec{b} + 6\vec{c} = 0 = \vec{0}$

Que. 25 A circus artist is climbing a 20 m long rope, which is tightly stretched and tied from the top of a vertical pole to the ground. Find the height of the pole, if the angle made by the rope with the ground level is 30°.

1. 10 m
2. 20 m
3. 30 m
4. 40 m

Testbook Solution Correct Option **- 1**

Concept:



$\tan \theta = \frac{\text{opposite side}}{\text{adjacent side}}$

$\sin \theta = \frac{\text{opposite side}}{\text{hypotenuse}}$

$\cos \theta = \frac{\text{adjacent side}}{\text{hypotenuse}}$

Calculation:

Given

Length of the rope **(l) = 20 m**

which is the hypotenuse of the triangle

angle made by the rope with the ground **(θ) = 30°**

let the height of the pole be = **h**

which will be the opposite side of the triangle

$\sin \theta = \frac{\text{opposite side}}{\text{adjacent side}}$

$\sin 30° = \frac{h}{l} = \frac{h}{20}$

$\sin 30° = \frac{1}{2}$

∴ **h = 10 m**

Que. 26 There are n equally spaced points 1, 2, ... n marked on the circumference of a circle. If the point 15 is directly opposite to the point 49, then the total number of points is

1. 50
2. 68
3. 66
4. 70

Testbook Solution Correct Option **- 2**

Concept:

Consider n equally spaced points 1, 2, ... 12 marked on the circumference of a circle.

Number of points on Rightside = **(Difference of directly opposite point) - 1** = (12 - 6) - 1 = 5

Number of points on Leftside = **(Difference of directly opposite point) - 1** = (12 - 6) - 1 = 5

Total number of points = Rightside points + Leftside points + directly opposite points = 5 + 5 + 2 = 12points

Calculation:

Directly opposite points are 49 and 15

Difference of directly opposite point = 49 - 15 = 34

Number of points on Rightside = 34 - 1 = 33

Number of points on Leftside = 34 - 1 = 33

Total number of points = 33 + 33 + 2 = 68

Que. 27 Let S = {1, 2, ..., n}. The number of possible pairs of the form (A, B) with A ⊆ B for subsets A, B of S is

1. 2^n
2. 3^n
3. n!
4. $\Sigma_{k=0}^{n} \binom{n}{k} \binom{n}{n-k}$

Testbook Solution Correct Option **- 1**

Concept:

Let A be a finite set having n elements. Then, the number of subsets of A is given by: 2^n.

Que. 28 The probability that A speaks truth is 4 / 5 while this probability for B is 3 / 4. The probability that they contradict each other when asked to speak on a fact is

1. 3 / 20
2. 1 / 5
3. 7 / 20

4. 4 / 5

Testbook Solution Correct Option **- 3**

Concept:

P(A') = 1 - P(A)

Calculations:

Given, A : the event A speaks truth

$\Rightarrow P(A) = \frac{4}{5}$

A ' : the event A does not speak truth

$\Rightarrow P(A') = 1 - P(A) = 1 - \frac{4}{5} = \frac{1}{5}$

B : the event B speaks truth

$\Rightarrow P(B) = \frac{3}{4}$

B ' : the event B does not speak truth

$\Rightarrow P(B') = 1 - P(B) = 1 - \frac{3}{4} = \frac{1}{4}$

The probability that they contradict each other when asked to speak on a fact = P(A)P(B') + P(B)P(A')

$= \frac{4}{5} \times \frac{1}{4} + \frac{3}{4} \times \frac{1}{5}$

$= \frac{7}{20}$

Que. 29 The sum of the expression $\frac{1}{\sqrt{1}+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}} + \ldots + \frac{1}{\sqrt{80}+\sqrt{81}}$ is

1. 7
2. 8
3. 9
4. 10

Testbook Solution Correct Option **- 2**

Calculation:

$\frac{1}{\sqrt{1}+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}} + \ldots + \frac{1}{\sqrt{80}+\sqrt{81}}$

rationalize the numerator and denominator

$= \frac{1}{\sqrt{1}+\sqrt{2}} \times \frac{\sqrt{2}-\sqrt{1}}{\sqrt{2}-\sqrt{1}} + \frac{1}{\sqrt{2}+\sqrt{3}} \times \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}-\sqrt{2}} + \frac{1}{\sqrt{3}+\sqrt{4}} \times \frac{\sqrt{4}-\sqrt{3}}{\sqrt{4}-\sqrt{3}} + \ldots + \frac{1}{\sqrt{80}+\sqrt{81}} \times \frac{\sqrt{81}-\sqrt{80}}{\sqrt{81}-\sqrt{80}}$

$= \sqrt{2} - \sqrt{1} + \sqrt{3} - \sqrt{2} + \sqrt{4} - \sqrt{3} + \ldots + \sqrt{80} - \sqrt{79} + \sqrt{81} - \sqrt{80}$

$= \sqrt{81} - \sqrt{1}$

$= 9 - 1$

$= 8$

$\therefore \frac{1}{\sqrt{1}+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}} + \ldots + \frac{1}{\sqrt{80}+\sqrt{81}} = 8$

Que. 30 Consider the function f defined by $f(x) = \begin{cases} x^2 - 1, & x < 3 \\ 2ax, & x \geq 3 \end{cases}$ for all real numbers x. If f is continuous at x = 3, then value of a

1. 8
2. 3 / 4

3. 1 / 8
4. 4 / 3

Testbook Solution Correct Option **- 2**

Concept:

If function f(x) is continuous at x = a then $\lim_{x\to a}^{+} f(x) = \lim_{x\to a}^{-} f(x) = f(a)$

Calculations:

Given the function f defined by $f(x) = \begin{cases} x^2 - 1, & x < 3 \\ 2ax, & x \geq 3 \end{cases}$ for all real numbers x

f is continuous at x = 3

$\Rightarrow \lim_{x\to 3}^{+} f(x) = \lim_{x\to 3}^{-} f(x) = f(3)$ ....(1)

Consider, $\lim_{x\to 3}^{-} f(x) = \lim_{x\to 3}^{-} x^2 - 1$

$\Rightarrow \lim_{x\to 3}^{-} f(x) = (3)^2 - 1 = 8$ ....(2)

Now, $\lim_{x\to 3}^{+} f(x) = \lim_{x\to 3}^{+} 2ax$

$\Rightarrow \lim_{x\to 3}^{+} f(x) = 2a(3) = 6a$ ....(3)

and f(3) = 6a

From equation (1), (2) , and (3), we have

$\Rightarrow$ 6a = 8

$\Rightarrow$ a = 3 / 4

Que. 31 Three houses are available in a locality. Three persons apply for the houses. Each applies for one house without consulting others. The probability that all the three apply for the same house is

1. 8 / 9
2. 7 / 9
3. 2 / 9
4. 1 / 9

Testbook Solution Correct Option **- 4**

Concept:

P(E) = Probability of an event E = $\frac{\text{Favourable outcome}}{\text{Total outcome}}$

Number of ways of choosing **m** objects by **n** people with no restriction = m^n

Calculation:

Given

number of house **(m) = 3**

number of people applying for house**(n) = 3**

total number of way three people can apply for house = $3^3 = 27$

Number of way in which all people apply for same house = 3

P(all three applying for same house) = $\frac{3}{27} = \frac{1}{9}$

Que. 32 Five horses are in a race. Mr. A selects two of the horses at random and bets on them. The probability that Mr. A selected the winning horse is

1. 3 / 5
2. 1 / 5
3. 2 / 5
4. 4 / 5

Testbook Solution Correct Option **- 3**

Concept:

P(A) is the **probability** of an event "A" = $\frac{n(A)}{n(S)}$

Where n(A) is the number of favourable **outcomes and** n(S) is the total number of events in the sample space.

Calculations:

Give, there are 5 horses say H_1, H_2, H_3, H_4, H5

Mr. A selects two of the horses at random and bets on them

Selection of horses can be done H_1H_2, H_1H_3, H_1H_4, H_1H_5, H_2H_3, H_2H_4, H_2H_5, H_3H_4, H_3H_5, H_4H_5 = 10 ways.

Only one horse say H_3 can win = H_1H_3, H_2H_3, H_3H_4, H_3H_5 = 4 ways

The probability that Mr. A selected the winning horse is = $\frac{4}{10} = \frac{2}{5}$

Que. 33 If $3^x = 4^{x-1}$, then x =

1. $\frac{2-\log_3 2}{2\log_3 2-1}$
2. $\frac{2}{2\log_3 2-1}$
3. $\frac{2-\log_3 2}{2\log_3 2+1}$
4. $\frac{2-\log_3 2}{2\log_2 3-1}$

Testbook Solution Correct Option **- 2**

Concept:

Logarithm Rule: $\log a^x = x \log a$

Calculations:

Given, $3^x = 4^{x-1}$

Taking logarithm on both side, we get

$\Rightarrow \log 3^x = \log 4^{x-1}$

$\Rightarrow x \log 3 = (x - 1) \log 4$

$\Rightarrow x \log 3 = x \log 4 - \log 4$

$\Rightarrow x (\log 4 - \log 3) = \log 4$

$\Rightarrow x = \frac{\log 4}{\log 4 - \log 3}$

$\Rightarrow x = \frac{\log 2^2}{\log 2^2 - \log 3}$

$\Rightarrow x = \frac{2\log 2}{2\log 2 - \log 3}$

$\Rightarrow x = \frac{2\log 2}{2\log_3 2 - 1}$

Hence, If $3^x = 4^{x-1}$, then $x = \frac{2\log 2}{2\log_3 2 - 1}$

Que. 34

The matrix A has x rows and (x + 5) columns and the matrix B has y rows and (11 - y) columns. If both the matrices AB and BA exits, then the value of x and y are

1. 8, 3
2. 3, 5
3. 3, 8
4. 8, 5

Testbook Solution Correct Option **- 3**

Concept:

A is a matrix of order **m x n** and **B** is a matrix of order **p x q**

Where **m** is number of rows and **n** is number of column of matrix **A**

Similarly **p** is number of row and **q** is number of column of matrix **B**

For matrix multiplication to exist: N**umber of column** of first matrix **equal to** number rows of **second matrix**

So for matrix multiplication **AB , n = p**

So for matrix multiplication **BA , q = m**

Calculation:

Given

Matrix A

number of rows(**m**) = x

number of column(**n**) = x + 5

Matrix B

number of rows(**p**) = y

number of column(**q**) = 11 - y

Both **AB** and **BA** exists

n = p ⇒ x + 5 = y ....(1)

m = q ⇒11 - y = x ....(2)

put the value of y from 1 in 2

11-(x + 5) = x

11 - 5 - x = x

6 = 2 x

∴ x = 3

from 1 putting x=3

y = 8

∴ **x = 3 and y = 8**

Que. 35 the number of points in $(-\infty, \infty)$, for which $x^2 - x \sin x - \cos x = 0$ is

1. 6
2. 4
3. 2
4. 0

Testbook Solution Correct Option **- 4**

Concept:

$\frac{d \sin x}{dx} = \cos x$

$\frac{d \cos x}{dx} = -\sin x$

$\frac{d(uv)}{dx} = u\frac{dv}{dx} + v\frac{du}{dx}$

Calculation:

Let $f(x) = x^2 - x \sin x - \cos x$

Differentiate with respect to x, we get

$f'(x) = 2x - x\cos x - \sin x + \sin x = x(2 - \cos x)$

Differentiate the equation and compare to zero

$x(2 - \cos x) = 0$

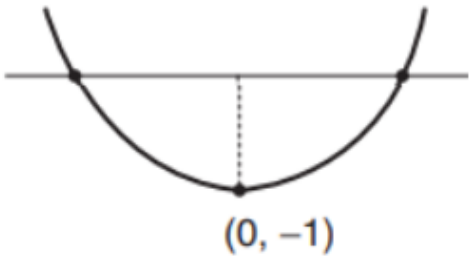
Maximum value of cos x = 1

So, $(2 - \cos x) > 0$

f(x) is increasing when $x > 0$;

f(x)is decreasing when $x < 0$

Therefore, $f(\infty) = \infty$, $f(-\infty) = -\infty$ and $f(0) = -1$



it will cut x-axis at 2 points. Hence 2 solutions.

Que. 36 There are 4 books on fairy tales, 5 novels and 3 plays. In how many ways can they be arranged in the order, books on fairy tales, novels and then plays so that the books of same category are put together?

1. 17280
2. 103680
3. 51840
4. 360

Testbook Solution Correct Option **- 1**

Concept:

Fundamental **Counting Principle** Definition.

The Fundamental **Counting Principle** (also called the **counting** rule) is a way to figure out the number of outcomes in a probability problem. Basically, you multiply the events together to get the total number of outcomes.

Calculations:

Given, There are 4 books on fairy tales, 5 novels and 3 plays.
Here, books are arranged in the order, books on fairy tales, novels and then plays

There are 4 books on fairy tales and they have to be put together. They can be arranged in 4! ways.
There are 5 novels. They can be arranged in 5! ways.
And there are 3 plays. They can be arranged in 3! ways.

So, by the counting principle all of them together can be arranged in 4!´5!´3! ways = 17280

Que. 37 Suppose a population A has 100 observations 101, 102, ..., 200 and another population B has 100 observations 151, 152, ..., 250. If V_A and V_B represents variance of the two populations respectively, then $\frac{V_A}{V_B}$ is

1. 9 / 4
2. 4 / 9
3. 1
4. 2 / 3

Testbook Solution Correct Option **- 3**

Concept:

$\sigma_x^2 = \frac{\sum d_i^2}{n}$

Calculations:

$\sigma_x^2 = \frac{\sum d_i^2}{n}$

Here the deviations are taken from the mean.

Since A and B have both 100 consecutive integers, therefore both have the same standard deviations and variance.

$\Rightarrow \sum d_i^2$ is same for both A and B

$\Rightarrow \frac{V_A}{V_B} = 1$

Que. 38 Sum of the roots of the equation $4^x - 3(2^{x+3}) + 128 = 0$ is

1. 5
2. 6
3. 7
4. 8

Testbook Solution Correct Option **- 3**

Concept:

Base Rule

If b raised to the xth power is equal to b raised to the yth power, that implies that x = y."

$b^x = b^y \Rightarrow x = y$

Calculations:

Given equation is $4^x - 3(2^{x+3}) + 128 = 0$

$\Rightarrow (2^2)^x - 3(2^x.2^3) + 128 = 0$

$\Rightarrow (2^x)^2 - 24(2^x) + 128 = 0$

$\Rightarrow (2^x)^2 - 16(2^x) - 8(2^x) + 128 = 0$

$\Rightarrow (2^x - 16)(2^x - 8) = 0$

$\Rightarrow 2^x = 16$ or $2^x = 8$

$\Rightarrow 2^x = 2^4$ or $2^x = 2^3$

$\Rightarrow x = 4$ or $x = 3$

The roots of the equation $4^x - 3(2^{x+3}) + 128 = 0$ are 4 and 3

Its Sum = 4 + 3 = 7

Que. 39 If the sum of the slopes of the lines given by $x^2 - 2cxy - 7y^2 = 0$ is four time their products, then the value of c is

1. 1
2. -1

3. -2
4. 2

Testbook Solution Correct Option **- 4**

Concept:

Let m_1 and m_2 be the slope of the line $ax^2 + 2hxy + by^2 = 0$

$\Rightarrow m_1 + m_2 = \frac{-2h}{b}$

$\Rightarrow m_1 . m_2 = \frac{a}{b}$

Calculations:

Given equation is $x^2 - 2cxy - 7y^2 = 0$

Comparing with the equation $ax^2 + 2hxy + by^2 = 0$

$\Rightarrow a = 1, h = -c$, and $b = -7$

Let m_1 and m_2 be the slope of the line $x^2 - 2cxy - 7y^2 = 0$

$\Rightarrow m_1 + m_2 = \frac{-2h}{b} = \frac{2c}{-7}$

$\Rightarrow m_1 . m_2 = \frac{a}{b} = \frac{1}{-7}$

Given, the sum of the slopes of the lines given by $x^2 - 2cxy - 7y^2 = 0$ is four time their products.

$\Rightarrow m_1 + m_2 = 4m_1 m_2$

$\Rightarrow \frac{2c}{-7} = \frac{4}{-7}$

$\Rightarrow c = 2$

Hence, if the sum of the slopes of the lines given by $x^2 - 2cxy - 7y^2 = 0$ is four-time their products, then the value of c is 2

Que. 40 The system of the equations

$x + y + 2z = a$

$x + z = b$

$2x + y + 3z = c$

has a solution if

1. $b = c$
2. $c = a + b$
3. $c = a + 2b$
4. $a = b = c$

Testbook Solution Correct Option **- 2**

Concept:

Consider the system of m linear equations

$a_{11} x_1 + a_{12} x_2 + \ldots + a_{1n} x_n = b_1$

$a_{21} x_1 + a_{22} x_2 + \ldots + a_{2n} x_n = b_2$

$\ldots$

$a_{m1} x_1 + a_{m2} x_2 + \ldots + a_{mn} x_n = b_m$

The above equations containing the n unknowns $x_1, x_2, \ldots, x_n$. To determine whether the above system of equations is consistent or not, we need to find the rank of following matrices.

$A = \begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \cdots & \cdots & \cdots & \cdots \\ a_{m1} & a_{m2} & \cdots & a_{mn} \end{bmatrix}$ and $[A|B] = \begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} & b_1 \\ a_{21} & a_{22} & \cdots & a_{2n} & b_2 \\ \cdots & \cdots & \cdots & \cdots & \cdots \\ a_{m1} & a_{m2} & \cdots & a_{mn} & b_m \end{bmatrix}$

A is the coefficient matrix and [A|B] is called an augmented matrix of the given system of equations.

We can find the consistency of the given system of equations as follows:

(i) If the rank of matrix A is equal to the rank of an augmented matrix and it is equal to the number of unknowns, then the system is consistent and there is a unique solution.

