
#1611960
Topic: Maths

Sum of the $1 + 2.3 + 3.5 + 4.7 + ...$ up to 11 terms is

A 942

B 892

$\boxed{\text{C}}$ 946

D 960

Hint

$1.1 + 2.3 + 3.5 + 4.7 + ...$ up to 11

$$= \sum_{r=1}^{11} r.(2r - 1)$$

$$= 2\sum_{r=1}^{11} r^2 - \sum_{r=1}^{11} r$$

$$= \frac{2.(11)(12)(23)}{6} - \frac{11(12)}{2}$$

$$= 44(23) - 11(6)$$

$$= 946$$

#1611974
Topic: Maths

If $\Rightarrow p(q \vee r)$ is false then truth value of p, q, t is respectively.

A TTT

B FFF

C FTT

$\boxed{\text{D}}$ TFF

Hint

$p \rightarrow (q \vee r)$

$\sim p \vee (q \vee r)$

$(A) \sim (T) \vee (T) \vee (T \vee T)$

$F \vee (T) = T$

$(B) \sim (F) \vee (F) \vee (F \vee F)$

$T \vee (F \vee F)$

$= T \vee F = T$

$(C) \sim (T) \vee (T \vee F)$

$F \vee T = T$

$(D) \sim (T) \vee (F \vee F)$

$F \vee (F \vee F) = F$

#1611988
Topic: Maths

If the ratio of coefficient of the three consecutives terms in binomial expansion of $(1 + x)^n$ is $2:15:70$.

Then the average of these coefficient is

A 227

$\boxed{\text{B}}$ 232

C 964

D 804

Hint

${}^nC_r : {}^nC_{r+1} : {}^nC_{r+2} = 2:15:70$

$\frac{{}^nC_r}{{}^nC_{r+1}} = \frac{2}{15} = \frac{{}^nC_{r+1}}{{}^nC_{r+2}} = \frac{15}{70}; \frac{{}^nC_r}{{}^nC_{r+2}} = \frac{2}{70}$

$\frac{(r+1)}{n-r} = \frac{2}{15} \quad \frac{(r+2)}{n-r-1} = \frac{3}{14}$

$15r + 15 = 2n - 2r \quad 14r + 28 = 3n - 3r - 3$

$17r = 2n - 15 \quad 17r = 3n - 31$

$\therefore n = 16; r = 1$

Average$=\frac{{}^nC_r + {}^nC_{r+1} + {}^nC_{r+2}}{3}$

$\frac{{}^{16}C_1 + {}^{16}C_2 + {}^{16}C_3}{3} = \frac{16 + 120 + 560}{3}$

$= 232g$

#1611996
Topic: Maths

If $\int e^{\sec}(\sec x \tan x\, f(x) + \sec x \tan x + \tan^2 x)dx = e^{\sec x} f(x) + c. Then f(x) is$

A $\sec x + x\, \tan x + \frac{1}{2}$

B $x\sec x + x\tan x + \frac{1}{2}$

C $x\sec x + x^2\tan x + \frac{1}{2}$

$\boxed{D}$ $\sec x + \tan x + \frac{1}{2}$

Hint

$\int e^{\sec}(\sec x \tan x\, f(x) + \sec x \tan x + \sec^2 x)dx = e^{\sec x} f(x)$

Differentiate both side

$\int e^{\sec}(\sec x \tan x\, f(x) + \sec x \tan x + sec^2 x)dx = e^{secx} f'(x) + e^{secx}\, tanx\, f(x)$

