
#1611182

Topic: Application of Binomial Expansion

The sum of coefficient of even powers of x in $(x+\sqrt{x^3-1})^6+(x-\sqrt{x^3-1})^6$ is

A 23

[✓ B] 24

C 18

D 21

Solution

$(x+\sqrt{x^3-1)^6}+(x+\sqrt{x^3-1})^6=({}^6C_0.\,x^6+{}^6C_2.\,x^4(x^3-1)+{}^6C_4x^2(x^3-1)^2+{}^6C_6(x^3-1)^3)$Terms with even powers of $x=2({}^6C_0.\,x^6-{}^6C_2.\,x^4+{}^6C_4x^2+{}^6C_4x^8+{}^6C_6(-1-3x^6)$Coefficients $=2({}^6C_0-{}^6C_2+{}^6C_4+{}^6C_6-3.\,{}^6C_6)=2(15-3)=24$

#1611190

Topic: Trigonometric Functions

Let $\sin(\alpha-\beta)=\frac{5}{13}$ and $\cos(\alpha+\beta)=\frac{3}{5}$, then $\tan(2\alpha)$ is equal to (Here $\alpha,\beta\in\left(0,\frac{\pi}{4}\right)$

[✓ A] $\frac{63}{16}$

B $\frac{61}{16}$

C $\frac{65}{16}$

D $\frac{32}{9}$

Solution

$0<\alpha<\frac{\pi}{4},0<\beta<\frac{\pi}{4}\Rightarrow 0<\alpha+beta<\frac{\pi}{2}$ and $-\frac{\pi}{4}<\alpha-\beta<\frac{\pi}{4}$Now $\sin(\alpha-\beta)=\frac{5}{13}\Rightarrow\cos(\alpha-\beta)=\frac{12}{13}$and $\cos(\alpha+\beta)=\frac{3}{5}\Rightarrow\sin(\alpha+\beta)=\frac{4}{5}$Now

$$\tan 2\alpha=\tan[(\alpha+\beta)+(\alpha-\beta)]=-\frac{\tan(\alpha+\beta)+\tan(\alpha-\beta)}{1-\tan(\alpha+\beta)\tan(\alpha-\beta)}=\frac{\frac{4}{3}+\frac{5}{12}}{1-\frac{4}{3}\times\frac{5}{12}}=\frac{63}{16}$$

#1611192

Topic: Position of a Point/Line w.r.t Circle

The line $x+y=n,n\in N$ makes intercepts with $x^2+y^2=16$. Then the sum of square of all possible intercepts.

A $\frac{105}{4}$

B 105

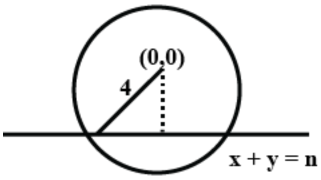
[✓ C] 210

D $\frac{105}{2}$

Solution

$P = \frac{n}{\sqrt{2}}$to make the intercept $\frac{n}{\sqrt{2}} < 4 \Rightarrow n < 4\sqrt{2}$Length of intercepts $= 2\sqrt{r^2 - p^2} = 2\sqrt{16 - n^2/2}$Square of intercept $= 4 \times \left(16 - \frac{n^2}{2}\right), n \in N$Sum of squares of intercept

$= 4 \times \left(\left(16 - \frac{1}{2}\right) + \left(16 - \frac{4}{2}\right) + \left(16 - \frac{16}{2}\right) + \left(16 - \frac{25}{2}\right)\right) = 2\left(80 - \frac{1}{2} \times 22\right) = 210$



#1611194

Topic: Special Integrals (Trigonometric Functions)

$\int \frac{\sin\frac{5x}{2}}{\sin\frac{x}{2}} dx$ is equal to

A $x + 2\sin x + \sin 2x + C$

B $x + 2\cos x + \sin 2x + C$

C $x + 2\sin x + \sin 2x + C$

D $x + 2\sin x - \sin 2x + C$

Solution

$\frac{\sin\frac{5x}{2}}{\sin\frac{x}{2}} dx = \in \frac{2\sin\frac{5x}{2}\cos\frac{x}{2}}{2\sin\frac{x}{2}\cos\frac{x}{2}} dx = \int\left(\frac{\sin 3x + \sin 2x}{\sin x}\right)dx = \int 2\cos x\, dx + \int(3 - 4\sin^2 x)dx 2\int \cos dx + \int dx + 2\int \cos^2 x\, dx = 2\sin x + x + \sin 2x + C$