Rank of A = Rank of augmented matrix = n

(ii) If the rank of matrix A is equal to the rank of an augmented matrix and it is less than the number of unknowns, then the system is consistent and there are an infinite number of solutions.

Rank of A = Rank of augmented matrix < n

(iii) If the rank of matrix A is not equal to the rank of the augmented matrix, then the system is inconsistent, and it has no solution.

Rank of A ≠ Rank of the augmented matrix

Calculation:

From the given equations:

x + y + 2z = a

x + z = b

2x + y + 3z = c

The coefficient matrix is:

$A = \begin{bmatrix} 1 & 1 & 2 \\ 1 & 0 & 1 \\ 2 & 1 & 3 \end{bmatrix}$ and the augmented matrix, $[A|B] = \begin{bmatrix} 1 & 1 & 2 & a \\ 1 & 0 & 1 & b \\ 2 & 1 & 3 & c \end{bmatrix}$

The determinant of the matrix $[A] = \begin{vmatrix} 1 & 1 & 2 \\ 1 & 0 & 1 \\ 2 & 1 & 3 \end{vmatrix}$

$R_3 = R_3 - R_1 - R_2$

$\Rightarrow |A| = \begin{vmatrix} 1 & 1 & 2 \\ 1 & 0 & 1 \\ 0 & 0 & 0 \end{vmatrix} = 0$

∴ The rank of matrix is 2

So, the solution if the rank of matrix A is equal to rank of augmented matrix A|B = 2

$\Rightarrow [A|B] = \begin{bmatrix} 1 & 1 & 2 & a \\ 1 & 0 & 1 & b \\ 2 & 1 & 3 & c \end{bmatrix}$

$R_3 = R_3 - R_1 - R_2$

$[A|B] = \begin{bmatrix} 1 & 1 & 2 & a \\ 1 & 0 & 1 & b \\ 0 & 0 & 0 & c-a-b \end{bmatrix}$

For rank of [A|B] to be 2

c - a - b = 0

c = a + b

Que. 41 Let $f(x) = x^2 - bx + c$, b is an odd positive integer. If $f(x) = 0$ has to prime numbers as roots and $b + c = 35$, then the global minimum value of f(x) is

1. $-\frac{183}{4}$
2. $\frac{173}{16}$
3. $-\frac{81}{4}$
4. $\frac{17}{2}$

Testbook Solution Correct Option **- 3**

Concept:

The function f(x) has a global maximum at the point 'a' in the interval I if $f(a) \geq f(x)$, for all $x \in I$.

Similarly, f(x) has a global minimum at the point 'a' if $f(a) \leq f(x)$, for all $x \in I$.

Global maxima or minima in [a, b] will always occur either at the critical points of f(x) within [a, b] or at the endpoints of the interval.

Calculations:

Given, function is $f(x) = x^2 - bx + c$.

Consider α, β be the roots of the function f(x).

$\Rightarrow \alpha + \beta = b$

Here, $f(x) = 0$ has to prime numbers as roots and b is an odd positive integer.

$\Rightarrow$ One root of the function $f(x) = x^2 - bx + c$ as 2.

$\Rightarrow f(2) = 0$

$\Rightarrow 2^2 - b(2) + c = 0$

$\Rightarrow 2b - c = 4$ ....(1)

and $b + c = 35$ .... (2)

from equation (1) and (2) , we have

$\Rightarrow b = 13$ and $c = 22$.

The global minimum value of f(x) is attained $x = \frac{13}{2}$

$f(\frac{13}{2}) = (\frac{13}{2})^2 - 13.(\frac{13}{2}) + 22$

$f(\frac{13}{2}) = -\frac{81}{4}$

Hence, if $f(x) = x^2 - bx + c$, b is an odd positive integer. If $f(x) = 0$ has to prime numbers as roots and $b + c = 35$, then the global minimum

value of f(x) is $-\frac{81}{4}$

Que. 42 The vertex of the parabola whose focus is (-1, 1) and directrix is $4x + 3y - 24 = 0$ is

1. $(0, \frac{3}{2})$
2. $(0, \frac{5}{2})$
3. $(1, \frac{3}{2})$
4. $(1, \frac{5}{2})$

Testbook Solution Correct Option **- 4**

Concept:

If two lines are perpendicular then product of their slopes equal to -1

Calculation:

Given: focus is (-1, 1) and directrix is $4x + 3y - 24 = 0$

$4x + 3y - 24 = 0$ .... (1)

$\Rightarrow y = \frac{-4x}{3} + 8$

So, Slope of directrix = $\frac{-4}{3}$

As we know, Axis of parabola and directrix are perpendicular to each others

So, Slope of directrix × slope of axis = -1

$\Rightarrow \frac{-4}{3} \times$ slope of axis = -1

$\Rightarrow$ slope of axis = $\frac{3}{4}$

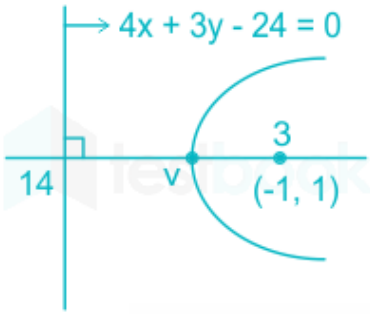
Now, Equation of axis is written as $(y - 1) = \frac{3}{4}(x + 1)$ {Focus lies on axis of parabola}

$\Rightarrow 4y - 4 = 3x + 3$

$\Rightarrow 3x - 4y + 7 = 0$ .... (2)

Solving equation (1) and (2), we get

M = (3, 4)



The midpoint of M and S is the vertex.

∴ Coordinate of vertex = $\left(\frac{3-1}{2}, \frac{4+1}{2}\right) = \left(1, \frac{5}{2}\right)$

Que. 43 The value of $\cos 20° + \cos 100° + \cos 140°$ is

1. 0
2. $\frac{1}{\sqrt{2}}$
3. $\frac{1}{2}$
4. 1

Testbook Solution Correct Option **- 1**

Concept:

cos A + **cos** B = **2 cos** $\frac{A+B}{2}$ **cos** $\frac{A-B}{2}$

cos A - **cos** B = **- 2 sin** $\frac{A+B}{2}$ **sin** $\frac{A-B}{2}$

sin A + **sin** B = **2 sin** $\frac{A+B}{2}$ **cos** $\frac{A-B}{2}$

sin A - **sin** B = **2 cos** $\frac{A+B}{2}$ **sin** $\frac{A-B}{2}$

Calculation:

$\cos 20° + \cos 100° + \cos 140° = 2 \cos \frac{20+100}{2} \cos \frac{100-20}{2} + \cos 140°$

$= 2 \cos 60° \cos 40° + \cos 140°$

$= 2 \times \frac{1}{2} \cos 40° + \cos 140°$

$= \cos 40° + \cos 140°$

$= 2 \cos \frac{140+40}{2} \cos \frac{140-40}{2}$

$= 2 \cos 90° \cos 50°$

$= 0$ $(\because \cos 90° = 0)$

$\therefore$ cos 20° + cos 100° + cos 140° = 0

Que. 44 The permutations of {a, b, c, d, e, f, g} are listed in lexicographic order. Which of the following permutations are just before and just after the permutation bacdefg?

1. agfedbc and bacdfge
2. agfedbc and badcefg
3. agfebcd and bacedgf
4. agfedcb and bacdegf

Testbook Solution Correct Option **- 4**

Concept:

Lexicographic order is the order in which the words appear in the dictionary

For the word before and after check starts from the left end

Application:

Set is {a, b, c, d, e, f, g}

The word before bacdefg is **agfedcb**

The word after bacdefg is **bacdegf**

Que. 45 The foci of the ellipse $\frac{x^2}{16} + \frac{y^2}{b^2} = 1$ and the hyperbola $\frac{x^2}{144} - \frac{y^2}{81} = \frac{1}{25}$ coincide. Then the value of b^2 is

1. 5
2. 7
3. 9
4. 1

Testbook Solution Correct Option **- 2**

Concept:

The eccentricity of the curve $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is $e^2 = 1 - \left(\frac{b^2}{a^2}\right)$

The eccentricity of the curve $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is $e^2 = 1 + \left(\frac{b^2}{a^2}\right)$

Foci of Hyperbola and Ellipse are (ae, 0) and (4e, 0)

Calculation:

For given Hyperbola $\frac{x^2}{144} - \frac{y^2}{81} = \frac{1}{25}$

$\Rightarrow \frac{25}{144}x^2 - \frac{25}{81}y^2 = 1$

$\therefore {a_h}^2 = \frac{144}{25}$ and ${b_h}^2 = \frac{81}{25}$

Eccentricity of hyperbola

${e_h}^2 = 1 + \left(\frac{{b_h}^2}{{a_h}^2}\right)$

$\Rightarrow {e_h}^2 = 1 + \left(\frac{81}{144}\right)$

$\Rightarrow {e_h}^2 = \frac{225}{144} \Rightarrow \mathbf{e_h = \frac{15}{12}}$

Focus of hyperbola $F_h = (a_h e_h, 0)$, Where e_h is the eccentricity of the hyperbola.

$\Rightarrow F_h = \left(\left(\frac{12}{5} \times \frac{15}{12}\right), 0\right)$

$\Rightarrow$ **F_h = (3, 0)**

For given Ellipse $\frac{x^2}{16} + \frac{y^2}{b^2} = 1$

$\therefore a_e{}^2 = 16$ and $b_e{}^2 = b^2$

Focus of ellipse $F_e = (ae, 0) = (4e_e, 0)$, Where e_e is eccentricity of the ellipse.

Given Focus of ellipse $F_e = F_h$

$\Rightarrow (4e_e, 0) = (3, 0)$

$\Rightarrow 4e_e = 3 \Rightarrow e_e = \mathbf{\frac{3}{4}}$

Also Eccentricity of an ellipse

$e_e{}^2 = 1 - \left(\frac{b_e{}^2}{a_e{}^2}\right)$

$\Rightarrow \left(\frac{3}{4}\right)^2 = 1 - \left(\frac{b^2}{4^2}\right)$

$\Rightarrow 1 - \frac{9}{16} = \frac{b^2}{16}$

$\Rightarrow \mathbf{b^2 = 7}$

Que. 46 If $\vec{a}, \vec{b}$ are vectors such that $|\vec{a} + \vec{b}| = \sqrt{29}$ and $\vec{a} \times (2\hat{i} + 3\hat{j} + 4\hat{k}) = (2\hat{i} + 3\hat{j} + 4\hat{k}) \times \vec{b}$ then possible value of $(\vec{a} + \vec{b}).(-7\hat{i} + 2\hat{j} + 3\hat{k})$ is

1. 0
2. 3
3. 4
4. 8

Testbook Solution Correct Option - **3**

Concept:

- The **cross product** of vector to itself = 0
- The **cross product** of collinear vectors = 0
- The **dot product** of collinear vectors = **Product** of their **Magnitudes**
- $\vec{a} \times \vec{b} = -\vec{b} \times \vec{a}$
- For **dot** product $(\vec{P} + \vec{Q}) \cdot \vec{R} = (\vec{P} \cdot \vec{R}) + (\vec{Q} \cdot \vec{R})$
- For **cross** product $(\vec{P} + \vec{Q}) \times \vec{R} = (\vec{P} \times \vec{R}) + (\vec{Q} \times \vec{R})$
- The unit vector in the direction of a $\vec{P} = \hat{P} = \frac{\vec{P}}{|\vec{P}|}$
- A vector $\vec{X}$ in direction of $\vec{P}$ = (Magnitude of $\vec{X}$) × $\hat{P}$

Calculation:

Given:

$\vec{a} \times (2\hat{i} + 3\hat{j} + 4\hat{k}) = (2\hat{i} + 3\hat{j} + 4\hat{k}) \times \vec{b}$

$\Rightarrow \vec{a} \times (2\hat{i} + 3\hat{j} + 4\hat{k}) - (2\hat{i} + 3\hat{j} + 4\hat{k}) \times \vec{b} = 0$

$\Rightarrow \vec{a} \times (2\hat{i} + 3\hat{j} + 4\hat{k}) + \vec{b} \times (2\hat{i} + 3\hat{j} + 4\hat{k}) = 0$

$\Rightarrow \mathbf{(\vec{a} + \vec{b}) \times (2\hat{i} + 3\hat{j} + 4\hat{k}) = 0}$

It means the $\vec{a} + \vec{b}$ and $2\hat{i} + 3\hat{j} + 4\hat{k}$ are collinear vectors.

$\therefore \vec{a} + \vec{b} = |\vec{a} + \vec{b}| \times \frac{2\hat{i}+3\hat{j}+4\hat{k}}{|2\hat{i}+3\hat{j}+4\hat{k}|}$

$\Rightarrow \vec{a}+\vec{b}=\sqrt{29}\times\frac{2\hat{i}+3\hat{j}+4\hat{k}}{\sqrt{29}}$

$\Rightarrow \mathbf{\vec{a}+\vec{b}=2\hat{i}+3\hat{j}+4\hat{k}}$

$(\vec{a}+\vec{b})\cdot(-7\hat{i}+2\hat{j}+3\hat{k})=\left(2\hat{i}+3\hat{j}+4\hat{k}\right)\cdot\left(-7\hat{i}+2\hat{j}+3\hat{k}\right)$

$\Rightarrow (\vec{a}+\vec{b})\cdot(-7\hat{i}+2\hat{j}+3\hat{k})=(2\times(-7)+3\times2+4\times3)$

$\Rightarrow (\vec{a}+\vec{b})\cdot(-7\hat{i}+2\hat{j}+3\hat{k})=(-14+6+12)$

$\Rightarrow \mathbf{(\vec{a}+\vec{b})\cdot(-7\hat{i}+2\hat{j}+3\hat{k})=4}$

Que. 47 Let $x_1, x_2, ..., x_n$ be n observations such that $\sum x^2_i = 400$ and $\sum x_i = 80$. Then a possible value of n among the following is

1. 10
2. 15
3. 20
4. 8

Testbook Solution Correct Option **- 3**

concept:

Variance = $\frac{\sum(x-\mu)^2}{N}$,where , μ = mean

Variance $\geq$ 0

$\frac{\sum x^2}{N}\geq\mu^2$

Calculation:

sum of n observation $\sum x_i = 80$

sum of the square of n observation $\sum x^2_i = 400$

$\mu=\frac{80}{n}$

$\frac{\sum x^2}{n}=\frac{400}{n}$

$\frac{\sum x^2}{n}\geq\mu^2$

$\frac{400}{n}\geq\frac{80^2}{n^2}$

$n \geq 16$

From options,

$\therefore n = 20$

Que. 48 Area of the greatest rectangle that can be inscribed in the ellipse is

1. $\sqrt{ab}$
2. 2ab
3. ab
4. a / b

Testbook Solution Correct Option **- 2**

Concept:

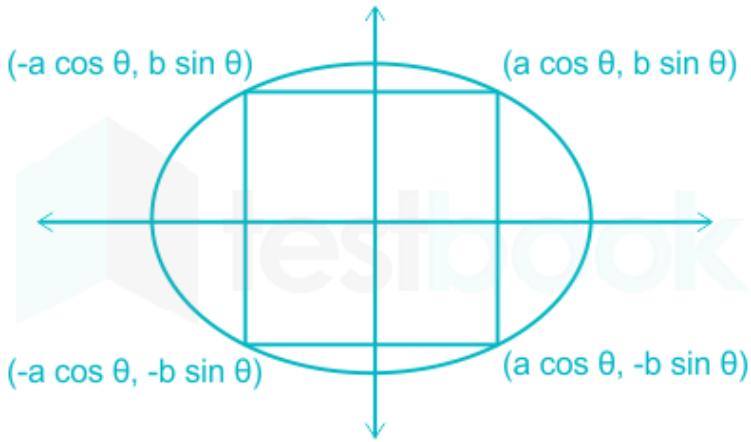
The parametric point on the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ is (± a cosθ, ± b sinθ)

Where 2a is the length of the major axis and 2b is the length of the minor axis.