$\therefore secx\, tanx + sec^2 x = f'(x)$

$\therefore f(x) = secx + tanx + d$

#1612004
Topic: Maths

The domain of the function

$f(x) = \frac{1}{x^2 - 4} + \ell n(x^3 - x) is$

A $[-1, 0) \cup (1, \infty)$

B $(-1, \frac{1}{2}) \cup (1, 2) \cup (2, \infty)$

$\boxed{C}$ $(-1, 0) \cup (1, 2) \cup (2, \infty)$

D $(-\infty, 0) \cup (1, 2) \cup (2, \infty)$

Hint

$f(x) = \frac{1}{x^2 - 4} + \ell n(x^3 - x) is$

For domain $x^2 - 4 \neq 0$

$\therefore x \in R - 2, 2$

& $x^3 - x > 0$

$x(x-1)(x+1) > 0$

$\frac{-\ +\ -\ +}{-1, 0, 1}$

$\therefore x \in (-1, 0) \cup (1, \infty)$

$\therefore$ Domain $: \in (-1, 0) \cup (1, 2) \cup (2, \infty)$

#1612006

Topic: Maths

The area enclosed by the region $\frac{y^2}{2} \le x \le y + 4$ is

A 16

B 8

[✓ C] 18

D 12

Hint

$\frac{y^2}{2} \le x \le y + 4$

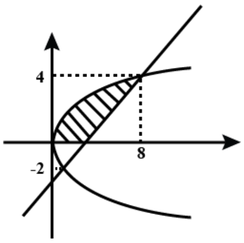
$y^2 \le 2x$ and $x - y - 4 \le 0$

$\int_{-2}^{4} (x_{Right} - x_{left}) dy$

$\int_{-2}^{4} \left((y+4) - \frac{y^2}{2} \right) dy$

$\left(\frac{y^2}{2} + 4y - \frac{y^3}{6} \right)_{2}^{4}$

$= 18$



#1612038

Topic: Maths

Let A $\begin{bmatrix} 0 & 2y & 1 \\ 2x & y & -1 \\ 2x & -y & 1 \end{bmatrix}$ then number of possible matrices that $A' = 3I_3$ is

A 3

B 8

C 6

[✓ D] 4

Hint

If $A'A - 3I$, then $AA' = 3I$

$$= \begin{bmatrix} 0 & 2y & 1 \\ 2x & y & -1 \\ 2x & -y & +1 \end{bmatrix} \begin{bmatrix} 0 & 2x & 2x \\ 2y & y & -y \\ 1 & -1 & 1 \end{bmatrix}$$

$$= \begin{bmatrix} (4y^2+1 & (2y^2-1) & (2y^2-1) \\ (2y^2-1) & (4x^2+y^2+1) & (4x^2-y^2-1) \\ (-2y^2+1) & (4x^2-y^2-1) & (4x^2+y^2+1) \end{bmatrix} =$$

$$\begin{bmatrix} 3 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 3 \end{bmatrix}$$

$\therefore 4y^2 + 1 = 3 \therefore y^2 = \frac{1}{2}$

$4x^2 + y^2 + 1 = 3$

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

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

$4x^2 = \frac{3}{2} \;\; \therefore x^2 = \frac{3}{8}$

$(x, y) = \left(\pm \sqrt{\frac{3}{8}}, \pm \frac{1}{\sqrt{2}} \right)$

(4 such matrices)

#1612041
Topic: Maths

The point lying on common tangent to the circle $x^2 + y^2 = 4$ and $x^2 + y^2 + 6x + 8y - 24 = 0$ is

[✓ A] $(6, -2)$

B $(4, -2)$

C $(4, 6$

D $(2, 4)$

Hint

Circle $x^2 + y^2 = 4$ &

$x^2 + y^2 + 6x + 8y - 24 = 0$ touches internaly

$\therefore$ Common tangent will be $S_1 - S_2 = 0$

$6x + 8y = 20$

$3x + 4y - 10 = 0$

Hence point $(6, -2)$ lies on above line.

#1612051
Topic: Maths

If complex number

$\omega = \frac{5 + 3z}{5(1 - z)}$ and $|z| < 1$ then

A $5\,Im(\omega) < 1$

B $5\,Im(\omega) > 4$

C $5\,Re(\omega) > 1$

[✓ D] $5\,Re(\omega) > 1$

Hint

$$\omega = \frac{5+3z}{5-5z}$$

$5\omega - 5\omega z = 5 + 3z$

$(5\omega + 3)z = 5\omega - 5$

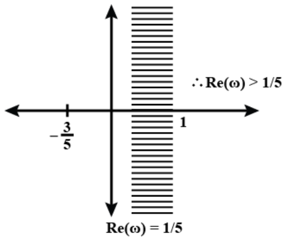
$$Z = \frac{5\omega - 5}{5\omega + 3}$$

$|Z| < 1$

$$\therefore \left|\frac{5\omega - 5}{5\omega + 3}\right| < 1$$

$|5\omega - 5| < |5\omega + 3|$

$$|\omega - 1| < \left|\omega + \frac{3}{5}\right|$$



#1612072

Topic: Maths

Let α and β are the roots of $(m^2+1)x^2 - 3x + (m+1)^2 = 0$. If sum of roots is maximum then $\left|\theta^3 - \beta^3\right|$