#1611195

Topic: Area of Bounded Regions

The area bounded by the curve $y \le x^2 + 3x, 0 \le y \le 4,\ 0 \le x \le 3$, is

A $\frac{59}{6}$

B $\frac{57}{4}$

C $\frac{59}{3}$

D $\frac{57}{6}$

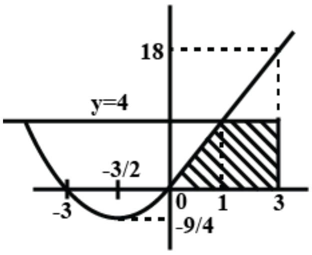
Solution

$y = x^2 + 3x = 4 \Rightarrow x^2 + 3x - 4 = 0$

$(x + 4)(x - 1) = 0$

$x = 1$

area $= \int_0^1 (x^2 + 3x)dx + 2(4) = \frac{1}{3} + \frac{3}{2} + 8 = \frac{11}{6} + 8 = \frac{59}{6}$



#1611207

Topic: Truth Tables

"If you are born in India then you are citizen of India" Contrapositive of this statement is

A If you are born in India then you are not citizen of India

[✓ B] If you are not citizen of India then you are not born in india

C If you are citizen of India then you are not born in India

D If you are citizen of India then you are born in India

Solution

Contrapositive of $p \Rightarrow q$ is $\sim q \Rightarrow \sim p$ Hence answer is "If you are not citizen of India then you are not born in India."

#1611210

Topic: Operations on Matrices

Let $A = \begin{bmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{bmatrix}$ and $A^{32} = \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$ then α may be

A 0

B $\frac{\pi}{32}$

[✓ C] $\frac{\pi}{64}$

D $\frac{\pi}{16}$

Solution

$$A^2 = \begin{bmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{bmatrix}\begin{bmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{bmatrix}$$

$$A^2 = \begin{bmatrix} \cos2\alpha & -\sin2\alpha \\ \sin2\alpha & \cos2\alpha \end{bmatrix}$$

similarly we observe that $A^n = \begin{bmatrix} \cos n\alpha & -\sin n\alpha \\ \sin n\alpha & \cos n\alpha \end{bmatrix}$

hence $\cos32\alpha = 0$ and $\sin32\alpha = 1$

$32\alpha = 2n\pi + \dfrac{\pi}{2}$

$\alpha = \dfrac{n\pi}{16} + \dfrac{\pi}{64}, n \in i$

#1611214

Topic: Tangent

Shortest distance between the curve $y^2 = x - 2$ and $y = x$ is

A greater than 4

[✓ B] less than 2

C greater than 3

D greater than 2

Solution

Shortest distance between $y^2 = x - 2$ and $y = x$

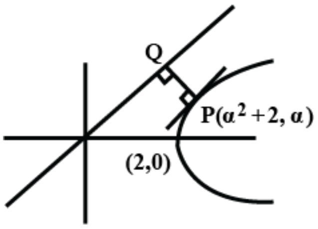
$\frac{dy}{dx}$ at point P will be 1.

Differentiating the curve

$$2yy' = 1 \Rightarrow y' = \frac{1}{2y} = \frac{1}{2\alpha} = 1 \quad \therefore P\left(\frac{9}{4}, \frac{1}{2}\right)$$

$\therefore$ minimum distance = PQ

$$= \left|\frac{\frac{9}{4} - \frac{1}{2}}{\sqrt{2}}\right| = \frac{7}{4\sqrt{2}}$$



#1611220

Topic: L'Hospital's Rule

$$lim_{x\to 0}\frac{si_n^2x}{\sqrt{2} - \sqrt{1 + cosx}} =$$

A $\sqrt{2}$

B 2

C 4

[✓ D] $4\sqrt{2}$

Solution

$$\lim_{x\to 0}\frac{\sin^2 x}{\sqrt{2} - \sqrt{1 + \cos x}} = \lim_{x\to 0}\frac{\sin^2 x(\sqrt{2} + \sqrt{1 + \cos x})}{1 - cosx}$$

$$= \lim_{x\to 0}\frac{\sin^2 x}{x^2}\left(\frac{1}{\frac{1 - \cos x}{x^2}}\right)(\sqrt{2} + \sqrt{1 + \cos x}) = \frac{2\sqrt{2}}{1/2} = 4\sqrt{2}$$

#1611223

Topic: Permutation Involving Restrictions

How many 9 digit number can be formed using the digits $1, 1, 2, 2, 2, 2, 3, 4, 4$ such that odd numbers occur at even places.