Calculation:

Let the coordinate point of the edge of the rectangle be (see diagram)

(a cosθ, sinθ), (-a cosθ, b sinθ), (-a cosθ, -b sinθ) and (a cosθ, -b sinθ)



The length of the rectangle = 2a cosθ

The breadth of the rectangle = 2b sinθ

Area of the rectangle = 2a cosθ × 2b sinθ

⇒ Area of the rectangle = 4ab cosθ sinθ = **2ab sin2θ** (∵ 2 sinθ cosθ = sin2θ)

To maximize area the value of sin2θ should be maximum, i.e., **sin2θ = 1**

Maximum area of the rectangle in the ellipse = 2ab

Que. 49 Two common tangents to the circle $x^2 + y^2 = 2a^2$ and parabola $y^2 = 8ax$ are

1. $x = \pm (y + 2a)$
2. $y = \pm (x + 2a)$
3. $x = \pm (y + a)$
4. $y = \pm (x + a)$

Testbook Solution Correct Option **- 2**

Concept:

Standard equation of Parabola $y^2 = 4ax$

Equation of a tangent to the Parabola $y = mx + \frac{a}{m}$, Where m is the slope of the tangent

Equation of a circle with center (0,0) and radius r is $x^2 + y^2 = r^2$

Perpendicular distance from centre of a circle to the tangent to a circle is the **radius** of a circle

Perpendicular distance of a point (x_1, y_1) from a line $Ax + By + C = 0$ is $\left|\frac{Ax_1+By_1+C}{\sqrt{A^2+B^2}}\right|$

Calculation:

Given

Equation of parabola $y^2 = 8ax$

Equation of circle $x^2 + y^2 = 2a^2$

hence radius r = $\sqrt{2}a$

comparing the Parabola equation with the standard equation

so the equation of a tangent to given parabola is $y = mx + \frac{2a}{m}$ ....(1)

Perpendicular distance of the above line from center of circle (0,0) is equal to radius of circle $\sqrt{2}a$

$\frac{\frac{2a}{m}}{\sqrt{m^2+1}} = \sqrt{2}a$

$\Rightarrow \frac{2a}{m} = \sqrt{2}a\sqrt{m^2+1}$

Squaring both sides and arranging the equation

$m^4 + m^2 - 2 = 0 \Rightarrow (m^2+2)(m^2-1) = 0$

(m^2+2) =0 not possible as slope cannot be a complex number

$(m^2-1) = 0 \Rightarrow m = \pm 1$

put the value of m in equation 1 to get the equation of the common tangent

$y = \pm(x + 2a)$

Que. 50 If $a_1, a_2, ..., a_n$ are in A.P. and $a_1 = 0$, then the value of

$$\left(\frac{a_3}{a_2} + \frac{a_4}{a_3} + \ldots + \frac{a_n}{a_{n-1}}\right) - a_2\left(\frac{1}{a_2} + \frac{1}{a_3} + \ldots + \frac{1}{a_{n-2}}\right)$$ is equal to

1. $(n-2) + \frac{1}{n-2}$
2. $\frac{1}{n-2}$
3. n - 2
4. $n - \frac{1}{n-2}$

Testbook Solution Correct Option - **1**

Concept:

For a series $a_1, a_2, a_3, \ldots, a_n$ is in A.P

n^{th} term of A.P is given as $a_n = a_1 + (n-1)d$

a_1 is the first term of A.P, n is the term of A.P to find, d is the common difference

Calculation:

Given:

First term of A.P $(a_1) = 0$

So $a_2 = d, a_3 = 2d, a_4 = 3d$

Similarly $a_{n-2} = (n-3)d$,$a_{n-1} = (n-2)d$, $a_n = (n-1)d$

$\left(\frac{a_3}{a_2} + \frac{a_4}{a_3} + \ldots + \frac{a_n}{a_{n-1}}\right) - a_2\left(\frac{1}{a_2} + \frac{1}{a_3} + \ldots + \frac{1}{a_{n-2}}\right)$

$= \left(\frac{2d}{d} + \frac{3d}{2d} + \ldots + \frac{(n-1)d}{(n-2)d}\right) - d\left(\frac{1}{d} + \frac{1}{2d} + \ldots.. + \frac{1}{(n-3)d}\right)$

$= \left(\frac{2}{1} + \frac{3}{2} + \ldots + \frac{(n-1)}{n-2}\right) - \left(\frac{1}{1} + \frac{1}{2} + \ldots.. + \frac{1}{n-3}\right)$

$= (2-1) + \left(\frac{3}{2} - \frac{1}{2}\right) + \ldots + \left(\frac{n-2}{n-3} - \frac{1}{n-3}\right) + \frac{n-1}{n-2}$

$= 1 + 1 + \ldots.. + 1 + \frac{n-1}{n-2}$

$= n - 3 + \frac{n-1}{n-2}$

$= \frac{n^2-5n+6+n-1}{n-2}$

$= \frac{n^2-4n+4+1}{n-2}$

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

$$\left(\frac{a_3}{a_2}+\frac{a_4}{a_3}+\ldots+\frac{a_n}{a_{n-1}}\right)-a_2\left(\frac{1}{a_2}+\frac{1}{a_3}+\ldots+\frac{1}{a_{n-2}}\right)=\mathrm{n}-2+\frac{1}{\mathrm{n}-2}$$

Que. 51 A, B, C, D, E, F and G are members of a family consisting of four adults, three children, three male and four female. Out of the children, F and G are girls. A and D are brothers and A is a doctor. E is an engineer married to one of the brothers and has two children. B is married to D and G is their child. Who is C?

1. E's daughter
2. A's son
3. G's Brother
4. F' Father

Testbook Solution Correct Option **- 2**

Preparing the family tree using the following symbols,

Symbol in Diagram	Meaning
○	Female
□	Male
=	Married couple
—	Siblings
|	Difference of a generation

Given,

1) A, B, C, D, E, F and G are members of a family.

2) consisting of four adults, three children, three male and four female.

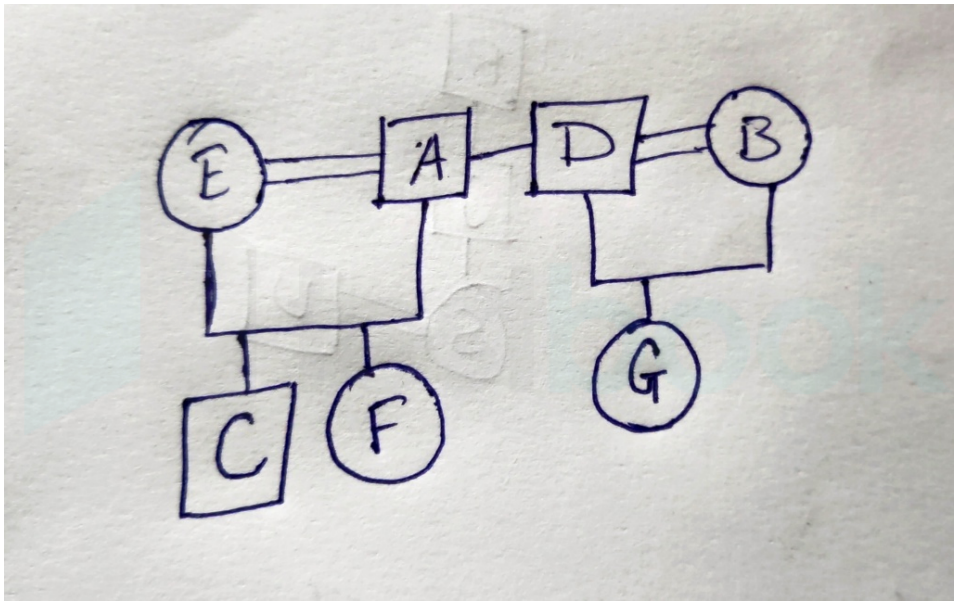
3) Out of the children F and G are girls.

4) A and D are brothers and A is a doctor.

5) E is an engineer married to one of the brothers and has two children.

6) B is married to D and G is their child.

Thus,



Here, we see C is the son of A.

Hence, the correct answer is **A's son.**

Que. 52 P, Q, R and S are four logical statements such that if P is true, then Q is true; if Q is true, then R is true; and if S is false, then both Q and R is true.. Then it follows that

1. if S is false, then both Q and R is true.
2. If at least one of Q and R is true, then S is false
3. If P is true, then S is false.
4. If Q is true, then S is true

Testbook Solution Correct Option **- 1**

Checking the given options:

1) if S is false, then both Q and R is true → This statement follows because as given in the question 'if S is false, then both Q and R is true'.

2) If at least one of Q and R is true, then S is false → This statement is not followed because it is complementary to the statement given in question 'if S is false, then both Q and R is true'.

3) If P is true, then S is false → we can not conclude this statement because in question there is no relation given between P and S.

4) If Q is true, then S is true → This statement is not followed because it is given in question 'if S is false, then both Q and R is true'.

Hence, 'if S is false, then both Q and R is true' is the correct answer.

Que. 53 Eight friends J, K, L, M, N, O, P and Q live on eight different floors of a building but not necessarily in the same order. The lowermost floor of the building is numbered one, the one above that is numbered two and so on until the topmost floor is numbered eight.

- J lives on floor numbered six.
- Only one person lives between J and L.
- O lives on the floor immediately below L.
- Only one person lives between O and P.
- O lives above P.
- K lives on an even-numbered floor but not on the floor numbered two.
- Two persons live between K and Q.
- Q does not live on the lowermost floor.
- N lives on one of the floors above Q.

If P and L interchange their places, who will live between P and M?

1. O
2. L
3. J
4. No one

Testbook Solution Correct Option **- 1**

Given,

Eight friends J, K, L, M, N, O, P and Q live on eight different floors of a building but not necessarily in the same order. The lowermost floor of the building is numbered one, the one above that is numbered two and so on until the topmost floor is numbered eight.

- J lives on floor numbered six.

8	
7	
6	J
5	
4	
3	
2	
1	

- Only one person lives between J and L.

Case - 1

8	
7	
6	J
5	
4	L
3	
2	
1	

Case - 2

8	L
7	
6	J
5	
4	
3	
2	
1	

- O lives on the floor immediately below L.

Case - 1

8	
7	
6	J
5	
4	L
3	O
2	
1	

Case - 2

8	L
7	O
6	J
5	
4	
3	
2	
1	

- Only one person lives between O and P.
- O lives above P.

Case - 1

8	
7	
6	J
5	
4	L
3	O
2	
1	P

Case - 2

8	L
7	O
6	J
5	P
4	
3	
2	
1	

- K lives on an even-numbered floor but not on the floor numbered two.

Case - 1

8	K
7	
6	J
5	
4	L
3	O
2	
1	P

Case - 2

8	L
7	O
6	J
5	P
4	K
3	
2	
1	

- Two persons live between K and Q.
- Q does not live on the lowermost floor. By this statement, we can eliminate case 2 and we continue with case 1.

Case - 1

8	K
7	
6	J
5	Q
4	L
3	O
2	
1	P

- N lives on one of the floors above Q. So the final arrangement is :

Case - 1

8	K
7	N
6	J
5	Q
4	L
3	O
2	M
1	P

From the above arrangement we see, If P and L interchange their places then O lives between P and M.

Hence, the correct answer is **O.**

Que. 54 Three of the following four are alike in a certain way based on the given arrangement and thus form a group. Which of the following does not belong to the group?

1. PL
2. MQ
3. LN
4. OM

Testbook Solution Correct Option - **4**

Given,

Eight friends J, K, L, M, N, O, P and Q live on eight different floors of a building but not necessarily in the same order. The lowermost floor of the building is numbered one, the one above that is numbered two and so on until the topmost floor is numbered eight.

- J lives on floor numbered six.

8	
7	
6	J
5	
4	
3	
2	
1	

- Only one person lives between J and L.

Case - 1

8	
7	
6	J
5	
4	L
3	
2	
1	

Case - 2

8	L
7	
6	J
5	
4	
3	
2	
1	

- O lives on the floor immediately below L.

Case - 1

8	
7	
6	J
5	
4	L
3	O
2	
1	

Case - 2

8	L
7	O
6	J
5	
4	
3	
2	
1	

- Only one person lives between O and P.
- O lives above P.

Case - 1

8	
7	
6	J
5	
4	L
3	O
2	
1	P

Case - 2

8	L
7	O
6	J
5	P
4	
3	
2	
1	

- K lives on an even-numbered floor but not on the floor numbered two.

Case - 1

8	K
7	
6	J
5	
4	L
3	O
2	
1	P

Case - 2

8	L
7	O
6	J
5	P
4	K
3	
2	
1	

- Two persons live between K and Q.
- Q does not live on the lowermost floor. By this statement, we can eliminate case 2 and we continue with case 1.

Case - 1

8	K
7	
6	J
5	Q
4	L
3	O
2	
1	P

- N lives on one of the floors above Q. So the final arrangement is :

Case - 1

8	K
7	N
6	J
5	Q
4	L
3	O
2	M
1	P

From the above arrangement we see, OM does not belong to the group all other pairs have the gap of two persons.
Hence, the correct answer is **OM.**

Que. 55 Who amongst the following lives on the floor number eight?

1. A
2. O
3. K
4. Cannot be determined

Testbook Solution Correct Option **- 3**
Given,

Eight friends J, K, L, M, N, O, P and Q live on eight different floors of a building but not necessarily in the same order. The lowermost floor of the building is numbered one, the one above that is numbered two and so on until the topmost

floor is numbered eight.

- J lives on floor numbered six.

8	
7	
6	J
5	
4	
3	
2	
1	

- Only one person lives between J and L.

Case - 1

8	
7	
6	J
5	
4	L
3	
2	
1	

Case - 2

8	L
7	
6	J
5	
4	
3	
2	
1	

- O lives on the floor immediately below L.

Case - 1

8	
7	
6	J
5	
4	L
3	O
2	
1	

Case - 2

8	L
7	O
6	J
5	
4	
3	
2	
1	

- Only one person lives between O and P.
- O lives above P.

Case - 1

8	
7	
6	J
5	
4	L
3	O
2	
1	P

Case - 2

8	L
7	O
6	J
5	P
4	
3	
2	
1	

- K lives on an even-numbered floor but not on the floor numbered two.

Case - 1

8	K
7	
6	J
5	
4	L
3	O
2	
1	P

Case - 2

8	L
7	O
6	J
5	P
4	K
3	
2	
1	

- Two persons live between K and Q.
- Q does not live on the lowermost floor. By this statement, we can eliminate case 2 and we continue with case 1.

Case - 1

8	K
7	
6	J
5	Q
4	L
3	O
2	
1	P

- N lives on one of the floors above Q. So the final arrangement is :

Case - 1

8	K
7	N
6	J
5	Q
4	L
3	O
2	M
1	P

From the above arrangement we see, K lives on floor number eight.

Hence, the correct answer is **K.**

Que. 56 Which of the following is true about M?

1. K lives immediately above M.
2. Only two people live between M and Q.
3. M lives on an odd numbered floor.
4. M lives on the lower most floor.

Testbook Solution Correct Option **- 2**

Given,

Eight friends J, K, L, M, N, O, P and Q live on eight different floors of a building but not necessarily in the same order. The lowermost floor of the building is numbered one, the one above that is numbered two and so on until the topmost floor is numbered eight.

- J lives on floor numbered six.

8	
7	
6	J
5	
4	
3	
2	
1	

- Only one person lives between J and L.

Case - 1

8	
7	
6	J
5	
4	L
3	
2	
1	

Case - 2

8	L
7	
6	J
5	
4	
3	
2	
1	

- O lives on the floor immediately below L.

Case - 1

8	
7	
6	J
5	
4	L
3	O
2	
1	

Case - 2

8	L
7	O
6	J
5	
4	
3	
2	
1	

- Only one person lives between O and P.
- O lives above P.

Case - 1

8	
7	
6	J
5	
4	L
3	O
2	
1	P

Case - 2

8	L
7	O
6	J
5	P
4	
3	
2	
1	

- K lives on an even-numbered floor but not on the floor numbered two.

Case - 1

8	K
7	
6	J
5	
4	L
3	O
2	
1	P

Case - 2

8	L
7	O
6	J
5	P
4	K
3	
2	
1	

- Two persons live between K and Q.
- Q does not live on the lowermost floor. By this statement, we can eliminate case 2 and we continue with case 1.

Case - 1

8	K
7	
6	J
5	Q
4	L
3	O
2	
1	P

- N lives on one of the floors above Q. So the final arrangement is :

Case - 1

8	K
7	N
6	J
5	Q
4	L
3	O
2	M
1	P

The above arrangement is the final arrangement.

From the above arrangement we see, Only two people live between M and Q.

Hence, the correct answer is **Only two people live between M and Q.**

Que. 57 If the English word 'EXAMINATION' is coded as 56149512965, then the word 'GOVERNMENT' can be coded as

1. 7655955552
2. 7645954452
3. 7645954552
4. 7644956552

Testbook Solution Correct Option **- 3**

The positions of letters according to the English alphabet series.

Alphabets	A	B	C	D	E	F	G	H	I	J	K	L	M
Positional value	1	2	3	4	5	6	7	8	9	10	11	12	13
Positional value	26	25	24	23	22	21	20	19	18	17	16	15	14
Alphabets	Z	Y	X	W	V	U	T	S	R	Q	P	O	N

Given,

'EXAMINATION' is coded as 56149512965

The pattern followed here is,

Word	E	X	A	M	I	N	A	T	I	O	N
Positional Value	05	24	01	13	09	14	01	20	09	15	14
Logic	0 + 5 = 5	2 + 4 = 6	0 + 1 = 1	1 + 3 = 4	0 + 9 = 9	1 + 4 = 5	0 + 1 = 1	2 + 0 = 0	0 + 9 = 9	1 + 5 = 6	1 + 4 = 5
Code	5	6	1	4	9	5	1	2	9	6	5

Similarly,

Word	G	O	V	E	R	N	M	E	N	T
Positional Value	07	15	22	05	18	14	13	05	14	20
Logic	0 + 7 = 7	1 + 5 = 6	2 + 2 = 4	0 + 5 = 5	1 + 8 = 9	1 + 4 = 5	1 + 3 = 3	0 + 5 = 5	1 + 4 = 5	2 + 0 = 2
Code	7	6	4	5	9	5	4	5	5	2

Therefore, the code is 7645954552.

Hence, the correct answer is **7645954552.**

Que. 58 A family has several children. Each boy in this family has as many sisters as brothers, but each girl has twice as many brothers as sisters. How many brothers and sisters are there?

1. 1 and 2
2. 3 and 4
3. 6 and 3
4. 4 and 3

Testbook Solution Correct Option **- 4**

Given,

A family has several children.

Each boy in this family has as many sisters as brothers, but each girl has twice as many brothers as sisters.

By checking the given options.

1) 1 and 2

Here we see only one boy is there so he has not as many sisters as brothers, thus this option is gets eliminated.

2) 3 and 4

Here we see if one boy is selected he has two brothers which are not as many as sisters, thus this option is gets eliminated.

3) 6 and 3

Here we see if one boy is selected he has five brothers which are also not as many as sisters, thus this option is gets eliminated.

4) 4 and 3

Here we see if one boy is selected he has **three brothers and three sisters**, and if a girl selected **she has two sisters and four brothers** which is she has twice as many brothers as sisters.

Hence, the correct answer is **4 and 3.**

Que. 59 In a certain code language '134' means 'good and tasty', '478' means 'see good pictures' and '729' means 'pictures are faint'. Which of the following numerical symbols stand for 'see'?