A $8\sqrt{5}$

B $8\sqrt{3}$

C $10\sqrt{5}$

D $4\sqrt{3}$

Hint

$(m^2+1) - 3x + (m+1)^2$

$$\alpha + \beta = \frac{3}{m^2+1}$$

$$\alpha\beta = \frac{(m+1)^2}{m^2+1}$$

$\therefore (\alpha + \beta) =$ is maximum $\therefore m^2 + 1$ is min

$\therefore m = 0$

$\alpha + \beta = 3, \alpha\beta = 1$

$\left|\theta^3 - \beta^3\right| = \left|(\alpha - \beta)(\alpha^2 + \beta^2 + \alpha\beta)\right|$

$= \left|\sqrt{(\alpha+\beta)^2 - 4\alpha\beta}\right|$

$\left|(\alpha + \beta)^2 - \alpha\beta\right|$

$\sqrt{5}.8 = 8\sqrt{5}$

#1612083

Topic: Maths

If a line makes an angle $\frac{\pi}{3}$ with x-axis, $\frac{\pi}{4}$ with y-axis then angle made by line with z-axis is

A $\frac{2\pi}{3}$

B $\frac{5\pi}{12}$

C $\frac{3\pi}{4}$

D $\frac{\pi}{12}$

Hint

$\alpha = \frac{\pi}{3}; \beta = \frac{\pi}{4}$

$\therefore cos^2\alpha + cos^2\beta + cos^2\gamma = 1$

$\frac{1}{2} + \frac{1}{2} + cos^2\gamma = 1$

$cos^2\gamma = \frac{1}{4}$

$\therefore cos\gamma = \pm\frac{1}{2}$

$\gamma = \frac{2\pi}{3}$

#1612099

Topic: Maths

If two points B and C at distance of 5 units from each other, lie on the line $\frac{x+2}{3} = \frac{y-1}{0} = \frac{z}{4}$.If point A has coordinates $(1, -1, 2)$. Then the area of ΔABC is

$\boxed{\text{A}}$ $\sqrt{34}$

B $2\sqrt{34}$

C $\sqrt{41}$

D $3\sqrt{34}$

Hint

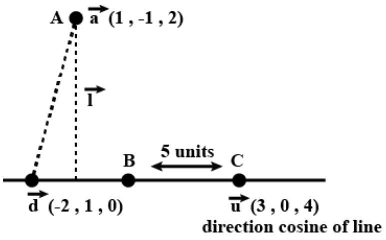
$|\vec{p}| = |(\vec{a} - \vec{d}) \times u|$

$|\vec{p}| = \left|(3\vec{i} - 2\vec{j} + 2k) \times \left(\frac{3}{5}i + \frac{4}{5}k\right)\right|$

$\left| -\frac{8}{5}i + \frac{6}{5}j + \frac{6}{5}k \right|$

$\sqrt{\frac{136}{25}}$

Area of triangle $= \frac{1}{2} \times 5 \times \sqrt{\frac{136}{25}} = \sqrt{34}\ units^2$



#1612125

Topic: Maths

If $y(x)$ satisfies the differential equation $cosx\frac{dy}{dx} - y\ sinx = 6x$ and $y(\frac{\pi}{3}) = 0$. Then value of $y(\frac{\pi}{6})$ is

A $\frac{\pi^2}{3\sqrt{2}}$

$\boxed{\text{B}}$ $\frac{-\pi^2}{3\sqrt{2}}$

C $\frac{\pi^2}{2\sqrt{3}}$

D $\frac{\pi^2}{4}$

Hint

$\frac{dy}{dx} - y\,tanx - 6xsecx,$

Linear Diffreaction equation in 'y'