A 160

B 175

[✓ C] 180

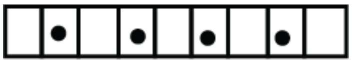
D 220

Solution

1, 1, 2, 2, 2, 2, 3, 4, 4

odd numbers occur at even places

${}^{4}C_{3} \times \frac{3!}{2!} \times \frac{6!}{4!2!} = 4 \times 3 \times 15 = 180$



#1611226

Topic: Properties of Definite Integral

Let $g(x) = lnx$ and $f(x) = \left(\frac{1 - xcosx}{1 + xcosx}\right)$ then $\int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} g(f(x))dx$ is equal to

$\boxed{A}$ $\ell n1$

B $\ell n2$

C ℓne

D $\ell n4$

Solution

$g(x) = \ell n(x),\ f(x) = \frac{1 - x\cos x}{1 + x\cos x}$ and $g(f(x)) = \ell n\left(\frac{1 - xcosx}{1 + xcosx}\right)$

$I = \int_{-\pi/4}^{\pi/4} \ell n\left(\frac{1 - x\cos x}{1 + x\cos x}\right)dx$

$x \to a + b - x$

$x \to -x$

$I = \int_{-\pi/4}^{\pi/4} \ell n\left(\frac{1 + x\cos x}{1 - x\cos x}\right)dx$

Adding , $2I = \int_{-\pi/4}^{\pi/4} \ell n(1)dx = 0 \Rightarrow I = 0$

#1611228

Topic: Binomial Coefficients

Let $2.{}^{20}C_0 + 5.{}^{20}C_1 + 8.{}^{20}C_2 + \ldots\ldots + 62.{}^{20}C_{20}$. then sum of this series is

A 16.2^{22}

B 8.2^{20}

C 8.2^{21}

$\boxed{D}$ 16.2^{21}

Solution

$$2.{}^{20}C_0 + 5.{}^{20}C_1 + 8.{}^{20}C_2 + ... + 62.{}^{20}C_{20} = \sum_{r=0}^{20} (3r+2).{}^{20}C_r$$

$$= 3\sum_{r=0}^{20} r.\ {}^{20}C_r + 2\sum_{r=0}^{20}\ {}^{20}C_r = 3\times 20\sum_{r=1}^{20}\ {}^{19}C_{r+1} + 2.(2^{20}) = 60.\ 2^{19} + 2.2^{20} = 16.2^{21}$$

#1611229

Topic: Special Series

Sum of the natural number between 100 and 200 whose HCF with 91 should be more than 1

A 1121

B 3210

$\boxed{C}$ 3121

D 1520

Solution

Natural numbers between $100 \,\&\, 200$.

$101, 102, ..., 199$.

Either divide by 7 or divide by 13.

(sum of numbers (divide by 7) + (sum of number divided by 13) - (sum of number of divide by 91)

$$\sum_{r=1}^{14}(98+7r) + \sum_{r=1}^{8}(91+13r) - (182) = \left(98\times 14 + 7.\frac{14\times 15}{2}\right) + \left((91\times 8) + 13\times\frac{8\times 9}{2}\right) - 182$$

$$= 1372 + 735 + 728 + 468 - 182 = 3121$$

#1611230

Topic: Variance and Standard Deviation

If mean and variance of 7 variates are 8 and 16 respectively and five of them are $2, 4, 10, 12, 14$ then find the product of remaining two variates

A 49

$\boxed{B}$ 48

C 45

D 40

Solution

Let remaining two variates are a and b then

$$\frac{a+b+2+4+10+12+14}{7}=8$$

and $\dfrac{a^2+b^2+4+16+100+144+196}{7}-(8)^2=16$

$\Rightarrow a+b=14$ and $a^2+b^2=100$

$$\Rightarrow ab=\frac{(a+b)^2-(a^2+b^2)}{2}=\frac{196-100}{2}=48$$

#1611232

Topic: Maths

If α and β are the roots of $x^2-2x+2=0$ then find minimum value of n such that $\left(\frac{\alpha}{\beta}\right)^n=1$

[✓ A] 4

B 3

C 2

D 5

#1611240

Topic: Linear Differential Equation

Solution of differential equation $(x^2+1)^2\frac{dy}{dx}+2x(x^2+1)y=1$ is

A $y=\dfrac{tan^{-1}x}{x^2+1}+C$

B $y=tan^{-1}x+C$

[✓ C] $y(x^2+1)=tan^{-1}x+C$

D $y(tan^{-1}x)=x^2+C$

Solution

$(x^2+1)^2\frac{dy}{dx}+2x(x^2+1)y=1$

$\frac{dy}{dx}+\frac{2x}{x^2+1}y=\frac{1}{(x^2+1)^2}$

Linear D.E.