1. 2
2. 7
3. 8
4. 1

Testbook Solution Correct Option **- 3**

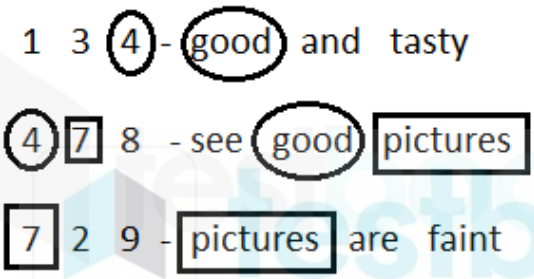
Given,

"134' means 'good and tasty'

'478' means 'see good pictures'

'729' means 'pictures are faint'

The codes here are,



From the above figure '**8**' is the code for '**See**'

Hence, the correct answer is **8.**

Que. 60 A team must be selected from the ten portable players A, B, C, D, E, F, G, H, I and J. Of these, A, C, E and J are forwards, B, G and H are point guards and D, F and I are defenders.

- The team must have at least one forward, one point guard and one defender.
- If the team includes J, it must also include F.
- The team must include E or B, but not both.
- If the includes G, it must also include F.
- The team must include exactly one among C, G and I.
- C and F cannot be members of the same team.
- D and H cannot be members of the same team.
- The team must include both A and D or neither of them.
- There is no restriction on the number of members in the team.

Which of the following cannot be included in the team of size 6?

1. A
2. H
3. J

4. E

Testbook Solution Correct Option **- 2**
Given,

A team must be selected from the ten portable players A, B, C, D, E, F, G, H, I and J. Of these, A, C, E and J are forwards, B, G and H are point guards and D, F and I are defenders.

- The team must have at least one forward, one point guard and one defender.
- If the team includes J, it must also include F.
- The team must include E or B, but not both.
- If the includes G, it must also include F.
- The team must include exactly one among C, G and I.
- C and F cannot be members of the same team.
- D and H cannot be members of the same team.
- The team must include both A and D or neither of them.
- There is no restriction on the number of members in the team.

The team of size six are :

G, F, J → If the team includes J, it must also include F, If the includes G, it must also include F and the team must include exactly one among C, G and I.

G, F, J, A, D →The team must include both A and D or neither of them and D and H cannot be members of the same team.

G, F, J, A, D, E/ B → The team must include E or B, but not both and C and F cannot be members of the same team.

The team must have at least one forward, one point guard and one defender → G (point guards), J (forward) and F (Defender)

The team of six-person are:

1) J, F, E, G, A, D

2) J, F, G, B, A, D

These are the only teams of size 6.

Therefore, we see **H** cannot be included in the team of size 6.

Hence, the correct answer is **H.**

Que. 61 What would be size of the largest possible team?

1. 7
2. 6
3. 5
4. 4

Testbook Solution Correct Option **- 2**
Given,

A team must be selected from the ten portable players A, B, C, D, E, F, G, H, I and J. Of these, A, C, E and J are forwards, B, G and H are point guards and D, F and I are defenders.

- The team must have at least one forward, one point guard and one defender.
- If the team includes J, it must also include F.
- The team must include E or B, but not both.
- If the includes G, it must also include F.
- The team must include exactly one among C, G and I.
- C and F cannot be members of the same team.
- D and H cannot be members of the same team.
- The team must include both A and D or neither of them.
- There is no restriction on the number of members in the team.

The largest possible team is **G, F, J, A, D, E/ B**

G, F, J → If the team includes J, it must also include F, If the includes G, it must also include F and the team must include exactly one among C, G and I.

G, F, J, A, D →The team must include both A and D or neither of them and D and H cannot be members of the same team.

G, F, J, A, D, E/ B → The team must include E or B, but not both and C and F cannot be members of the same team.

The team must have at least one forward, one point guard and one defender → G (point guards), J (forward) and F (Defender)

The team formed is **G, F, J, A, D, E/ B**

Hence, the correct answer is **6.**

Que. 62 What could be the maximum size of the team that includes G?

1. 4
2. 3
3. 6
4. More than 6

Testbook Solution Correct Option **- 2**

Given,

A team must be selected from the ten portable players A, B, C, D, E, F, G, H, I and J. Of these, A, C, E and J are forwards, B, G and H are point guards and D, F and I are defenders.

- The team must have at least one forward, one point guard and one defender.
- If the team includes J, it must also include F.
- The team must include E or B, but not both.
- If the includes G, it must also include F.
- The team must include exactly one among C, G and I.
- C and F cannot be members of the same team.
- D and H cannot be members of the same team.
- The team must include both A and D or neither of them.
- There is no restriction on the number of members in the team.

If G is in any team then the possibility of the player get selected in the team is :

G, F, J → If the team includes J, it must also include F, If the includes G, it must also include F and the team must include exactly one among C, G and I.

G, F, J, A, D →The team must include both A and D or neither of them and D and H cannot be members of the same team.

G, F, J, A, D, E/ B → The team must include E or B, but not both and C and F cannot be members of the same team.

The team must have at least one forward, one point guard and one defender → G (point guards), J (forward) and F (Defender)

Maximum size of the team that includes G is 6.

The team formed is G, F, J, A, D, E/ B

Hence, the correct answer is **6.**

Que. 63 A group of 260 children are seated in n rows for a group photo session. Each row contains three less children than the row in front of it. Which of the following number of rows is not possible?

1. 3
2. 4
3. 5
4. 6

Testbook Solution Correct Option **- 4**

Shortcut Trick

Let no of children be x, x + 3, x + 6, x + 9, x + 12, x + 15..... Present in Rows R1 ,R2, R3, R4, R5, R6 ..... respectively

Putting R = 3, 4, 5 and 6

You have to check this question by option method

We see that when R = 3

x + x + 3 + x + 6 = 630

3x + 9 = 630

3x = 639

x = 213 (possible)

Similarly for n = 4

x+(x–3)+(x–6)+(x−9)=630

4x–18=630

⇒ x = 162

Similarly for n = 5

(4x–18)+(x−12)=630

5x–30=630

x=120

Again possible.

We see that when R = 6

x + x + 3 + x + 6 + x + 9 + x + 12 + x + 15 = 630

6x + 45 = 630

6x = 585

x = 97.5

then x is not an integer. So R = 6 does not satisfies.

Detailed Solution (for concept understanding only):

Given:

Total children in a group are = 260

Each row contains three less children than the row in front of it

Total rows are = n

Formula used:

Sum of first n terms = n/2 [2a + (n - 1) d]

Calculation:

Let the number of students in first row be x

In second row number of students are = x – 3

In third row number of students are = x – 6

⋮

In nth row number of students are = x – 3(n - 1)

∴ x – 3 (n-1) > 0 ----(1)

⇒ sum of students in all rows = 260

n/2 [X+X – 3n] = 630 => n (2X-3n) = 1260

⇒ x + (x – 3) + (x – 6) + …….. + x – 3(n – 1) = 260

⇒ nx – 3 – 6 … – 3 (n – 1) = 260

$\Rightarrow nx - 3(1 + 2 + 3 + \ldots\ldots\ldots (n - 1) = 260$

$\Rightarrow nx - 3[n(n-1)/2] = 260$

$\Rightarrow 2nx - 3n(n-1) = 520$

$\therefore x = [520 + 3n(n - 1)]/2n$

By putting this value of x in equation 1

$\Rightarrow [520 + 3n(n - 1)]/2n - 3(n - 1) > 0$

$\Rightarrow 520 + 3n^2 - 3n - 6n^2 + 6n > 0$

$\Rightarrow 520 - 3n^2 + 3n > 0$

By multiplying by -1 both sides

$\Rightarrow 3n^2 - 3n - 520 < 0$

$\Rightarrow n < (3 \pm \sqrt{9 + 12 \times 520}) / 6$

$\Rightarrow n < (3 \pm \sqrt{6240}) / 6$

$\Rightarrow n < (3 \pm 79.05) / 6$

$\therefore -76.05 / 6 < n < 82.05 / 6$

The number of row cannot be negative so we discarded negative value

$\Rightarrow n < 82.05 / 6$

$\Rightarrow n < 13.67$

Hence the maximum possible value of row can be 13, the number of row greater than 13 is not possible

Que. 64 405 sweets were distributed equally among a group of children such that the number of sweets received by each child is one-fifth of the number of children. The number of children in the group is

1. 45
2. 9
3. 21
4. 15

Testbook Solution Correct Option **- 1**

Given:

Total number of sweets = 405

Formula used:

Total number of sweets = Total number of children × sweets received by each child

Calculation:

Let the number of children be n

Sweets received by each child = n / 5

$\Rightarrow n \times n / 5 = 405$

$\Rightarrow n^2 = 2025$

$\therefore n = 45$

Que. 65 The number of the common terms in the two sequences 17, 21, 25, ... 817 and 16, 21, 26 . . .. 851 is

1. 28
2. 39
3. 40
4. 87

Testbook Solution Correct Option **- 3**

Calculation:

17, 21, 25, ... 817

Common difference of first sequence = d_1 = 21 - 17 = 4

16, 21, 26 851

Common difference of second sequence = d_2 = 21 - 16 = 5

Now, LCM of d_1 and d_2 = 4 × 5 = 20

So, common differnce = d = 20

First common term in both the sequences is 21.

∴ a = 21

New sequence: a, a + d, a + 2d, ...

or 21, 41, 61, 81, ... 801

As we know, nth term = a + (n - 1) d

⇒ 801 = 21 + (n - 1) × 20

⇒ (n - 1) × 20 = 780

⇒ (n - 1) = 39

∴ n = 40

The total number of terms common in both the sequences is 40.

Que. 66 Fact 1: Most stuffed toys are stuffed with beans.

Fact 2: There are stuffed bears and stuffed tigers.

Fact 3: Some chairs are stuffed with beans.

If the above statements are fact, which of the following statements must also be fact?

1. Only children's chairs are stuffed with beans.
2. All stuffed tigers are stuffed with beans.
3. Stuffed monkeys are not stuffed with beans.

1. 1 is fact
2. Only 2 is a fact
3. Both 2 and 3 are facts
4. None of the statements 1, 2, 3 are true.

Testbook Solution Correct Option **- 4**

Given,

Fact 1: Most stuffed toys are stuffed with beans.

Fact 2: There are stuffed bears and stuffed tigers.

Fact 3: Some chairs are stuffed with beans.

Statements:

1. Only children's chairs are stuffed with beans - Here we don't know anything about children's chairs.

2. All stuffed tigers are stuffed with beans - We don't whether all the tigers are stuffed with beans or not.

3. Stuffed monkeys are not stuffed with beans - We don't know anything about monkeys.

Hence, the correct answer is **None of the statements 1, 2, 3 are true.**

Que. 67

- Eleven students A, B, C, D, E, F, G, H, I J and K are sitting in the first row of the class facing the teacher.
- D who is the immediate left of F is second to the right of C.
- A is second to the right of E, who is at one of the ends.
- J is the immediate neighbour of A and B and third to the left of G.
- H is to the immediate left of D and third to the right of I.

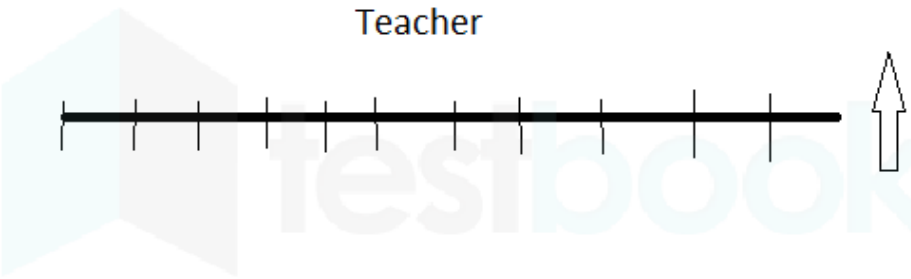
Which of the following groups of friends is sitting to the right of G?

1. CHDE
2. CHDF
3. IBJA
4. None of these

Testbook Solution Correct Option **- 2**

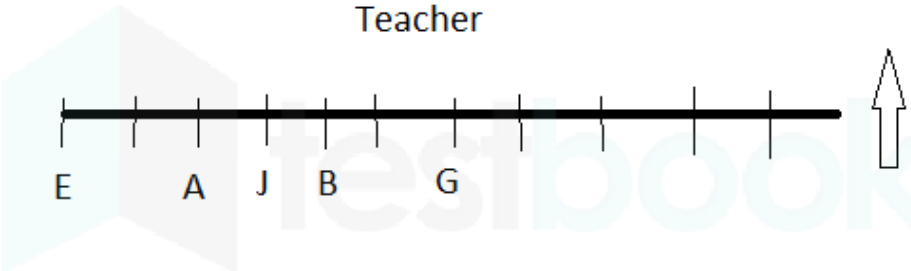
Given,

- Eleven students A, B, C, D, E, F, G, H, I J and K are sitting in the first row of the class facing the teacher.

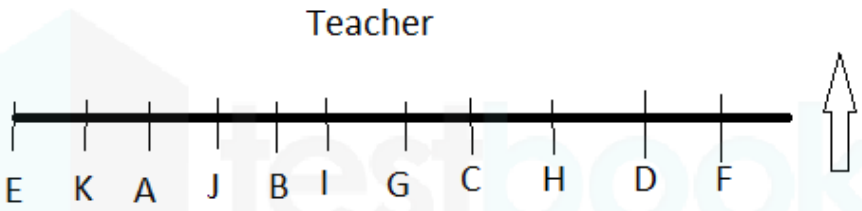


- A is second to the right of E, who is at one of the ends.

- J is the immediate neighbour of A and B and third to the left of G.



- D who is the immediate left of F is second to the right of C.
- H is to the immediate left of D and third to the right of I.



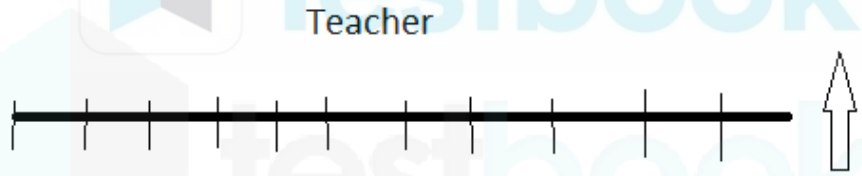
The above arrangement is the final arrangement of the students sitting in the 1st row.
From the above arrangement, C, H, D, F group of friends is sitting to the right of G.
Hence, the correct answer is **CHDF.**

Que. 68 If E and D, C and B, A and H and K and F interchange their positions, which of the following pairs of students are sitting at the ends?

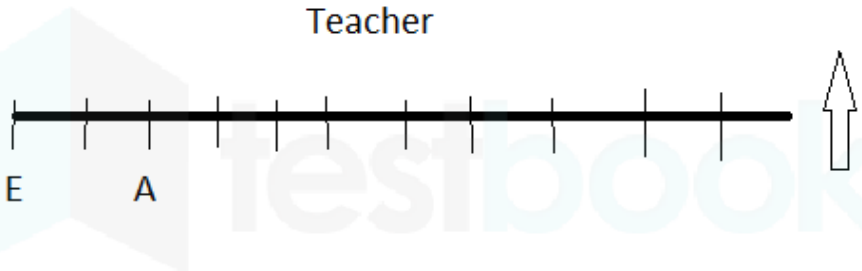
1. D and E
2. E and F
3. D and K
4. K and F

Testbook Solution Correct Option **- 3**
Given,

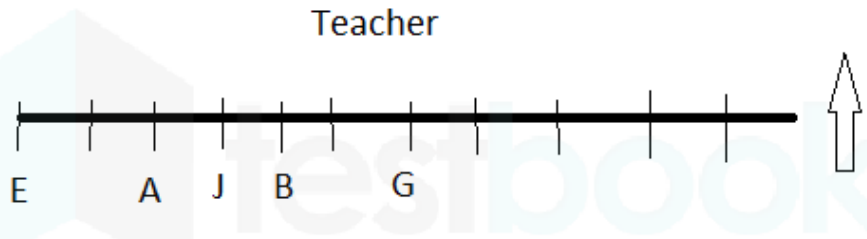
- Eleven students A, B, C, D, E, F, G, H, I J and K are sitting in the first row of the class facing the teacher.



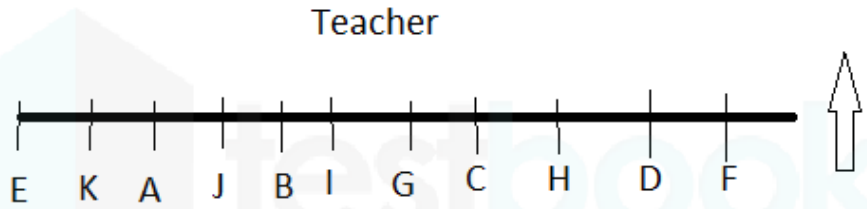
- A is second to the right of E, who is at one of the ends.



- J is the immediate neighbour of A and B and third to the left of G.

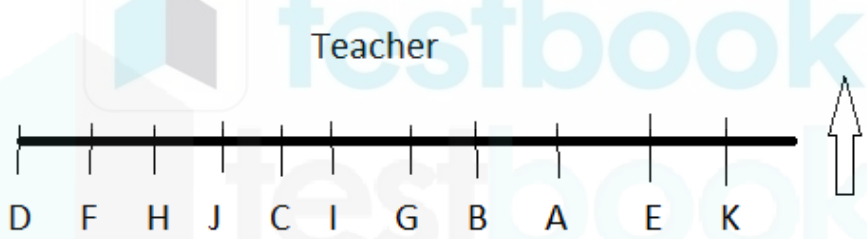


- D who is the immediate left of F is second to the right of C.
- H is to the immediate left of D and third to the right of I.



The above arrangement is the final arrangement of the students sitting in the 1st row.

After interchanging the positions of E and D, C and B, A and H and K and F we get,



After interchanging the positions D and K are sitting at ends.

