



MATHS

BOOKS - CBSE COMPLEMENTARY MATERIAL MATHS (HINGLISH)

THREE DIMENSIONAL GEOMETRY

One Mark Questions

1. The distance of the point P(a,b,c)` from the x-axis is

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2. The angle between the lines 2x=3y=-z and 6x=-y=-4z is

3. Write the equation of a line passsing through (2,-3,5) and parallel to

line
$$\frac{x-1}{3} = \frac{y-2}{4} = \frac{z+1}{-1}$$

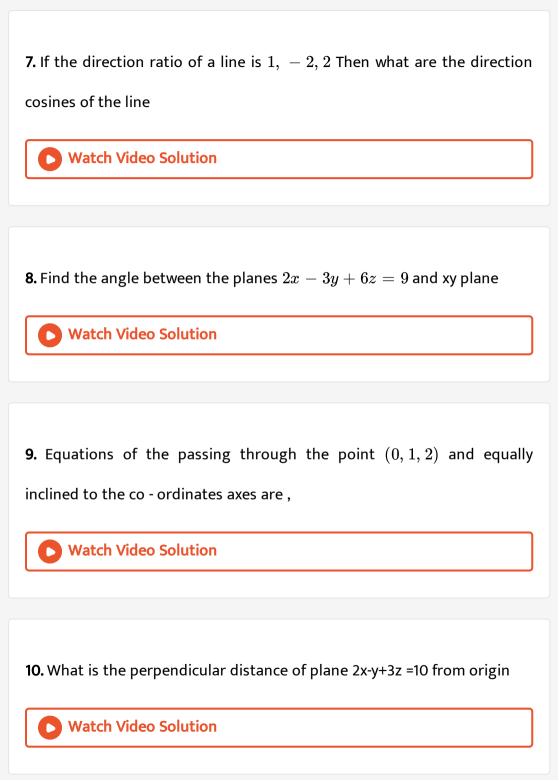
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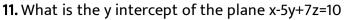
4. Write the equation of a line through (1,2,3) and parallel to $\vec{r} \cdot (\hat{i} - \hat{j} + 3\hat{k}) = 5$ Watch Video Solution

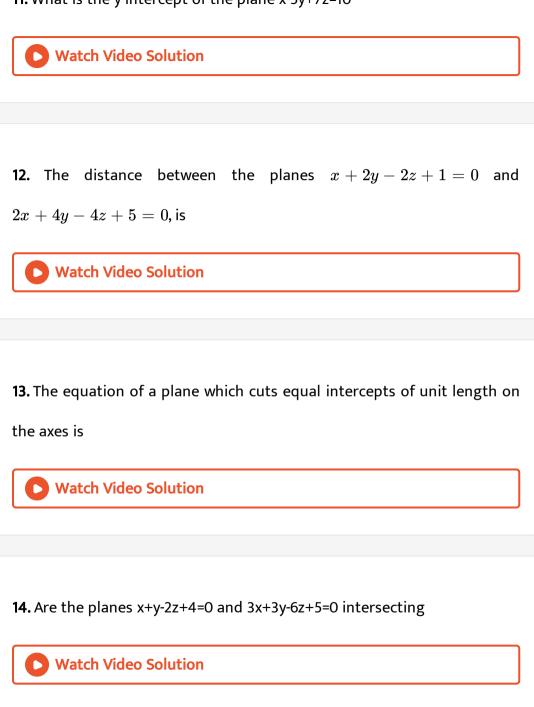
5. What is the value of λ for which the lines $\frac{x-1}{2} = \frac{y-3}{5} = \frac{z-1}{\lambda}$ and $\frac{x-2}{3} = \frac{y+1}{-2} = \frac{z}{2}$ are prependicular to each other

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6. Write line
$$\overrightarrow{r}=\left(\hat{i}-\hat{j}
ight)+\lambda\left(2\hat{j}-\hat{k}
ight)$$
 in to cartesian form

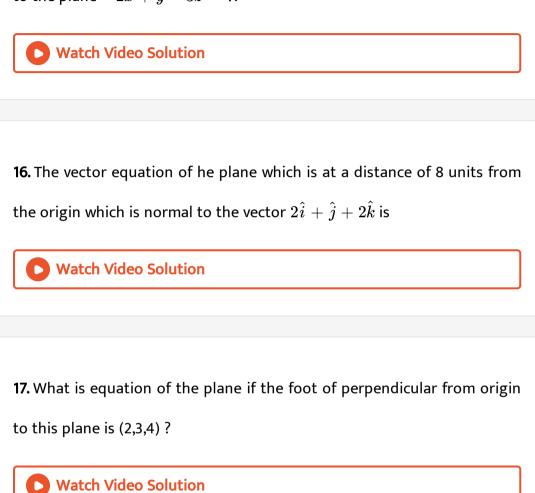






15. Find the equation of the plane through the point (1,4,-2) and parallel

to the plane -2x + y - 3z = 7.