$I.F.\ =e^{\int\frac{2x}{x^2+1}dx}=e^{\ell n(x^2+1)}=x^2+1$

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

$y(x^2+1)=\int\frac{1}{(x^2+1)^2}(x^2+1)dx$

$y(x^2+1)=tan^{-1}x+C$

#1611256

Topic: Algebra of Real Functions

If $f(x)=log_e\left(\frac{1-x}{1+x}\right)$ then $f\left(\frac{2x}{1+x^2}\right)$ is equal to

A $f(x)$

[✓ B] $2f(x)$

C $-2f(x)$

D $(f(x))^2$

Solution

$f(x)=\ell n\left(\frac{1-x}{1+x}\right)$

$f\left(\frac{2x}{1+x^2}\right)=\ell n\left(\frac{1-\frac{2x}{1+x^2}}{1+\frac{2x}{1+x^2}}\right)=\ell n\left(\frac{1+x^2-2x}{1+x^2+2x}\right)=\ell n\left(\left(\frac{1-x}{1+x}\right)^2\right)=2\ell n\left(\frac{1-x}{1+x}\right)=2f(x)$

#1611261

Topic: Multiplication Theorem

Given that $A\subset B$, then identify the correct statement

A $P(A/B)=P(A)$

B $P(A/B)\le P(A)$

[✓ C] $P(A/B)\ge P(A)$

D $P(A/B)=P(A)-P(B)$

Solution

$A \subset B$

$P(A/B) = \frac{P(A \cap B)}{P(B)} = \frac{P(A)}{P(B)} \neq P(A)$ (always)

$P(A/B) = \frac{P(A)}{P(B)} \geq P(A)$

#1611266

Topic: Application of Matrices and Determinants

Find the value of c for which the following equations have non trivial solutions :

$cx - y - z = 0$

$-cx + y - cz = 0$

$x + y - cz = 0$

A $\frac{1}{2}$

$\boxed{\text{B}}$ -1

C 2

D 0

Solution

$$\begin{vmatrix} C & -1 & -1 \\ -C & 1 & -C \\ 1 & 1 & -C \end{vmatrix} = 0 \Rightarrow \begin{vmatrix} 0 & 0 & -(1+C) \\ -C & 1 & -C \\ 1 & 1 & -C \end{vmatrix} = 0$$

$\Rightarrow -(1+C)(-C-1) = 0$

$\Rightarrow C = -1$

#1611277

Topic: Inverse Trigonometric Functions

Let $2y = \left(\cot^{-1}\left(\frac{\sqrt{3}\cos x + sinx}{\cos x - \sqrt{3}\sin x}\right)\right)^2$ then $\frac{dy}{dx}$ is equal to

$\boxed{\text{A}}$ $x - \frac{\pi}{6}$

B $x + \frac{\pi}{6}$

C $2x - \frac{\pi}{6}$

D $2x - \frac{\pi}{3}$

Solution

$$2y = \left(\cot^{-1}\left(\frac{\sqrt{3}\cos x + sinx}{\cos x - \sqrt{3}\sin x}\right)\right)^2$$

$$2y = \left(\cot^{-1}\left(\frac{\sqrt{3} + \tan x}{1 - \sqrt{3}\tan x}\right)\right)^2$$

$$2y = \left(\cot^{-1}\left(\tan\left(\frac{\pi}{3} + x\right)\right)\right)^2$$

$$2y = \left(\frac{\pi}{2} - \tan^{-1}\left(\tan\left(\frac{\pi}{3} + x\right)\right)\right)^2 = \left(\frac{\pi}{2} - \left(\frac{\pi}{3} + x\right)\right)^2$$

$$2y = \left(x - \frac{\pi}{6}\right)^2$$

$$2y = x^2 - \frac{\pi}{3}x + \frac{\pi^2}{36}$$

$$y' = x - \frac{\pi}{6}$$

#1611280

Topic: Maxima and Minima

Let S_1 is set of minima and S_2 is set of maxima for the curve $y = 9x^4 + 12x^3 - 36x^2 - 25$, then