$I.\,F = e^{\int tanxdx} = e^{-\ell n(secx)} = cosx$

$y = (I.\,F.) = \int Q.\,(I.\,F.)dx$

$y(cosz) = \int 6xdx$

$y.\,cosx = 3x^2 + c$

$\because\ y(\frac{\pi}{3}) = 0$

$0 = 3(\frac{\pi^2}{9}) + c$

$\therefore\ c = \frac{-2\pi^2}{3}$

$ycosx = 3x^2 - -\frac{\pi^2}{3}$

when $x = \frac{\pi}{6}$

$y\frac{\sqrt{3}}{2} = 3.\frac{\pi^2}{36} - \frac{\pi^2}{3}$

$y\frac{\sqrt{3}}{2} = \frac{-\pi^2}{4}$

$y = \frac{-\pi^2}{2\sqrt{3}}$

#1612137

Topic: Maths

There are two newspaper A & B published in a city, If 25% people read A, 20% people read B & 8% both read. Also 30% of these who read A both not B look into advertisement 40% of these who read B but not A look into advertisement 50 of these who read both A & B look into advertisement then how many % of people into advertisement.

[✓ A] 13.9%

B 13%

C 13.1%

D 13.2%

Hint

Let total number of persons=100

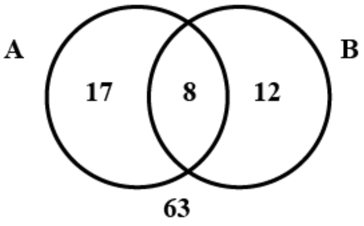
25 read A

20 read B

8 read A & B

40% of $\bar{A} \cap B = 4.8$ look into adv.

30% of $\bar{A} \cap B = 4.8$ look into adv.



#1612138

Topic: Maths

There are two towers of $5m$ & $10m$. The line joining there tops makes 15^0 with ground then find the distance between them.

A $5(1 - \sqrt{3})$

B $10(1 + \sqrt{3})$

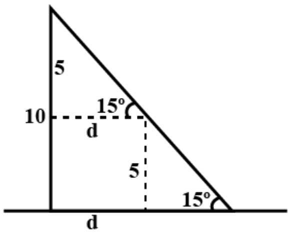
[✓ C] $5(2 + \sqrt{3})$

D $2(2+\sqrt{3})$

Hint

$\tan 15^{o}_{-} = \dfrac{5}{d} = 2-\sqrt{3}$

$d = \dfrac{5}{2-\sqrt{3}} = 5(2+\sqrt{3})$



#1612140
Topic: Maths

If the sum of first 3 terms of an A.P. is 33 and their product is 1155. Then the $11th$ term of the A.P. is

$\boxed{\text{A}}$ -25

B 25

C 36

D -36

Hint

$a-d, a, a+d$

Sum = $3a = 33 \Rightarrow a = 11$

Terms = $11-d, 11, 11+d$

Product = $11(121-d^2) = 1155$

$121-d^2 = 105$

$d^2 = 16$

$d = \pm 4$

$\therefore$ terms $7, 11, 15$ or $15, 11, 17$

$t_{11} = 7+10(4)$ $\quad$ $t_{11} = 15+10(-4)$

$= 47$ $\quad$ $= -25$

#1612141
Topic: Maths

An inverted cone with semi verticle angle $\theta = tan^{-1}\left(\frac{1}{2}\right)$ is being filled with water at the rate of $5cm^3$ min . Then the rate of change of height of water when height of water is $10cm$ is

A $\dfrac{2}{3\pi}$ cm/min

B $\dfrac{3}{2\pi}$ cm/min

$\boxed{\text{C}}$ $\dfrac{1}{5\pi}$ cm/min

D $\dfrac{2}{5\pi}$ cm/min

Hint

$\frac{dv}{dt} = 5cm^3/min$

$v = \frac{1}{3}\pi r^2 h$

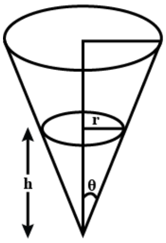
$\tan\theta = \frac{r}{h} = \frac{1}{2} \Rightarrow 2r = h$