Hence, the correct answer is **D and K.**

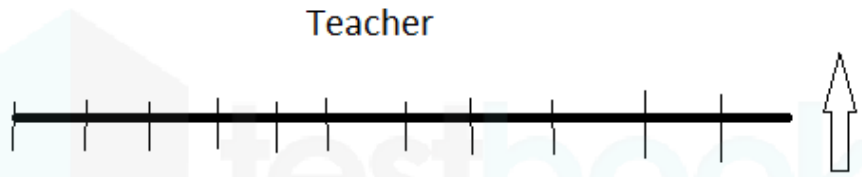
Que. 69 Who is sitting in the middle of the row?

1. B
2. C
3. G
4. I

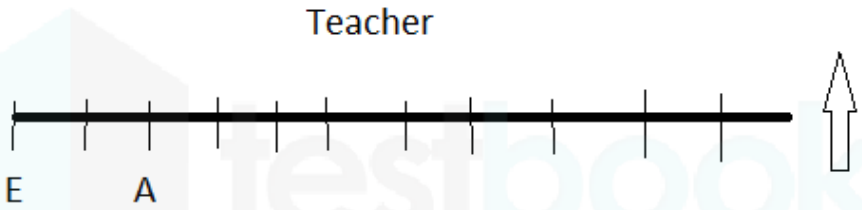
Testbook Solution Correct Option **- 4**

Given,

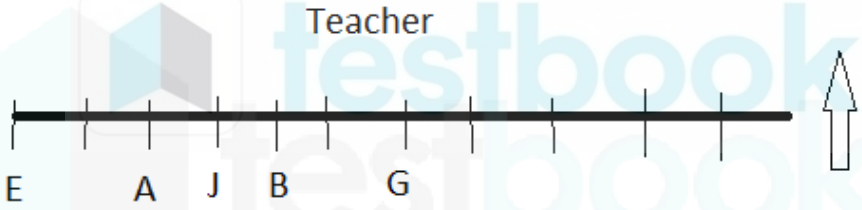
- Eleven students A, B, C, D, E, F, G, H, I J and K are sitting in the first row of the class facing the teacher.



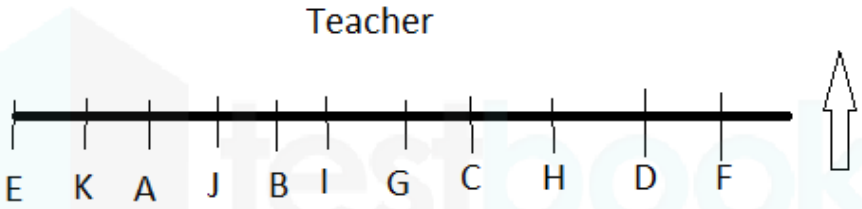
- A is second to the right of E, who is at one of the ends.



- J is the immediate neighbour of A and B and third to the left of G.



- D who is the immediate left of F is second to the right of C.
- H is to the immediate left of D and third to the right of I.



The above arrangement is the final arrangement of the students sitting in the 1st row.
From the above arrangement, I is sitting in the middle of the row,
Hence, the correct answer is **I.**

Que. 70 The day after the day after tomorrow is four days after Monday, What day is it today?

1. Monday
2. Tuesday
3. Wednesday
4. Thursday

Testbook Solution Correct Option **- 2**

GIven,

Four days after Monday is Friday which is same as the day after the day after tomorrow.

So three days previous to Friday is **Tuesday.**

Hence, the correct answer is **Tuesday.**

Que. 71 A boy is asked to put in a basket one mango when ordered 'One', one orange when ordered 'Two', one apple when ordered 'Three' and is asked to take out from the basket one mango and orange when ordered 'Four'. A sequence of orders is given as 12332142314223314113234

How many total fruits will be in the basket at the end of above order sequence?

1. 9
2. 8
3. 11
4. 10

Testbook Solution Correct Option **- 3**

Given,

A boy is asked to put in a basket one mango when ordered 'One',

one orange when ordered 'Two',

one apple when ordered 'Three' and

The boy asked to take out one mango and orange from the basket when ordered 'Four.'

A sequence of orders is given as 12332142314223314113234

So,

Orders	1	2	3	3	2	1	4
Fruits in the Basket	1 Mango	1 Orange	1 Apple	1 Apple	1 Orange	1 Mango	Total fruits Mango = 2 Orange = 2 Apple = 2 Take out 1 mango and 1 orange Remaining fruits Mango = 1 Orange = 1 Apple = 2

Orders	2	3	1	4
Fruits in the Basket	1 Orange	1 Apple	1 Mango	Total fruits Mango = 2 Orange = 2 Apple = 3 Take out 1 mango and 1 orange Remaining fruits

					Mango = 1 Orange = 1 Apple = 3	

Orders	2	2	3	3	1	4
Fruits in the Basket	1 Orange	1 Orange	1 Apple	1 Apple	1 Mango	Total fruits Mango = 2 Orange = 3 Apple = 5 Take out 1 mango and 1 orange Remaining fruits Mango = 1 Orange = 2 Apple = 5

Orders	1	1	3	2	3	4
Fruits in the Basket	1 Mango	1 Mango	1 Apple	1 Orange	1 Apple	Total fruits Mango = 3 Orange = 3 Apple = 7 Take out 1 mango and 1 orange Remaining fruits Mango = 2 Orange = 2 Apple = 7

The total fruits in the basket at the end are: Mango = 2 Orange = 2 Apple = 7
Total fruits in the basket at the end of the above order sequence are 2 + 2 + 7 = 11
Hence, the correct answer is **11.**

Que. 72 How many total oranges were in the basked at the end of the above sequence?

1. 1

2. 4
3. 3
4. 2

Testbook Solution Correct Option **- 4**

Given,

A boy is asked to put in a basket one mango when ordered 'One',

one orange when ordered 'Two',

one apple when ordered 'Three' and

The boy asked to take out one mango and orange from the basket when ordered 'Four.'

A sequence of orders is given as 12332142314223314113234

So,

Orders	1	2	3	3	2	1	4
Fruits in the Basket	1 Mango	1 Orange	1 Apple	1 Apple	1 Orange	1 Mango	Total fruits Mango = 2 Orange = 2 Apple = 2 Take out 1 mango and 1 orange Remaining fruits Mango = 1 Orange = 1 Apple = 2

Orders	2	3	1	4
Fruits in the Basket	1 Orange	1 Apple	1 Mango	Total fruits Mango = 2 Orange = 2 Apple = 3 Take out 1 mango and 1 orange Remaining fruits Mango = 1 Orange = 1 Apple = 3

Orders	2	2	3	3	1	4
Fruits in the Basket	1 Orange	1 Orange	1 Apple	1 Apple	1 Mango	Total fruits Mango = 2 Orange = 3 Apple = 5 Take out 1 mango and 1 orange Remaining fruits Mango = 1 Orange = 2 Apple = 5

Orders	1	1	3	2	3	4
Fruits in the Basket	1 Mango	1 Mango	1 Apple	1 Orange	1 Apple	Total fruits Mango = 3 Orange = 3 Apple = 7 Take out 1 mango and 1 orange Remaining fruits Mango = 2 Orange = 2 Apple = 7

The total fruits in the basket at the end are: Mango = 2 Orange = 2 Apple = 7

Total oranges were in the basket at the end of the above sequence are **2.**

Hence, the correct answer is **2.**

Que. 73 How many pairs of the letters are there in the word "NECESSARY" which have as many letters between them in the word as there are between them in the alphabet and in the same order?

1. One
2. two
3. three
4. four

Testbook Solution Correct Option **- 1**

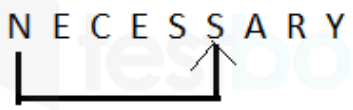
The positions of letters according to the English alphabet series:

Alphabets	A	B	C	D	E	F	G	H	I	J	K	L	M
Positional value	1	2	3	4	5	6	7	8	9	10	11	12	13
Positional value	26	25	24	23	22	21	20	19	18	17	16	15	14
Alphabets	Z	Y	X	W	V	U	T	S	R	Q	P	O	N

Given,

"NECESSARY"

So,



Here we see only one pair that is **NS.**

Hence, the correct answer is **one.**

Que. 74 What is the missing number in the series 4, 7, 11, 18, 29, 47, _____, 123, 199?

1. 76
2. 77
3. 86
4. 87

Testbook Solution Correct Option **- 1**

Given,

4, 7, 11, 18, 29, 47, _____, 123, 199

Logic: Each number of the series get added by there pervious term to get the next number of the sereis.

The pattern followed here is,

4 + 3 = 7

7 + 4 = 11

11 + 7 = 18

18 + 11 = 29

29 + 18 = 47

47 + 29 = 76

76 + 47 = 123

123 + 76 = 199

Hence, the correct answer is **76.**

Que. 75

- A, B, C, D, E and F are six members in a family in which there are two married couples.
- D is the brother of F.
- Both D and F are lighter than B.
- C a lady is neither heaviest nor lightest in the family.
- E is lighter than C.
- B is lighter than E.
- The grandfather is the family is the heaviest.

How is C related to D?

1. Grandmother
2. Cousin
3. Sister
4. Mother

Testbook Solution Correct Option **- 1**

Given,

1) A, B, C, D, E and F are six members in a family in which there are two married couples.

2) D is brother of F.

3) Both D and F are lighter than B.

4) C a lady, is neither heaviest nor lightest in the family.

5) E is lighter than C.

6) The grandfather is the family is the heaviest.

In terms of weight, F < B, D < B, B < E, E < C. So, we have : D < F < B < E < C or F < D < B < E < C. C is not the heaviest. So, A is the heaviest. Thus, the sequence becomes : F < D < B < E < C < A or D < F < B < E < C < A.

D is the brother of F.

B is the mother of D and F.

A, being the heaviest, is the grandfather.

Now, C is a lady and so one couple is AC.

B is a female and so on cannot pair up with C. So, the other couples is BE.

C is the wife of A and A is the grandfather of D. So, C is the grandmother of D

Que. 76 Who among the following will be in the second place if all the members in the family are arranged in a descending order of their weights?

1. C
2. A
3. D
4. Data inadequate

Testbook Solution Correct Option **- 1**

Given,

1) A, B, C, D, E and F are six members in a family in which there are two married couples.

2) D is brother of F.

3) Both D and F are lighter than B.

4) C a lady, is neither heaviest nor lightest in the family.

5) E is lighter than C.

6) The grandfather is the family is the heaviest.

In terms of weight, F < B, D < B, B < E, E < C. So, we have : D < F < B < E < C or F < D < B < E < C. C is not the heaviest. So, A is the heaviest. Thus, the sequence becomes : F < D < B < E < C < A or D < F < B < E < C < A.

D is the brother of F.

B is the mother of D and F.

A, being the heaviest, is the grandfather.

Now, C is a lady and so one couple is AC.

B is a female and so on cannot pair up with C. So, the other couples is BE.

The descending order of weights is :

A > C > E > B > F > D or A > C > E > B > D > F.

Clearly, C comes second.

Que. 77 Which of the following is a pair of married couples?

1. AB
2. BC

3. AD
4. BE

Testbook Solution Correct Option **- 2**
Given,

1) A, B, C, D, E and F are six members in a family in which there are two married couples.

2) D is brother of F.

3) Both D and F are lighter than B.

4) C a lady, is neither heaviest nor lightest in the family.

5) E is lighter than C.

6) The grandfather is the family is the heaviest.

It is given in the question that C is Lady and in option, except option (2) we don't know the gender of rest of the options so BC is must be the couple.

Hence, 'BC' is the correct answer.

Que. 78 Raman was born on March 5, 1970, Lakshman was born 25 days before Raman. The year when they took birth, Republic Day fell on Monday. What is the day of birth of Lakshman?

1. Sunday
2. Monday
3. Wednesday
4. Saturday

Testbook Solution Correct Option **- 1**
Given,

Raman was born on March 5, 1970, Lakshman was born 25 days before Raman.

Same year Republic Day fell on Monday, which is 26th January 1970 is Monday.

We know, that 1970 is not a leap year as it is not divisible by 4.

Therefore, Lakshman was born on 8th February 1970 which is 25 days before Raman.

Now, calculate the days after 26th January 1970 up to 8th February 1970 = 13

So, the number of odd days is 6.

Therefore, February 8, 1970, was **Sunday.**

Hence, the correct answer is **Sunday.**

Que. 79 A clock is set right at 5 a.m. The clock looses 16 minutes in 24 hours. What will be the correct time when the clock indicates 10 p.m. on the fourth day?

1. 11 p.m.
2. 10:45 p.m.
3. 11:15 p.m.
4. 12 p.m.

Testbook Solution Correct Option **- 1**
Time from 5 am of a particular day to 10 pm on the 4th day is 89 hours.

now the clock loses 16 min in 24 hours or in other words, we can say that 23 hours 44 min of this clock is 24 hours of the correct clock or (23 + 44/60) = 356/15 hours of this clock = 24 hours of the correct clock.

therefore 89 hours of this clock = ((24×15)/356)×89 hours of correct clock = 90 hours of the correct clock.

therefore it is clear that in 90 hours this clock loses 1 hour and hence the correct time is 11 pm when the clock shows 10 pm.

Hence, '11p.m' is the correct answer .

Que. 80

- There are six houses P, Q, R, S T and U, three on either side of the road.
- The houses are in different colours - red, blue, green, orange, yellow and white.
- All the houses are of different heights.
- T, the tallest house is exactly opposite to the red coloured house.
- The shortest house is exactly opposite to the green coloured house.
- U, the orange coloured house is located between P and S.
- R, the yellow coloured house is exactly opposite to P.
- Q, the green coloured house is exactly opposite to P.
- P, the green coloured house is exactly opposite to U.
- P, the white coloured house is taller than R, but sorter than S and Q.

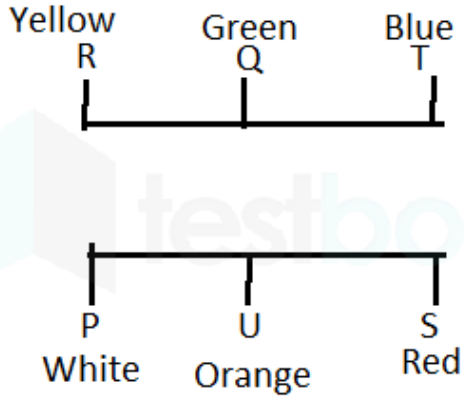
What is the colour of tallest house?

1. Red
2. Blue
3. Green
4. Yellow

Testbook Solution Correct Option **- 2**

Given,

- There are six houses P, Q, R, S T and U, three on either side of the road.
- The houses are in different colours - red, blue, green, orange, yellow and white.
- All the houses are of different heights.
- T, the tallest house is exactly opposite to the red coloured house.
- The shortest house is exactly opposite to the green coloured house.
- U, the orange coloured house is located between P and S.
- R, the yellow coloured house is exactly opposite to P.
- T, the Blue coloured house is exactly opposite to S.
- Q, the green coloured house is exactly opposite to U.
- P, the white coloured house is taller than R, but sorter than S and Q.



The above arrangement is the final arrangement on either side of the road.

The above arrangement is height wise arrangement in descending order from left to right.

From the above arrangement, we see the colour of the tallest house is **Blue.**

Hence, the correct answer is **Blue.**

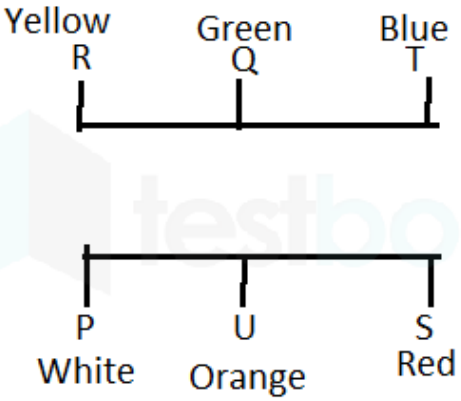
Que. 81 Which of the second shortest house?

1. P
2. R
3. S
4. Cannot be Determined

Testbook Solution Correct Option **- 2**

Given,

- There are six houses P, Q, R, S T and U, three on either side of the road.
- The houses are in different colours - red, blue, green, orange, yellow and white.
- All the houses are of different heights.
- T, the tallest house is exactly opposite to the red coloured house.
- The shortest house is exactly opposite to the green coloured house.
- U, the orange coloured house is located between P and S.
- R, the yellow coloured house is exactly opposite to P.
- T, the Blue coloured house is exactly opposite to S.
- Q, the green coloured house is exactly opposite to U.
- P, the white coloured house is taller than R, but sorter than S and Q.



The above arrangement is the final arrangement on either side of the road.

The above arrangement is height wise arrangement in descending order from left to right.

From the above arrangement we see second shortest house is **R.**

Hence, the correct answer is **R.**

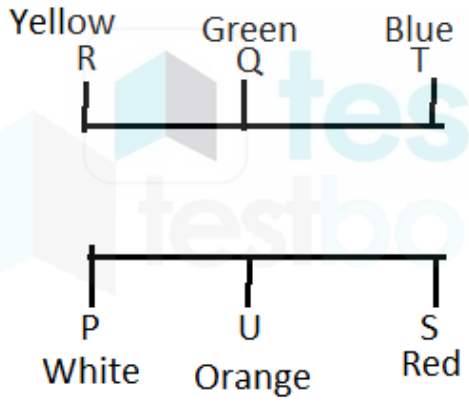
Que. 82 Which is the second largest house?

1. Q
2. R
3. S
4. Cannot be determined

Testbook Solution Correct Option **- 4**

Given,

- There are six houses P, Q, R, S T and U, three on either side of the road.
- The houses are in different colours - red, blue, green, orange, yellow and white.
- All the houses are of different heights.
- T, the tallest house is exactly opposite to the red coloured house.
- The shortest house is exactly opposite to the green coloured house.
- U, the orange coloured house is located between P and S.
- R, the yellow coloured house is exactly opposite to P.
- T, the Blue coloured house is exactly opposite to S.
- Q, the green coloured house is exactly opposite to U.
- P, the white coloured house is taller than R, but sorter than S and Q.