A $S_1 = \{-2, -1\}; S_2 = \{0\}$

[✓ B] $S_1 = \{-2, 1\}; S_2 = \{0\}$

C $S_1 = \{-2, 1\}; S_2 = \{-1\}$

D $S_1 = \{-2, 2\}; S_2 = \{0\}$

Solution

$y = 9x^4 + 12x^3 - 36x^2 - 25$

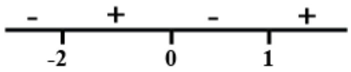
$\frac{dy}{dx} = 36x^3 + 36x^2 - 72x$

$= 36x(x^2 + x - 2)$

$= 36x(x + 2)(x - 1)$

$\{-2, 1\} \rightarrow$ points of minima

$\{0\} \rightarrow$ point of maxima



#1611285

Topic: Nature of the Function

Let $f''(x) > 0$ and $\phi(x) = f(x) + f(2 - x), x \in (0, 2)$ be a function, then the function $\phi(x)$ is

A increasing in $(0, 1)$ and decreasing $(1, 2)$

[✓ B] decreasing in $(0, 1)$ and increasing $(1, 2)$

C increasing in $(0, 2)$

D decreasing in $(0, 2)$

Solution

$f''(x) > 0, y = f(x); x \in (0, 2)$

$\phi(x) = f(x) + f(2 - x)$

$\phi'(x) = f'(x) - f'(2 - x)$

for $\phi(x)$ to be increasing

$\phi'(x) > 0 \Rightarrow f'(x) > f'(2 - x)$

$\Rightarrow x > 2 - x$ $(f'(x)$ is increasing in $(0, 2))$

$\Rightarrow x > 1$

$\Rightarrow x \in (1, 2)$

For $\phi(x)$ to be decreasing

$\phi'(x) = 0 \Rightarrow f'(x) < f'(2 - x)$

$\therefore x \in (0, 1)$

#1611291

Topic: Properties of Triangles

Let vertices of the triangle ABC is $A(0, 0), B(0, 1)$ and $C(x, y)$ and perimeter is 4 then the locus of C is :

A $9x^2 + 8y^2 + 8y = 16$

B $8x^2 + 9y^2 + 9y = 16$

[✓ C] $9x^2 + 8y^2 - 8y = 16$

D $8x^2 + 9y^2 - 9x = 16$

Solution

$\sqrt{x^2+y^2} + \sqrt{x^2+(y-1)^2} = 3$

$\Rightarrow x^2+y^2-2y+1 = 9 + x^2+y^2-6\sqrt{x^2+y^2}$

$3\sqrt{x^2+y^2} = 4+y$

$9x^2+9y^2 = 16+y^2+8y$

#1611297

Topic: Position of Points Relative to a Line

Let the equation of a line is $3x+5y=15$ and a point P on this line is equidistant from x and y axis. In which quadrant the point P lies ?

$\boxed{\text{A}}$ 1^{st}

B 3^{rd}

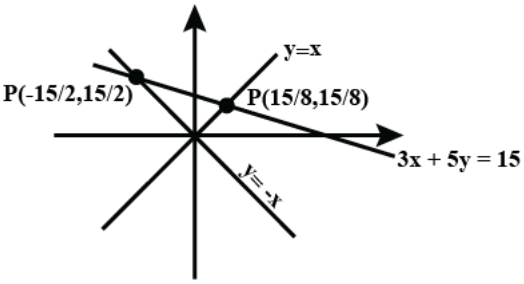
C 4^{th}

D None of these

Solution

From the figure,

Intersection of the original line with $y=x$ and $y=-x$ will give desired points P in 1^{st} and 2^{nd} quadrant.



#1611333

Topic: Lines

The perpendicular distance of point $(2,-1,4)$ from the line $\frac{x+3}{10} = \frac{y-2}{-7} = \frac{z}{1}$ lies between

A (2, 3)

$\boxed{\text{B}}$ (3, 4)

C (4, 5)

D (1, 2)

Solution

Let the foot of perpendicular from $P(2,\ -1, 4)$ to the given line be $A(10\lambda - 3,\ -7\lambda + 2, \lambda)\overrightarrow{PA}\cdot(10\hat{i} - 7\hat{j} + k) = 0$

$\Rightarrow 10(10\lambda - 5) - 7(-7\lambda + 3) + 1(\lambda - 4) = 0$

$\Rightarrow 150\lambda = 75 \Rightarrow \lambda = \dfrac{1}{2}$

$|\overrightarrow{PA}| = \sqrt{(10\lambda - 5)^2 + (-7\lambda + 3)^2 + (\lambda - 4)^2}$