$v = \frac{1}{3}\pi\frac{h^3}{4} = \frac{\pi h^3}{12}$

$\Rightarrow \frac{dv}{dt} = \frac{\pi}{4}h^2\frac{dh}{dt}$

$5 = \frac{\pi}{4}10^2\frac{dh}{dt}$

$\Rightarrow \frac{dh}{dt} = \frac{20}{100\pi} = \frac{1}{5\pi}$ cm/min



#1612143

Topic: Maths

If points $A(-8, 5)$ & $B(6, 5)$ lie on a circle C_1. The line $3y = x_7$ is a diameter of C_1. Rectangle. $ABCD$ which is inscribed inside the circle is completed . Then the area of this rectangle is

A 60

[✓ B] 84

C 42

D 74

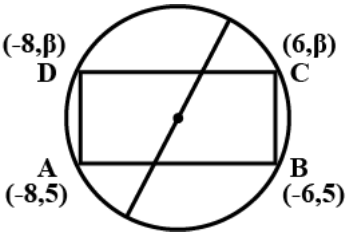
Hint

$A(-8, 5)$; $B(6, 5)$

mid point of $AC = \left(-1, \frac{\beta+5}{2}\right)$ lies on $3y = x + 7$

$\frac{3}{2}(\beta + 5) = 6 \quad \Rightarrow \beta + 5 = 4 \ \ \beta = -1$

$\therefore$ Area of rectangle = $(14)(6) = 84$



#1612144

Topic: Maths

Let $y^2 = 4x$ is a parabole . Then minimum area of a circle touching parabola at $(1, 2)$ as well as x-axis is

[✓ A] $4\pi(3 - 2\sqrt{2})$

B $8\pi(3 - 2\sqrt{2})$

C $8\pi(4 - 2\sqrt{2})$

D $8\pi(3 - 5\sqrt{2})$

Hint

Equation of tangent at $(1, 2)$

$2y = 2(x+1) \Rightarrow y = x+1$

Equation of normal $y = -x+3$

Let centre be $C(3-r, r)$

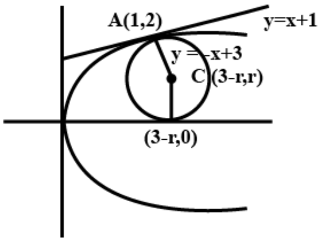
$AC^2 = r^2 \qquad \Rightarrow (3-r-1)^2 + (r-2)^2 = r^2$

$2(2-r)^2 = r^2 \Rightarrow r^2 - 8r + 8 = 0 \quad \Rightarrow r = 4 \pm 2\sqrt{2}$

For $r = 4 + 2\sqrt{2}, 3 - r < 0$

So, $r - 4 - 2\sqrt{2}$

Area $= \pi r^2 = 8\pi(3 - 2\sqrt{2})$



#1612146

Topic: Maths

The mean and median of 10, 22, 26, 29, 34, x, 42, 67, 70,y (in increasing order) are 42 and 35 respectively then the value $\frac{y}{x}$is

A $\frac{9}{2}$

B $\frac{5}{3}$

[✓ C] $\frac{7}{3}$

D $\frac{7}{2}$

Hint

Median is 35

$35 = \frac{34+x}{2}$

$x = 70 - 34$

$= 36$

$10\mu = 10 + 22 + 26 + 24 + 29 + 34 + x + 42 + 67 + 70 + y$

$420 = 39 + 48 + 70 + 109 + 70 + y$

$350 = 87 + 179 + y$

$y = 350 - 266$

$y = 84$

$\frac{y}{x} = \frac{84}{36} = \frac{21}{9} = \frac{7}{3}$

#1612147

Topic: Maths

If tangent of $y^2 = x$ at (α, β), where $\beta > 0$ is also a tangent of ellipse $x^2 + 2y^2 = 1$ then value of α is

[✓ A] $\sqrt{2} - 1$

[✓ B] $\sqrt{2} + 1$

C $2\sqrt{2} + 1$

D $2\sqrt{2} - 1$

Hint

Let required point of contact be (β^2, β)