The above arrangement is the final arrangement on either side of the road.

The above arrangement is height wise arrangement in descending order from left to right.

From the above arrangement we see second largest house is either **S or Q.**

Hence, the correct answer is **Cannot be determined.**

Que. 83 Unscramble the letters is the following words and find the odd one.

1. ONGEAR
2. NOONI

3. ALPEP
4. AUVAG

Testbook Solution Correct Option **- 2**

Given,

ONGEAR, NOONI, ALPEP, AUVAG

Each word form a meaningful word,

ONGEAR - ORANGE

NOONI - ONION

AUVAG - GUAVA

ALPEP - APPLE

All are fruits except option 2.

Hence, the correct answer is **NOONI .**

Que. 84 A bus starts from its depot filled to the seating capacity. It stops at a point A where $1/6^{th}$ of the passengers alight and 10 boards of the bus. At point B, $1/5^{th}$ of the passengers alight and 3 boards the bus. At point C which is the last stop, all the 55 passengers alight. The capacity of the bus is

1. 96
2. 99
3. 66
4. 90

Testbook Solution Correct Option **- 3**

Given:

At point A, $1/6^{th}$ of the passengers alight and 10 boards of the bus.

At point B, $1/5^{th}$ of the passengers alight and 3 boards the bus.

At point C which is the last stop, all the 55 passengers alight.

Calculations:

Let total number of passenger be x.

At point A,$1/6^{th}$ of the passengers alight and 10 boards of the bus,

Number of passengers in the bus = x - x/6 + 10

⇒ 5x/6 + 10

At point B, $1/5^{th}$ of the passengers alight and 3 boards the bus,

Now, Number of passengers in the bus = (5x/6 + 10) - {(1/5)(5x/6 + 10)} + 3

⇒ (5x/6 + 10)(1 - 1/5) + 3

⇒ (5x/6 + 10)(4/5) + 3

⇒ (4x/6 + 8) + 3

⇒ 4x/6 + 11

⇒ 2x/3 + 11

At point C, 55 passengers alight the bus,

⇒ 2x/3 + 11 = 55

⇒ 2x/3 = 44

⇒ x = 132/2

⇒ x = 66

∴ **The capacity of the bus is 66.**

Que. 85 Kha-kha is an obscure island which is inhabited by two types of people: the "Yes" type and the "No" type. A native of type 'yes' ask only questions and right answer to which is 'Yes' while those of type 'No' ask only questions the right answer to which is 'No'. For example, the 'yes' type will ask questions like "Is 2 plus 2 equal to 4?" While the "No" type will ask questions like "is 2 plus 2 equal to 5?". The following question is based on your visit to the island Kha-kha.

Kevin and Kumar are brothers from the island. Kumar asks you. Is at least one of us is of type 'No'? You can conclude that

1. Kevin is 'No, Kumar is 'Yes'.
2. Both are 'Yes'.
3. Kevin is 'yes', Kumar is 'No'.
4. Both are 'No'.

Testbook Solution Correct Option **- 1**
Given,

Kha-kha is an obscure island which is inhabited by two types of people: the "Yes" type and the "No" type. A native of type 'yes' ask only questions and right answer to which is 'Yes' while those of type 'No' ask only questions the right answer to which is 'No'. For example, the 'yes' type will ask questions like "Is 2 plus 2 equal to 4?" While the "No" type will ask questions like "is 2 plus 2 equal to 5?". The following question is based on your visit to the island Kha-kha.

Kevin and Kumar are brothers from the island.

Kumar asks you. Is at least one of us is of type 'No'?

There are only two answers either "Yes" or "No".

If the answer is 'No' Kumar will be of type "No", which is contradictory to the answer to the question.

If the answer is 'yes' Kumar will be of type "Yes", And Kevin will be of type "No".

Hence, the correct answer is **Kevin is 'No, Kumar is 'Yes'.**

Que. 86

- A group of six friends are sitting around a hexagonal table, each one at one corner of the hexagon.
- Ram is sitting opposite to Ramesh.
- Jyoti is sitting next to Seema.
- Neeta is sitting opposite to Seema but not next to Ram.
- Amrit has a person sitting between Ramesh and himself.

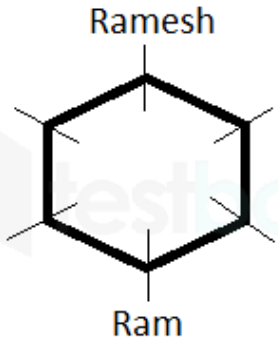
If Seema and Jyoti mutually interchange their positions, then who will be sitting opposite to Neeta?

1. Jyoti
2. Ram
3. Seema
4. Ramesh

Testbook Solution Correct Option **- 1**
Given,

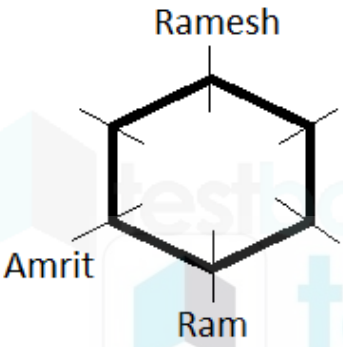
- A group of six friends are sitting around a hexagonal table, each one at one corner of the hexagon.
- Ram is sitting opposite to Ramesh.

Consider all of them are facing inside.

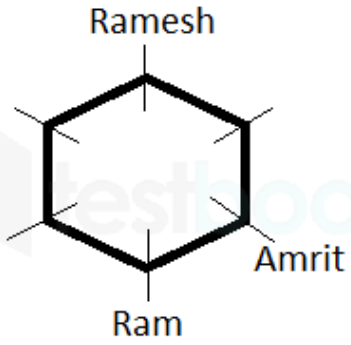


- Amrit has a person sitting between Ramesh and himself.

Case - 1

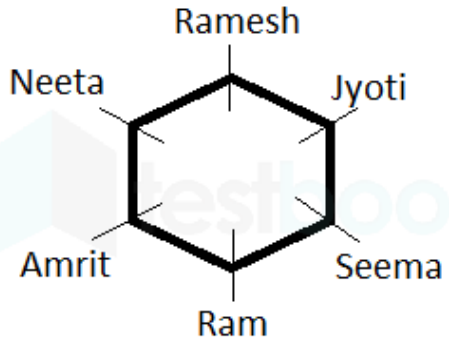


Case - 2

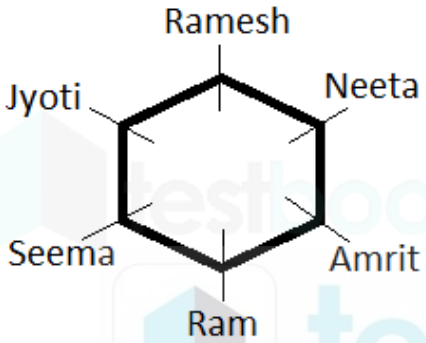


- Jyoti is sitting next to Seema.
- Neeta is sitting opposite to Seema but not next to Ram.

Case - 1



Case - 2



If Seema and Jyoti mutually interchange their positions in both case 1 and 2, then the **Jyoti** will be sitting opposite to Neeta.

Hence, the correct answer is **Jyoti.**

Que. 87 Who is sitting opposite to Jyoti?

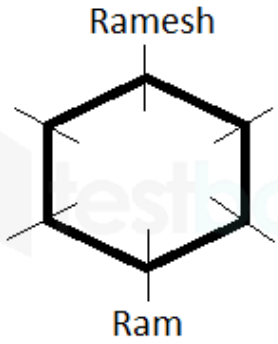
1. Ramesh
2. Neeta
3. Amrit
4. Seema

Testbook Solution Correct Option **- 3**

Given,

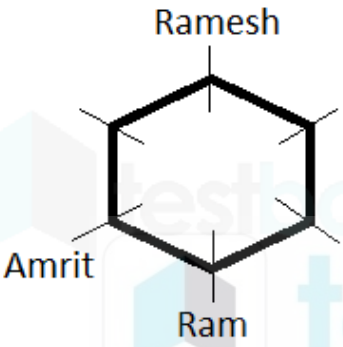
- A group of six friends are sitting around a hexagonal table, each one at one corner of the hexagon.
- Ram is sitting opposite to Ramesh.

Consider all of them are facing inside.

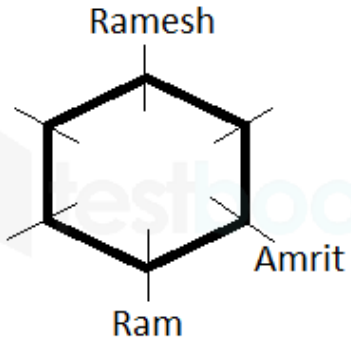


- Amrit has a person sitting between Ramesh and himself.

Case - 1

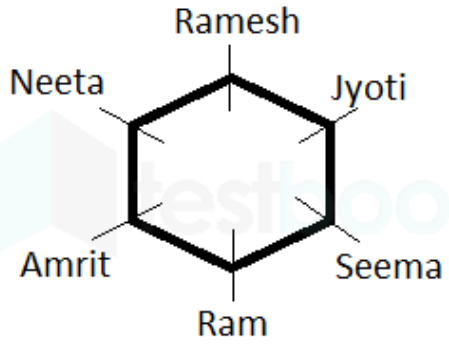


Case - 2

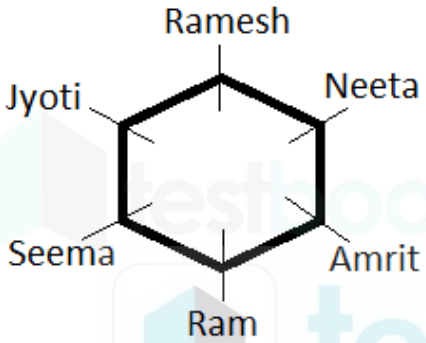


- Jyoti is sitting next to Seema.
- Neeta is sitting opposite to Seema but not next to Ram.

Case - 1



Case - 2



From case 1 and 2, **Amrit** is sitting opposite to the Jyoti.

Hence, the correct answer is **Amrit.**

Que. 88 Who is sitting between Amrit and Ramesh?

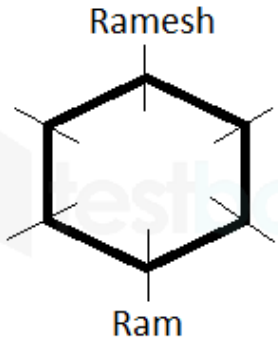
1. Neeta
2. Jyoti
3. Seema
4. Ram

Testbook Solution Correct Option **- 1**

Given,

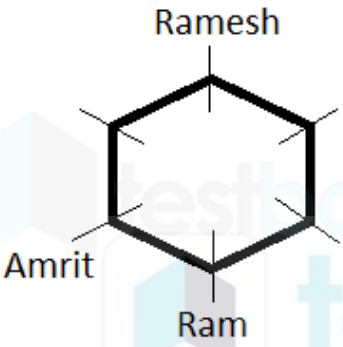
- A group of six friends are sitting around a hexagonal table, each one at one corner of the hexagon.
- Ram is sitting opposite to Ramesh.

Consider all of them are facing inside.

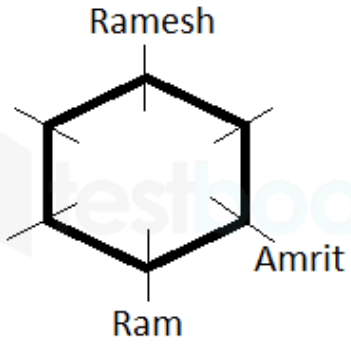


- Amrit has a person sitting between Ramesh and himself.

Case - 1

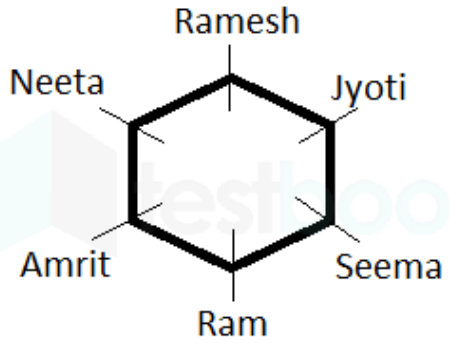


Case - 2

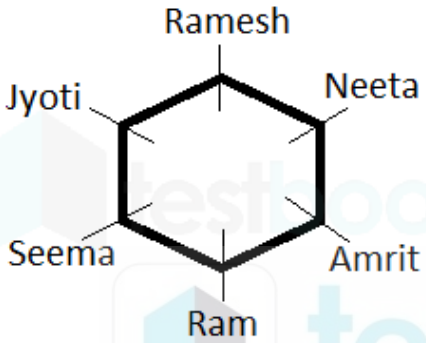


- Jyoti is sitting next to Seema.
- Neeta is sitting opposite to Seema but not next to Ram.

Case - 1



Case - 2



From the case1 and 2, **Neeta** is sitting between Amrit and Ramesh.
Hence, the correct answer is **Neeta.**

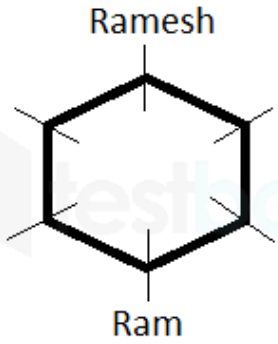
Que. 89 If neeta sits to the right of Amrit, then who is sitting to the left of Armit?

1. Ramesh
2. Neeta
3. Jyoti
4. Ram

Testbook Solution Correct Option **- 4**
Given,

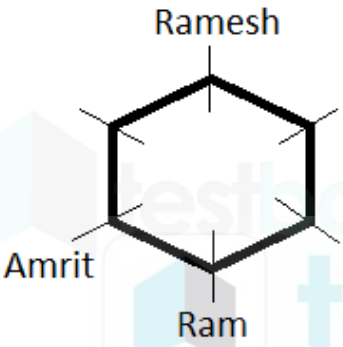
- A group of six friends are sitting around a hexagonal table, each one at one corner of the hexagon.
- Ram is sitting opposite to Ramesh.

Consider all of them are facing inside.

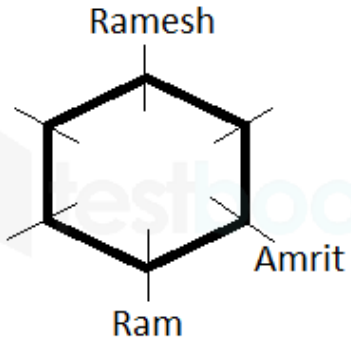


- Amrit has a person sitting between Ramesh and himself.

Case - 1

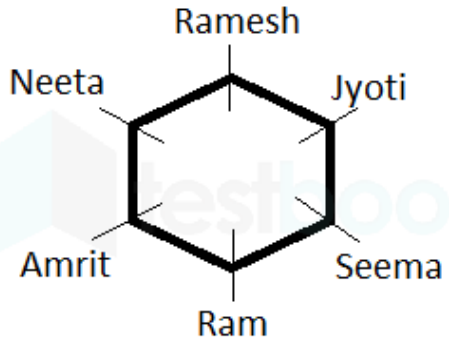


Case - 2

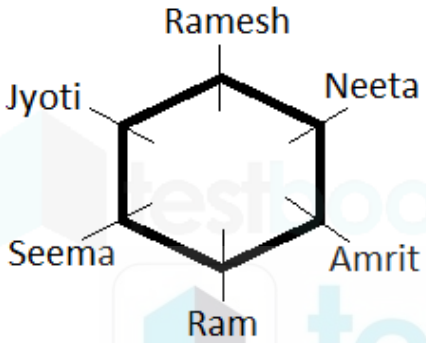


- Jyoti is sitting next to Seema.
- Neeta is sitting opposite to Seema but not next to Ram.

Case - 1



Case - 2



For the given condition we consider case 2.

according to case 2, Neeta sits to the right of Amrit, then **Ram** is sitting to the left of Armit.

Hence, the correct answer is **Ram.**

Que. 90 If all the 6's are replaced by 9's, then the algebraic sum of all the numbers from 1 to 100 (both inclusive) varies by

1. 333
2. 300
3. 279
4. 330

Testbook Solution Correct Option **- 4**

Concept used:

Sum of all numbers from 1 to n = n(n+1)/2

Calculation:

Sum of all numbers from 1 to 100 = 100(100 + 1)/2

⇒ Sum = 50 × 51

⇒ Sum = 5050

Number of 6's comes in units place = 10

Number of 6's comes in tens place = 10

Sum of these 6's = $10(6 \times 10) + 10(6 \times 1)$

⇒ Required sum = 600 + 60

⇒ Required sum = 660

If all 6's replaced by 9's

Sum of those 9's = $10(9 \times 10) + 10(9 \times 1)$

⇒ Sum of those 9's = 900 + 90

⇒ Sum of those 9's = 990

Algebraic sum = 5050 – 660 + 990

⇒ Sum = 5380

Required difference = 5380 – 5050

⇒ Required difference = 330

∴ **The algebraic sum of all the numbers from 1 to 100 varies by 330.**

Que. 91 The 2's complement representation of the number $(-100)_{10}$ in an 8 bit computer is

1. 10011011
2. 01100100
3. 11100100
4. 10011100

Testbook Solution Correct Option **- 4**

Concept:

Convert decimal to binary

Conversion steps:

- Divide the number by 2.
- Get the integer quotient for the next iteration.
- Get the remainder for the binary digit.
- Repeat the steps until the quotient is equal to 0.