$= \sqrt{0 + \left(\dfrac{1}{2}\right)^2 + \left(\dfrac{7}{2}\right)^2} = \sqrt{\dfrac{50}{4}}$

Which lies in $(3, 4)$

#1611348

Topic: Plane

If a plane passes through intersection of planes $2x - y - 4 = 0$ and $y + 2z - 4 = 0$ and also passes through the point $(1, 1, 0)$. Then the equation of plane is

[✓ A] $x - y - z = 0$

B $2x - z = 0$`

C $x + 2z - 1 = 0$

D $x - z - 1 = 0$

Solution

$P_1 + \lambda P_2 = 0$

$(2x - y - 4) + \lambda(y + 2z - 4) = 0$

it passes through $(1, 1, 0)$

$\Rightarrow 1 + \lambda = 0 \Rightarrow \lambda = -1$

equation of plane is $x - y - z = 0$

#1611349

Topic: Roots and Coefficients

If $|\sqrt{x} - 2| + \sqrt{x}(\sqrt{x} - 4) = 2$, then find the sum of roots of equation

A 12

B 8

C 4

[✓ D] 16

Solution

$|\sqrt{x}-2| + x - 4\sqrt{x} = 2$

$\Rightarrow |\sqrt{x}-2| + (\sqrt{x})^2 - 4\sqrt{x} + 4 = 6$

$\Rightarrow (\sqrt{x}-2)^2 + |\sqrt{x}-2| = 6$

Let $|\sqrt{x}-2| = t$

$t^2 + t - 6 = 0$

$\Rightarrow (t+3)(t-2) = 0$

$\Rightarrow t = 2$ or $t = -3$

but $t = -3$ not possible

$|\sqrt{x}-2| = 2$

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

$\Rightarrow \sqrt{x} = 0$ or $\sqrt{x} = 4$

$x = 0$ or $x = 16$

#1611350

Topic: Tangent

$4x^2 + y^2 = 8$, tangent at $(1, 2)$ and another tangent at (a, b) are perpendicular , then find the value of a^2.

$\boxed{\text{A}}$	$\frac{2}{17}$
B	$\frac{1}{17}$
C	$\frac{8}{17}$
D	$\frac{4}{17}$

Solution

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

Let (a, b) is $(\sqrt{2}\cos\theta, 2\sqrt{2}\sin\theta)$

tangent at $(1, 2)$ is $4x+2y=8 \Rightarrow 2x+y=4 \Rightarrow$ slope is $-2=m_1$

tangent at $(\sqrt{2}\cos\theta, 2\sqrt{2}\sin\theta)$ is $4\sqrt{2}\cos\theta x+2\sqrt{2}\sin\theta y=8 \Rightarrow$ slope is $-2\cot\theta=m_2$

Now $m_1m_2=-1 \Rightarrow 4\cot\theta=-1 \Rightarrow \cos\theta=\frac{1}{\sqrt{17}}$ or $\frac{-1}{\sqrt{17}}$

$$\Rightarrow a=\sqrt{\frac{2}{17}} \text{ or } -\sqrt{\frac{2}{17}} \Rightarrow a^2=\frac{2}{17}$$

#1611352

Topic: Applications of Vector Product

Find the magnitude of projection of vector $2i+3j+k$, on a vector which is perpendicular to the plane containing vectors $i+j+k$ and $i+2j+3k$.

$\boxed{\text{A}}$ $\frac{\sqrt{3}}{\sqrt{2}}$

B $\frac{\sqrt{2}}{\sqrt{3}}$

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

D $\frac{2\sqrt{2}}{\sqrt{3}}$

Solution

Normal vector to the plane to plane containing $\hat{i}+\hat{j}+\hat{k}$ and $\hat{i}+2\hat{j}+3\hat{k}$ is

$\bar{n}=(\hat{i}+\hat{j}+\hat{k})\times(\hat{i}+2\hat{j}+3\hat{k})$

$\bar{n}=\hat{i}-2\hat{j}+\hat{k}$

projection of $(2\hat{i}+3\hat{j}+\hat{k})$ on $\bar{n}$

$$=\left|\frac{(2\hat{i}+3\hat{j}+\hat{k}).(\hat{i}-2\hat{j}+\hat{k})}{\sqrt{1+4+1}}\right|$$

$$=\frac{3}{\sqrt{6}}=\sqrt{\frac{3}{2}}$$