Tangent on $y^2 = x$ is $T = 0$

$y.\beta = \frac{1}{2}(x + \beta^2)$

$y = \frac{x}{2\beta} + \frac{\beta}{2}$

Equation of ellipse is $x^2 + \frac{y^2}{1/2} = 1$

Condition for tangency $c^2 = a^2m^2 + b^2$

$\frac{\beta^2}{4} = 1\left(\frac{1}{4\beta^2}\right) + \frac{1}{2}$

$\Rightarrow \beta^4 = 2\beta^2 + 1 \quad \Rightarrow (\beta^2 - 1)^2 = 2$

$\Rightarrow \beta^2 = \sqrt{2} + 1$

$\therefore \alpha = \sqrt{2} + 1$

#1612148
Topic: Maths

$\int_0^1 x\cot^{-1}(1 - x^2 + x^4) =$

A $\frac{\pi}{2} - log2$

B $\frac{\pi}{2} + log\sqrt{2}$

C $\frac{\pi}{4} - log2$

$\boxed{\text{D}}$ $\frac{\pi}{4} - log\sqrt{2}$

Hint

$\int_0^1 x\tan^{-1}\left(\frac{1}{1 - x^2 + x^4}\right)dx$

$\Rightarrow$ put $x^2 = t$

$= \frac{1}{2}\int_0^1 \tan^{-1}\left(\frac{1}{1 - t + t^2}\right)dt$

$= \frac{1}{2}\int_0^1 \tan^{-1}\left(\frac{t + (1 + t)}{1 - t(1 - t)}\right)dt$

$= \frac{1}{2}\int_0^1 (\tan^{-1}t + \tan^{-1}(1 - t))dt$

$= \frac{1}{2}\int_0^1 (\tan^{-1}(1 - t))dt + \frac{1}{2}\int_0^1 (\tan^{-1}(1 - t))dt$

$\int_0^1 (\tan^{-1}(1 - t))dt = \int_0^1 (\tan^{-1}(t))dt$

Put $\tan^{-1}t = k$

$\int_0^{\frac{\pi}{4}} k\sec^2 kdk$

$= \frac{\pi}{4} - \frac{1}{2}\ell n2$ (using by parts)

#1612150
Topic: Maths

The value of $\sin 10^0.\sin 30^0.\sin 50^0.\sin 70^0$ is

A $\frac{1}{36}$

B $\frac{1}{32}$

C $\frac{1}{18}$

$\boxed{\text{D}}$ $\frac{1}{16}$

Hint

$(\sin 30^o)(\sin 10^o)\ (\sin(60^o-10^o))(\sin(60^o+10^o))=\frac{1}{2}\left(\frac{1}{4}\sin 30^o\right)=\frac{1}{16}$

#1612152

Topic: Maths

If $f(x)=\begin{cases} a\,|\,\pi-x\,|\,+1 & x\le 5 \\ b\,|\,x-\pi\,|\,+3 & x>5 \end{cases}$

is continuous $\forall x\epsilon R$. Then value of $a-b$ is

A $\frac{1}{5-\pi}$

[✓ B] $\frac{2}{5-\pi}$

C $\frac{2}{5+\pi}$

D $\frac{1}{5+\pi}$

Hint

We have to check only at $x=5$

$f(5)=a\,|\,\pi-5\,|\,+1=a(5-\pi)+1=f(5^-)$

$f(5^+)=b\,|\,5-\pi\,|\,+3=b(5-\pi)+3$

$f(5)=f(5^-)=f(5^+)$

$a(5-\pi)+1=b(5-\pi)+3$

$(a-b)(5-\pi)=2$

$\therefore\ a-b=\frac{2}{5-\pi}$

#1612153

Topic: Maths

If the lines $x+(a-1)y=1$ and $2x+a^2y=1$ where $a\in R-\{0,1\}$ are perpendicular to each other. Then distance of their points of intersection from the origin is