Calculation:

Convert $(-100)_{10}$ to binary

Division by 2	Quotient	Remainder
100/2	50	0
50/2	25	0
25/2	12	1
12/2	6	0
6/2	3	0
3/2	1	1

1/2	0	1

So, the binary equivalent of 100 is 1100100

$(100)_{10}$ in binary system 1100100

Now two's complement = 1st complement + 1

= 0011011 + 1

= 0011100

For $(-100)_{10}$ will be 10011100

Que. 92 The number of terms in the product-of-sum canonical form of $\overline{[(x_1 + x_2)\ \overline{(x_3 x_4)}]}$ is

1. 7
2. 8
3. 9
4. 10

Testbook Solution Correct Option **- 3**

Concept:

Canonical Form: Any Boolean function that expressed as a sum of minterms or as a product of max terms is said to be in its canonical form.

There are two types of canonical forms:

SOP: Sum of products or sum of minterms

Example of SOP: XY + X'Y'

POS: Product of sums or product of max terms

Example of POS: (X+Y) (X'+Y')

The max term expression will be formed by the terms which are not present in the min-term expression.

Example:

The logic expression given below is the minterm expression.

Y = ∑m (0, 3, 6, 7, 10, 12, 15)

By converting the above min-term expression into max term expression, we get

Y = ΠM (1, 2, 4, 5, 8, 9, 11, 13, 14)

Calculation:

Given Boolean expression is,

$\overline{[(x_1 + x_2)\ \overline{(x_3 x_4)}]}$

By using Demorgan's theorem, the above expression can be simplified as

$= \overline{(x_1 + x_2)} + x_3 x_4$

$= \overline{x_1}\ \overline{x_2} + x_3 x_4$

The K-map representation for the above expression is,

x_1x_2 \ x_3x_4	00	01	11	10
00	1	1	1	1
01			1	
11			1	
10			1	

From the above K-map representation,

The number of minterms (sum of product terms) = 7

The number of variables (n) = 4

Total number of terms = $2^n = 2^4 = 16$

The number of max terms (product of sum terms) = 16 – 7 = 9

Que. 93 Find the odd man out:

1. HTTP
2. FCFS
3. HTML
4. TCP/IP

Testbook Solution Correct Option **- 2**

- Web browsers and servers use **TCP/IP protocols** to connect to the Internet. HTTP is a common TCP/IP protocol
- **HTTP** takes care of the communication between a web server and a web browser. HTTP is used for sending requests from a web client (a browser) to a web server, returning web content (web pages) from the server back to the client.
- **HTML** is the standard markup language for Web pages

Therefore FCFS is the odd man out.

Additional Information

- FCFS – an acronym for first come, first serve – in computing and in systems theory.
- It is a method for organizing the manipulation of a data structure – often, specifically a data buffer – where the oldest (first) entry, or 'head' of the queue, is processed first.

Que. 94 Consider a hard disk with 16 recording surfaces (0-15) having 16384 cylinders (0-16383) and each cylinder contains 64 sectors(0-63). Data storage capacity in each sector is 512 bytes. Data are organized cyclinder-wise and the addressing format is <cylinder no., surface no., sector no.>. A file of size 42797KB is stored in the disk and the starting disk location of the file is <1200,9,40>. What is cylinder number of the last sector of the file, if it is stored in a contiguous manner?

1. 1284
2. 1282
3. 1286
4. 1288

Testbook Solution Correct Option **- 1**

Data:

File size is 42797 KB= 42797 ×210 B=85594×29 B.

recording surfaces = 16 (0 to 15)

cylinders = (0-16383)

sectors(0-63

one sector=512 B

Calculation:

The file will be stored in 85594 sectors, that is, it needs to cross 85594 sectors

starting of the file is

number of cylinders to cross = (85594÷16)× 64 = 83 cylinders

remaining sectors to cross = 85594-(83×16× 64) = 602

number of surfaces to cross = 9

so to cross 9 surfaces we need to cross on more cylinder as the file has started at surface 9 and no surface in the

cylinder is 16 so
number of the cylinder to cross=83+1=84
so cylinder number = 1200+84=1284

Que. 95 Consider the following min term expression for F.

$F(P, Q, R, S) = \sum 0, 2, 5, 7, 8, 10, 13, 15$

The min-terms 2, 7, 8 and 13 are 'do not care' terms. The minimal sum-of-products form for F is

1. $Q\bar{S} + \bar{Q}S$
2. $\bar{Q}\bar{S} + QS$
3. $\bar{Q}R\bar{S} + \bar{Q}RS + QR\bar{S} + QRS$
4. $\bar{P}Q\bar{S} + \bar{P}QS + PQS + PQ\bar{S}$

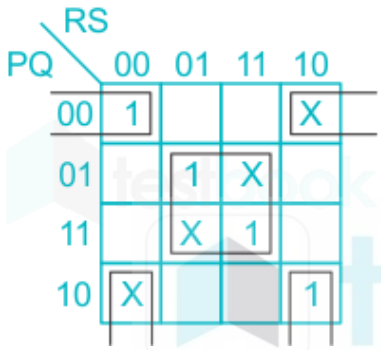
Testbook Solution Correct Option **- 2**

$F(P, Q, R, S) = \sum 0, 2, 5, 7, 8, 10, 13, 15$

Don't care min terms are 2, 7, 8, 13

By plotting the K-map, the minimal SOP (sum of products) can be found.

Explanation –



While putting the terms to k-map following things happen,

- 3rd and 4th columns are swapped
- 3rd and 4th rows.
- term 2 is going to (0, 3) column instead of (0, 2)
- 8 is going to (3, 0) instead of (2,0)

Solving, the above K-map, we get $\bar{Q}\bar{S} + QS$

Que. 96 Consider the equation $(43)_x = (y3)_8$ where x and y are unknown. The number of possible solution is

1. 4
2. 6
3. 5
4. 7

Testbook Solution Correct Option **- 3**

Concept:

$(ABCD)_a = D^* a^0 + C^* a^1 + B^* a^2 + A^* a^3$

Calculation:

Given: $(43)_x = (y3)_8$

$\Rightarrow 3 * x^0 + 4 * x^1 = 3 * 8^0 + y * 8^1$

$\Rightarrow 3 + 4x = 3 + 8y$

$\Rightarrow 4x = 8y$

$\therefore x = 2y$

Now, $y < 8$ and $x > 4$ (because the number represented in base x is 43 or redix is always greater)

The following are possible solutions

$y = 3, 4, 5, 6, 7$ $(y < 8)$

$x = 6, 8, 10, 12, 14$

Hence number of possible solution is five.

Que. 97 Subtract $(1010)_2$ from $(1101)_2$ using first complement

1. $(1100)_2$
2. $(0101)_2$
3. $(1001)_2$
4. $(0011)_2$

Testbook Solution Correct Option **- 4**

To Find:

$(1101)_2 - (1010)_2$

Step 1:

Find 1's complement of $(1010)_2$

1's complement of $(1010)_2 = (0101)_2$

Step 2:

Add 1's complement of $(1010)_2$ with $(1101)_2$

	carry	1	1	0	1
+		0	1	0	1
	1	**0**	**0**	**1**	**0**

Step 3:

Add carry 1 to result

$0010 + 1 = (0011)_2$

Que. 98 A hard disk has a rotational speed 6000 rpm. Its average latency time is

1. 5×10^{-3} sec
2. 0.05 sec
3. 1 sec
4. 0.5 sec

Testbook Solution Correct Option **- 1**

6000 rpm ≡ 6000 rotations per minute

6000 rotations → 1 minute

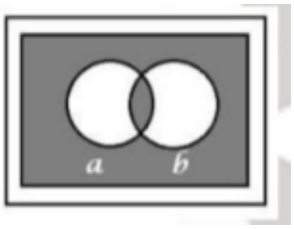
6000 rotations → 60 seconds

1 rotation → $\frac{60}{6000} = 10^{-2}s$

Average latency time = ½ rotation

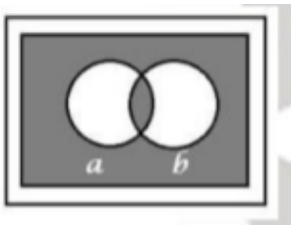
Average latency time = $\frac{10^{-2}}{2} = \frac{10 \times 10^{-3}}{2} = 5 \times 10^{-3}s$

Que. 99 The Boolean expression represented by the following Venn diagram is



1. a XOR b
2. a'b + ab
3. ab + a'b'
4. (a + b') (a' + b)

Testbook Solution Correct Option **- 1**
Venn diagram:



Let f(a, b) be the Boolean expression represent by Venn diagra:

$f(a, b) = (a \cap \overline{b}) \cup \overline{(a \cup \overline{b})}$

$f(a, b) = (a.\overline{b}) + \overline{(a + \overline{b})}$

f(a, b) = a.$\overline{b}$ + $\overline{a}$.b ≡ a.b' + a'.b

f(a, b) = a⊕ b

f(a, b) = a XOR b

Symbol:

∪ → OR → +

∩ → AND → .

Que. 100 The range of n-bit signed magnitude representation is

1. 0 to $2^n - 1$
2. $-(2^{n-1} - 1)$ to $(2^{n-1} - 1)$
3. $-(2^n-1)$ to (2^n-1)
4. 0 to $2^{n-1}-1$

Testbook Solution Correct Option **- 2**
Concept:

In signed form, for n bits

Minimum number = $-2^{n-1} - 1$

Maximum number = $2^{n-1} - 1$

Range is $-(2^{n-1} - 1)$ to $(2^{n-1} - 1)$

Example:

1 byte = 8 bits

Minimum number = $-(2^{n-1} - 1) = -(2^{8-1} - 1) = -127$

Maximum number = $2^{n-1} - 1 = 2^{8-1} - 1 = 127$

Additional Information

In unsigned form, for n bits

Minimum number = 0

Maximum number = $2^n - 1$

Range 0 to $2^n - 1$

In 2's complement form, for n bits

Minimum number = -2^{n-1}

Maximum number = $2^{n-1} - 1$

Range is $-(2^{n-1})$ to $(2^{n-1} - 1)$

Que. 101 Questions are based on the following:

White cement is the basic raw material for producing cement tiles and cement paint which are used extensively in building construction. The main consumers of white cement are, therefore, cement tiles and cement paint manufacturing units. These consumers, mostly on the small scale, are today facing a major crisis because of a significant increase in the price of white cement during a short period. The present annual licensed production capacity of white and grey cement in the country is approximately 3.5 lakh tonnes. The average demand is 2 — 2.5 lakh tonnes. This means that there is an idle capacity to the tune of one lakh tonnes or more. The price rise is, therefore, not a phenomenon arising out of inadequate production capacity but evidently because of artificial scarcity created by the manufacturers in their self-interest.

The main reason for the continuing spurt in cement price is its decontrol. As it is, there is stiff competition in the cement paint and tile manufacturing business. Any further price revision at this stage is bound to have a severe adverse impact on the market conditions. The government should take adequate steps to ensure that suitable controls are brought in else it should allow the import of cement.

Why is the price of cement going up?

1. Because the Government is controlling the quota
2. Because of export of white cement
3. Because of the large usage of white cement
4. None of the above

Testbook Solution Correct Option **- 4**

The correct answer is **'None of the above'.**

Key-Points

- The given passage is about **'Crisis in the Industry of White Cement'.**
- The main reason for the continuing spurt in cement price is its decontrol. The first line of the second passage clearly explains the reason behind the price increase of **White Cement.**
- **Decontrol:** to remove official control on something, especially prices and businesses
  - *Example: Prices have been **decontrolled** and markets are flourishing.*
- Therefore, currently, this sector is facing a major crisis.
- Hence, the correct answer is **Option 4. None of the options** is correct.

The correct answer is '***None of the above.'***

Additional Information

- **White Cement:** White Portland cement is used in combination with white aggregates to produce white concrete for prestige construction projects and decorative work.
- White concrete usually takes the form of pre-cast cladding panels, since it is not economical to use white cement for structural purposes.

Que. 102 What is the crisis being faced by the cement tile manufactures as described in the passage?

1. White cement prices are very high
2. White cement is not of good quality
3. White cement usage is high
4. White cement is priced very low

Testbook Solution Correct Option **- 1**
The correct answer is **'White cement prices are very high'.**

Key-Points

- The given passage is about **'Crisis in the Industry of White Cement'.**
- As per the given passage, "The **main consumers of white cement** are, therefore, **cement tiles and cement paint manufacturing units''.**
- These consumers are facing **a major crisis due to the price increase of white cement.** The third line of the first passage clearly explains this.
- Therefore, the correct answer is **Option 1.**

The correct answer is '***White cement prices are very high.'***

Additional Information

- **White Cement:** White Portland cement is used in combination with white aggregates to produce white concrete for prestige construction projects and decorative work.
- White concrete usually takes the form of pre-cast cladding panels, since it is not economical to use white cement for structural purposes.

Que. 103 Which of the following words has the same meaning as the word **'artificial'** as used in the passage?

1. Deliberate
2. Prolonged
3. Practical
4. Unnatural

Testbook Solution Correct Option **- 4**
The correct answer is **Unnatural.**

Key-Points

- The similar meaning of the given word **'artificial' is 'unnatural'.**
- **Artificial: made by people,** often as a copy of something natural
  - *Example: These clothes made of **artificial** fibers.*
- **Unnatural:** not found in nature; **artificial**
  - *Example: Nothing **unnatural** or polluting can be used.*

- By reading the above explanations we find that the correct answer is **Option 4.**

Hence, the correct answer is '***Unnatural.'***

Additional Information

- The meaning of the other words given in the options as follows:
  - **Deliberate:** (often of something bad) **intentional** or planned
    *Example: We made a **deliberate** decision to live apart for a while.*
  - **Prolonged: continuing for a long** time
    *Example: **Prolonged** use of the drug is known to have harmful side-effects.*
  - **Practical:** relating to **experience, real situations**, or actions rather than ideas or imagination
    *Example: The service offers young people **practical** advice on finding a job.*

Que. 104 Which of the following words has the opposite meaning to the word **'basic'** as used in the passage?

1. Vital
2. Unimportant
3. Acidic
4. Last

Testbook Solution Correct Option **- 2**
The correct answer is **'Unimportant'.**

Key-Points

- The antonym of the given word **'basic' is 'unimportant'.**
- **Basic:** Here, the word ***basic*** has been used to denote *'core',* or *'the very first'* or *'first and foremost',* like the base foundation or the starting point from which something can develop (cement tiles cannot be developed without cement)
  - *Example: I really need to get some **basic** financial advice.*
- **Unimportant:** not important
  - Example: Staffing is still a relatively unimportant issue compared to our other problems.
- By reading the above explanation we find that the correct answer is **Option 2.**

Hence, the correct answer is '***Unimportant.'***

Additional Information

- The meaning of the other words given in the options as follows:
  - **Vital: necessary** for the success or continued existence of something; extremely important
    *Example: A strong opposition is **vital** to a healthy democracy.*
  - **Acidic:** containing acid
    *Example: The whole of the upper part of the cone consists of grey highly **acidic** lava.*
  - **Last:** (the person or thing) **after every one** or everything else
    *Example: Our house is the **last** one on the left before the traffic lights.*

Que. 105 Which of the following is the closest in meaning to the word **'REPUTATION'**?

1. Character

2. Respect
3. Fame
4. Honour

Testbook Solution Correct Option **- 1**
The correct answer is **'Character'.**

Key-Points

- The exact synonym of the given word **'Reputation'** is **'Character'.**
- **Reputation:** the beliefs or **opinions that are generally held about someone** or something
  - *Example: The company has a worldwide **reputation** for quality.*
- **Character:** the **particular combination of qualities in a person** or place that makes them different from others
  - *Example: Politeness is traditionally part of the Indian **character.***

Hence, the correct answer is '***Character.'***

Additional Information

- The meaning of other words given in the option as follows:
  - **Respect: admiration felt or shown for someone** or something that you believe has good ideas or qualities
    *Example: She is a formidable figure who commands a great deal of **respect.***
  - **Fame:** the state of being known or **recognized by many people** because of your achievements, skills, etc.
    *Example: She first rose to **fame** as a singer at the age of 16.*
  - **Honour:** a quality that combines **respect, being proud, and honesty**
    *Example: We fought for the **honour** of our country.*

Que. 106 Which of the following words means **'Theatrical'**?

1. Thrilling
2. Histrionic
3. Delicate
4. Delicious

Testbook Solution Correct Option **- 2**
The correct answer is **'Histrionic'.**

Key-Points

- The exact synonym of the given word **'Theatrical'** is **'Histrionic'.**
- **Theatrical:** belonging or **relating to the theatre**, or to the performance or writing of plays, opera, etc.
  - *Example: The singer has made her **theatrical** debut on the West End stage.*
- **Histrionic: excessively theatrical** or dramatic in character or style
  - *Example: She put on a **histrionic** display of grief at the funeral.*
- By reading the above explanation we find that the correct answer is **Option 2.**

The correct answer is '***Histrionic.'***

Additional Information

- The meaning of the other words given in the option as follows:

- **Thrilling:** extremely **exciting**.
  *Example: The book is a **thrilling** adventure story.*
- **Delicate:** needing **careful** treatment, especially because easily damaged
  *Example: Peaches have **delicate** skins that are easily bruised.*
- **Delicious:** having a very **pleasant taste** or smell
  *Example: The **delicious** smell of freshly made coffee came from the kitchen.*

Que. 107 Identify the word which is different from the rest of the words:

1. Indisputable
2. Uncertain
3. Dubious
4. Doubtful

Testbook Solution Correct Option **- 1**
The correct answer is **'Indisputable'.**

Key-Points

- In the given question **'Indisputable'** is different from the rest of the words.
- **Indisputable**: true, and **impossible to doubt**
  - *Example: One fact is **indisputable** - this must never be allowed to happen again.*
- Whereas, 'Uncertain, Dubious, and Doubtful are synonyms.
- Therefore, the correct answer is **Option 1.**

The correct answer is '***Indisputable.***'

Additional Information

- The meaning of other words given in the options as follows:
  - **Uncertain:** not knowing what to do or believe, or not able to decide about something
    *Example: Ariana was **uncertain** about meeting him.*
  - **Dubious:** thought not to be completely true or not able to be trusted
    *Example: These claims are **dubious** and not scientifically proven.*
  - **Doubtful:** If you are doubtful about something, you are uncertain about it
    *Example: The teacher is **doubtful** about having parents working as classroom assistants.*

Que. 108 **Select the correct one word for the given group of words:**

A person who makes money by starting or running a business

1. Antraprenour
2. Andrapreneur
3. Entrapranour
4. Entrepreneur

Testbook Solution Correct Option **- 4**
The correct answer is **'Entrepreneur'.**

Key-Points

- The most appropriate meaning of the given statement is **'Entrepreneur'.**

- **Entrepreneur:** someone **who starts their own business**, especially when this involves seeing a new opportunity
  - *Example: He was one of the entrepreneurs of the '80s who made their money in property.*
- By reading the above explanation we find that the correct answer is **Option 4.**

Hence, the correct answer is '***Entrepreneur'.***

Hint

- All the options except **Option 4 are misspelled.**
- Therefore, the correct answer is **Option 4.**

Que. 109 Which of the following is the correct phrase to describe **a group of insects**?