A $\frac{5}{2}$

B $\frac{2}{\sqrt{5}}$

C $\frac{\sqrt{5}}{2}$

[✓ D] $\sqrt{\frac{2}{5}}$

Hint

$x+(a-1)y=1$

$2x+a^2y=1$

lines are perpendicular

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

$\Rightarrow a^3+a^2-2a^2-2a+2a+2=0$

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

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

$\Rightarrow a=-1$

$\therefore$ lines are $x-2y=1$

$2x+y=1$

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

$\therefore -5y=1\Rightarrow y=-\frac{1}{5},x=\frac{3}{5}$

required distance $=\sqrt{\frac{9}{25}+\frac{1}{25}}=\sqrt{\frac{10}{25}}=\sqrt{\frac{2}{5}}$

#1612156

Topic: Maths

If some balls are arranged in the form of an equilateral triangle with n rows such that r^{th} row of balls has r balls in it. if 99 more balls are added to existing one and the balls can now form a square with $(n-2)$ balls in each row. Then the number of balls that formed the equilateral triangle.

$\boxed{\text{A}}$ 190

B 290

C 100

D `140

Hint

$\frac{n(n+1)}{2}+99=(n-2)^2 \Rightarrow n^2-9n-190=0 \Rightarrow n=19 \Rightarrow$ number of balls $=\frac{19.20}{2}=190$

#1612159

Topic: Maths

Let $f(2)=6$ the value of $\lim_{x\to 2}\int_6^{f(x)}\frac{2tdt}{x-2}$

$\boxed{\text{A}}$ $12f'(2)$

B $24f'(2)$

C $8f'(2)$

D $10f'(2)$

Hint

$f(2)=6$

$\lim_{x\to 2}\int_6^{f(x)}\frac{2tdt}{x-2}$

$\lim_{x\to 2}\frac{\int_6^{f(x)}2tdt}{x-2}$ (using L.H. Rule)

$=\lim_{x\to 2}\frac{2f(x).\,f'(x)}{1}$

$=12f'(2)$

#1612164

Topic: Maths

If $f(x)=(x)-\left[\frac{x}{4}\right]$ then

A $\lim_{x\to 4^+}f(x)$ and $\lim_{x\to 4^-}f(x)$ both does not exit

$\boxed{\text{B}}$ function $f(x)$ is continuous at $x=4$

C $\lim_{x\to 4^+}f(x)$ and $f_{x\to 4^-}(x)$ both exit but are not equal

D $\lim_{x\to 4^+}f(x)$ and $f_{x\to 4^-}(x)$ does not exit

Hint

$f(x)=[x]=\left[\frac{x}{4}\right]$

$\lim_{h\to 0^+}[4+h]-\left[\frac{4+h}{4}\right]$

$4-1=3$

$\lim_{h\to 0^+}[4-h]-\left[\frac{4-h}{4}\right]$

$3-0=3$

$f(4)=[4]-[1]=3$

$f(x)$ continuous at $x=4$

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Topic: Maths

Let the system of lineat equations $2x + 3y - z = 0, 2x + ky - 3z = 0$ and $2x - y + z = 0$ have non trivial non trivial solution then $\frac{x}{y} + \frac{y}{z} + zx + k$ will be

A 2

[✓ B] 3

C 1

D -4

Hint

$$\begin{vmatrix} 2 & 3 & -1 \\ 2 & k & -3 \\ 2 & -1 & 1 \end{vmatrix} = 0$$

$R_2 \to R_2 - R_1$ and $R_3 \to R_3 - R_1$

$$\Rightarrow \begin{vmatrix} 2 & 3 & -1 \\ 0 & k-3 & -2 \\ 0 & -4 & 2 \end{vmatrix} = 0$$

$\Rightarrow k = 7$

Equation 1 $\Rightarrow 2\frac{x}{y} + 3 - \frac{z}{y} = 0$ ......(iv)

Equation 3 $\Rightarrow 2\frac{x}{y} - 1 + \frac{z}{y} = 0$

adding these two equation we get $4\frac{x}{y} + 2 = 0$

$\Rightarrow \frac{x}{y} = -\frac{1}{2}$.....(v)

Putting this value in equation (iv) we get $\frac{z}{y} = 2$ ....(vi)

Equation (v) divided by equation (vi) $\Rightarrow \frac{x}{z} = -\frac{1}{4}$

So, $\frac{x}{y} + \frac{y}{z} + \frac{z}{x} + k = -\frac{1}{2} + \frac{1}{2} - 4 + 7 = 3$