1. A flock of insects
2. A swarm of insects
3. A school of insects
4. A shoal of insects

Testbook Solution Correct Option **- 2**
The correct answer **'A swarm of insects'.**

Key-Points

- The given sentence is an example of **'Collective Noun'.**
- **Collective Noun:** a collective noun is a **collection of things taken as a whole**
  - *Example: An army of ants, A flock of birds, A flock of sheep, A herd of deer, A hive of bees, A litter of puppies, A murder of crows, A pack of hounds.*
- There are some certain words that are used before **a Collective Noun.**
- For certain groups, certain words are used before a noun when we refer to the whole class. These words as follows:
  - **People:** board, choir, class, committee, family, group, jury, panel, staff.
  - **Animals:** flock, herd, pod, swarm.
  - **Things:** bunch, collection, fleet, flotilla, pack, set.
- In the given sentence **'A swarm of insects'** is grammatically correct.

Hence, the correct answer is '***A swarm of insects'***.

Que. 110 **Change the following sentence into passive sentence**

They studied Mathematics last year.

1. Mathematics was studied by them last year.
2. Mathematics were studied by them last year.
3. Mathematics has been studied by them last year.
4. Mathematics studied them last year.

Testbook Solution Correct Option **- 1**
The correct answer is **'Mathematics was studied by them last year'.**

Key-Points

- The given sentence is in **Active Voice.** As per the question we have to change it into **Passive Voice.**

- The process of transformation as follows:
  - The subject of the given sentence is **'They'.**
  - The object of the given sentence is **'Mathematics'.**
  - We know that in **Passive Transformation subject will be put in place of the object** and **object will be put in place of the subject.**
  - **'Studied'** will be changed into **'Was studied'.**
  - The objective case of **'They'** that is **'Them'** will be used.
- Therefore, by following the above process we find that the correct answer is **Option 1.**

The correct answer is '***Mathematics was studied by them last year.'***

Que. 111 The meaning of the word **"EGRESS"** is

1. Entrance
2. Exit
3. Double
4. Program

Testbook Solution Correct Option **- 2**
The correct answer is **'Exit'.**

Key-Points

- The exact synonym of the given word **'Egress' is 'Exit'.**
- **Egress:** the act or way of leaving a place
  - *Example: The main egress from the restaurant had been blocked off.*
- **Exit:** the door through which you might leave a building or large vehicle
  - *Example: We headed for the nearest **exit.***
- By reading the above explanations we find that the correct answer is **Option 2**.

Hence, the correct answer is '***Exit'.***

Additional Information

- The meaning of the other words given in the option as follows:
  - **Entrance:** a door, gate, etc. **by which you can enter** a building or place
    *Example: There are two **entrances** - one at the front and one around the back.*
  - **Double: twice the size**, amount, price, etc., or consisting of two similar things together
    *Example: Go through the **double** doors and turn left.*
  - **Program:** a series of **instructions that can be put into a computer** in order to make it perform an operation
    *Example: She's written a **program** to find words that frequently occur together.*

Que. 112 Select the meaning of the given idiom.

Elbow room

1. Opportunity for reconsideration
2. Special room for the guest
3. To give enough space to move or work in
4. To add a new room to the house

Testbook Solution Correct Option **- 3**
The correct answer is **'To give enough space to move or work in'.**

Key-Points

- In the given question **'Elbow room'** is an idiom. The meaning of it as follows:
- **Elbow room: adequate space to move** or work in
  - *Example: At first the management gave the new director plenty of **elbow room.***
- By reading the above explanation we find that the correct answer is **'To give enough space to move or work in'.**

Hence, the Correct answer is ***'To give enough space to move or work in.'***

Additional Information

- The other Idioms/Phrase of the word 'Elbow' as follows:
  - **Elbow grease:** a **lot of physical effort**
    *Example: The polish needs a certain amount of **elbow grease** to apply.*
  - **Elbow sb out:** to **force someone** or something **out of a position** or job
    *Example: He resigned before he was **elbowed out.***
  - **Elbow bump:** a **friendly greeting** in which you touch someone's elbow (= the place where the arm bends) with your elbow.
    *Example: The fitness instructors used to high-five everyone as they walked in, but now it's all **elbow bumps.***

Que. 113 Select the pair that best expresses a relationship similar to that expressed in **SCALE : TONE**

1. Physician: Medicine
2. Wave: Amplitude
3. Spectrum: Color
4. Rainbow: Shower

Testbook Solution Correct Option **- 3**
The correct answer is **'Spectrum: Color'.**

Key-Points

- The above question is an example of an **'analogy'.**
- **Analogy:** a comparison between one thing and another, typically for the purpose of explanation or clarification.
  - *Example: An analogy between the workings of nature and those of human societies.*
- **'A color is part of the spectrum'** the same way **'A tone is part of a musical scale'.**
- Therefore, the correct answer is **Option 3.**

The Correct answer is ***'Spectrum: Color'***

Que. 114 Choose the answer which the best expresses the meaning of the idiom/phrase **"to burn a hole in the pocket".**

1. Steal from someone's pocket.
2. To destroy other's belonging.
3. To be very miserly.

4. Money that is spent quickly

Testbook Solution Correct Option **- 4**
The correct answer is **'Money that is spent quickly'.**

Key-Points

- The most appropriate answer to the given idiom **'to burn a hole in the pocket'** is **'Money that is spent quickly'.**
- **To burn a hole in the pocket:** If money is burning a hole in your pocket, you are **very eager to spend it.**
  - *Example: The day I got my allowance, I hurried down to the sporting goods store, the money **burning a hole in my pocket.***
- By reading the above definition we find that the correct answer is **Option 3.**

Hence, the Correct answer is ***'Money that is spent quickly'.***

Additional Information

- The other Phrase of the word **'Burn'** as follows:
  - **Burn down:** to destroy something with fire, or **to be destroyed** in this way.
    *Example: They weren't injured, but their house **burned down.***
  - **Burn off:** to **remove something** by burning it.
    *Example: Until recently these countries were **burning off** gas they could not use or sell.*
  - **Burn out:** If a fire burns out, it **stops producing flame**s because nothing remains that can burn.
    *Example: It can couple enough electrical energy to cause upset and **burn out** in electronic circuits on a wide scale.*

Que. 115 **Choose the correct alternative to fill in the blank:**

My windows look _____ the garden.

1. up on
2. out on
3. in
4. at

Testbook Solution Correct Option **- 2**
The correct answer is **'out on'.**

Key-Points

- The most appropriate answer for the given fill in blank is **'out on'.**
- We know that **'lookout on'** is a phrasal verb. The meaning of it as follows:
  - **Look out on:** be **oriented in a certain direction.**
  - *Example: The house **looks out on** a tennis court.*
- By reading the above definition we find that the correct answer is **Option 2.**

Hence, the correct sentence is *'My windows **look out on** the garden'.*

Additional Information

- The meaning of other phrasal verbs as follows:
  - **Look upon/on:** to consider or think of someone or something in a stated way.
    *Example: We **looked on** her as a daughter.*
  - **Look at:** to think about a subject carefully so that you can make a decision about it.
    *Example: Management is **looking at** ways of cutting costs.*

Que. 116 Fill in the blank with a suitable article

_____ darkest cloud has a silver lining.

1. An
2. A
3. The
4. From

Testbook Solution Correct Option **- 3**
The correct answer is **'The'.**

Key-Points

- The most suitable article for the given fill in the blank is **'The'.**
- The given sentence is an example of **a Superlative Degree.**
- We know that the definite article '**the**' is always used before **a superlative degree.** Here, in the given question **darkest'** is a superlative degree of **'dark'.**
- **Superlative Degree:** This **degree denotes the highest degree of quality** and is used when one thing/person is compared to all other things/ persons.
- The given sentence is **an idiomatic expression.** Its meaning is: we should **never feel hopeless** because difficult times always lead to better days.
  - *Example: Mohan is the smartest boy in the class.*
- Therefore, the correct answer is **Option 3.**

The correct sentence is '***The** darkest cloud has a silver lining.'*

Additional Information

- When any **object/person** is required to be shown superior to all other objects of its category, **the former should be shown as the part of the latter one.**
- *Example:*
  - *Sachin Tendulkar is the greatest of all other cricketers.* ✗
  - *Sachin Tendulkar is the greatest of all cricketers.* ✓

Que. 117 Fill in the blank with the appropriate adjective

This steak is completely _____, it is cold and tough.

1. edible
2. erratic
3. unswerving
4. inedible

Testbook Solution Correct Option **- 4**
The correct answer is **'inedible'.**

Key-Points

- The most appropriate adjective for the given fill in the blank is **'inedible'.**
- **Steak:** a thick, **flat piece of meat** or fish, especially meat from a cow.
- **Inedible:** not suitable as food.
- By reading the above definition we find that **'Steak'** is **a thick, flat piece of meat therefore, it is something that we cannot eat.**
- Hence, the correct answer is **Option 4.**

The Correct answer is ***'inedible'.***

Additional Information

- The meaning of the other words given in the Option as follows:
  - **Edible:** suitable or safe for eating.
    *Example: Only the leaves of the plant are **edible.***
  - **Erratic:** moving or behaving in a way that is not regular, certain, or expected.
    *Example: He drove in an **erratic** course down the road.*
  - **Unswerving:** If someone's trust or belief is unswerving, it is always strong and never becomes weaker.
    *Example: An **unswerving** linear decline is not usually observed.*

Que. 118 **Direction: Fill in the blank with a suitable preposition**

We have been looking for a new flat _____ ages.

1. since
2. for
3. during
4. in

Testbook Solution Correct Option **- 2**
The correct answer is **'for'.**

Key-Points

- The most suitable answer of the given fill in the blank is **'for'.**
- We know that the given sentence is an example of **the present perfect continuous tense.**
- We use the preposition **'for'** to talk about an amount of time or space. **The amount of time could be seconds, minutes, hours, days, months, or even years.**
- **The amount of time does not need to be exact.** We could use **'for'** when you are talking about vague periods of time, like **"for the weekend", "for ages" or "for a long time".**
- Therefore, the correct answer is **Option 2.**

The Correct sentence is '*We have been looking for a new flat **for** ages.'*

Additional Information

- The use of **'Since':**
  - We use **'Since'** to refer to **"a point of time".** **'Since'** can refer to **a point after a specific time or event in the past.** Or it can refer to **a particular point beginning sometime in the past and continuing until the**

present time.

- **The particular point** in time could be anything – last Tuesday, 2008 or midnight, for example.
- **The important point is** that **since** is used with **a particular point in time.**
  *Example: It has been raining **since** 8 a.m.*

Que. 119 Fill in the blank with the appropriate verb

Where is he? He should _____ home hours ago.

1. be
2. have been
3. had been
4. were

Testbook Solution Correct Option **- 2**
The correct answer is **'have been'.**

Key-Points

- The most appropriate verb for the given fill in the blank is **'have been'.**
- We use **should have + past participle.** We know that the Past Participle of **'be' is 'been'.**
- Hence, the correct answer is **Option 2.**
- We use **"should have been"** to express what we think should have happened, but did not happen.
  - *Example: I got really wet walking home last night, I should have taken an umbrella.*

Hence, the correct sentence is *'Where is he? He should **have been** home hours ago'.*

Que. 120 Fill in the blank with the appropriate question tag

You shouldn't be here on a holiday, _____

1. shouldn't you?
2. should you not?
3. wouldn't you?
4. should you?

Testbook Solution Correct Option **- 4**
The correct answer is **'should you?'.**

Key-Points

- In the given question the most appropriate fill in the blank is **'should you?'.**
- We know that **a positive statement is followed by a negative question tag.**
- Whereas, **a negative statement is followed by a positive question tag.**
- The given sentence is an example of **a negative statement.** Therefore, **a positive question tag will be used.**
  - Examples:
    Jack is from Spain, isn't he?
    He shouldn't say things like that, should he?
- Hence, the correct answer is **Option 4.**

The Correct answer is ***'should you?'***

Additional Information

- The other example of a question tag as follows:
  - If the verb is in **the past simple we use did.**
    Example: They went to the cinema, didn't they?
  - When the statement contains a word with **a negative meaning**, **the question tag needs to be positive.**
    Example: They rarely eat in restaurants, do they?
    In the above example '**rarely**' is **a negative word.** Therefore, **a positive question tag** will be used.

120 Questions

Que. 1	Correct Option - 2
Que. 2	Correct Option - 1
Que. 3	Correct Option - 1
Que. 4	Correct Option - 3
Que. 5	Correct Option - 1
Que. 6	Correct Option - 1
Que. 7	Correct Option - 4
Que. 8	Correct Option - 2
Que. 9	Correct Option - 1
Que. 10	Correct Option - 3
Que. 11	Correct Option - 1
Que. 12	Correct Option - 2
Que. 13	Correct Option - 3
Que. 14	Correct Option - 1
Que. 15	Correct Option - 4
Que. 16	Correct Option - 3
Que. 17	Correct Option - 2
Que. 18	Correct Option - 2
Que. 19	Correct Option - 4
Que. 20	Correct Option - 2
Que. 21	Correct Option - 4
Que. 22	Correct Option - 4
Que. 23	Correct Option - 4
Que. 24	Correct Option - 4
Que. 25	Correct Option - 1

Que. 26	Correct Option - 2
Que. 27	Correct Option - 1
Que. 28	Correct Option - 3
Que. 29	Correct Option - 2
Que. 30	Correct Option - 2
Que. 31	Correct Option - 4
Que. 32	Correct Option - 3
Que. 33	Correct Option - 2
Que. 34	Correct Option - 3
Que. 35	Correct Option - 4
Que. 36	Correct Option - 1
Que. 37	Correct Option - 3
Que. 38	Correct Option - 3
Que. 39	Correct Option - 4
Que. 40	Correct Option - 2
Que. 41	Correct Option - 3
Que. 42	Correct Option - 4
Que. 43	Correct Option - 1
Que. 44	Correct Option - 4
Que. 45	Correct Option - 2
Que. 46	Correct Option - 3
Que. 47	Correct Option - 3
Que. 48	Correct Option - 2
Que. 49	Correct Option - 2
Que. 50	Correct Option - 1
Que. 51	Correct Option - 2

Que. 52	Correct Option - 1
Que. 53	Correct Option - 1
Que. 54	Correct Option - 4
Que. 55	Correct Option - 3
Que. 56	Correct Option - 2
Que. 57	Correct Option - 3
Que. 58	Correct Option - 4
Que. 59	Correct Option - 3
Que. 60	Correct Option - 2
Que. 61	Correct Option - 2
Que. 62	Correct Option - 2
Que. 63	Correct Option - 4
Que. 64	Correct Option - 1
Que. 65	Correct Option - 3
Que. 66	Correct Option - 4
Que. 67	Correct Option - 2
Que. 68	Correct Option - 3
Que. 69	Correct Option - 4
Que. 70	Correct Option - 2
Que. 71	Correct Option - 3
Que. 72	Correct Option - 4
Que. 73	Correct Option - 1
Que. 74	Correct Option - 1
Que. 75	Correct Option - 1
Que. 76	Correct Option - 1
Que. 77	Correct Option - 2
Que. 78	

	Correct Option - 1
Que. 79	Correct Option - 1
Que. 80	Correct Option - 2
Que. 81	Correct Option - 2
Que. 82	Correct Option - 4
Que. 83	Correct Option - 2
Que. 84	Correct Option - 3
Que. 85	Correct Option - 1
Que. 86	Correct Option - 1
Que. 87	Correct Option - 3
Que. 88	Correct Option - 1
Que. 89	Correct Option - 4
Que. 90	Correct Option - 4
Que. 91	Correct Option - 4
Que. 92	Correct Option - 3
Que. 93	Correct Option - 2
Que. 94	Correct Option - 1
Que. 95	Correct Option - 2
Que. 96	Correct Option - 3
Que. 97	Correct Option - 4
Que. 98	Correct Option - 1
Que. 99	Correct Option - 1
Que. 100	Correct Option - 2
Que. 101	Correct Option - 4
Que. 102	Correct Option - 1
Que. 103	Correct Option - 4
Que. 104	

	Correct Option - 2
Que. 105	Correct Option - 1
Que. 106	Correct Option - 2
Que. 107	Correct Option - 1
Que. 108	Correct Option - 4
Que. 109	Correct Option - 2
Que. 110	Correct Option - 1
Que. 111	Correct Option - 2
Que. 112	Correct Option - 3
Que. 113	Correct Option - 3
Que. 114	Correct Option - 4
Que. 115	Correct Option - 2
Que. 116	Correct Option - 3
Que. 117	Correct Option - 4
Que. 118	Correct Option - 2
Que. 119	Correct Option - 2
Que. 120	Correct Option - 4