18. Find the angles between the planes $\overrightarrow{r}\left(\hat{i}-2\hat{j}-2\hat{k}
ight)=1$ and $\overrightarrow{r}\left(3\hat{i}-6\hat{j}+2\hat{k}
ight)=0$

19. If O is the origin, OP = 3 with direction ratios proportional to -1, 2, -2

then the coordinates of P are-

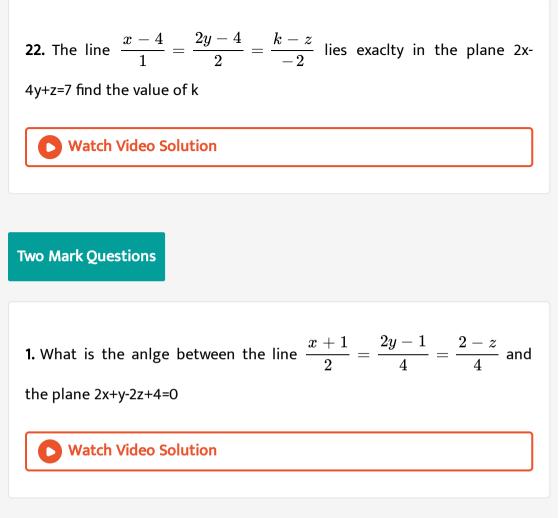


$$\overrightarrow{r}=2\hat{i}-2\hat{j}+3\hat{k}+\lambda\Big(\hat{i}-\hat{j}+4\hat{k}\Big)$$
 and the plane

$$\overrightarrow{r}.\left(\hat{i}+5\hat{j}+\hat{k}
ight)=5$$
 is

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21. Write the line 2x=3y =4z in vector form

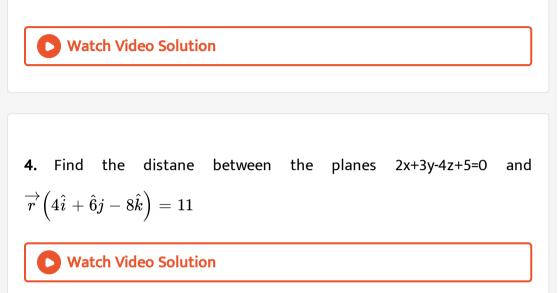


2. Find the equation of a line passing though (2,0,5) and which is parallel

line 6x-2=3y+1=2z-2

3. Find the equation of the plane passes through the point (2, 3, -4)

and (1, -1, 3) and parallel to x-axis.



5. The equation of a line are 5x-3 =15y+7=3-10z write the direction cosines

of the line



6. If a line makes angle lpha, eta and γ with the axes respectively then $\sin^2lpha + \sin^2eta + \sin^2\gamma =$



7. Find the equation of a line passing through the point (2,0,1) and parallel to the line whose equation is $\overrightarrow{r} = (2\lambda + 3)\hat{i} + (7\lambda - 1)\hat{j} + (-3\lambda + 2)\hat{k}$

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8. The plane 2x - 3y + 6z - 11 = 0 makes an angle $\sin^{-1}(\alpha)$ with X-

axis. The value of alpah is

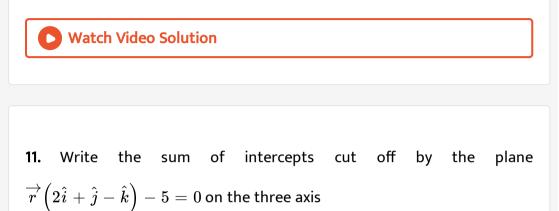
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9. If 4x + 4y - cz = 0 is the equation of the plane passing through the origin that contains the line $\frac{x+5}{2} = \frac{y}{3} = \frac{z-7}{4}$ then find the value of

С

10. Find the equation of the plane passing through the point (-2,1,-3) and

making equal intercept on the coordinate axes



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Four Mark Questions

1. Find the equation of a plane containing the point (0,-1,-1),(-4,4,4) and

(4,5,1) alos show that (3,9,4) lies on the that plane

2. Find the equation of the plane which is perpendicual to the plane $\vec{r}\left(5\hat{i}+2\hat{j}+6\hat{k}\right)+8=0$ and which is containg the line of intersection of the planes $\vec{r}\left(\hat{i}+2\hat{j}+3\hat{k}\right)=4$ and $\vec{r}\left(2\hat{i}+\hat{j}-\hat{k}\right)+5=0$

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3. Find the distance of the point (3, 4, 5) from the plane x + y + z = 2

measured parallel to the line 2x = y = z

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4. Find the equation of the plane passing through the lineof intersection

of the planes x+2y+3z-5=0 and 3x-2y-z+1=0 and

cutting off equal intercepts on the x-axis and z-axis.

5. Find the vector equation of the line passing through the point with position vector $2\hat{i} - \hat{j} + \hat{k}$ and parallel to the line joining the points with position vectors $-\hat{i} + 4\hat{j} + \hat{k}$ and $\hat{i} + 2\hat{j} + 2\hat{k}$. Also, find the cartesian equation of the line.

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6. Find the equation of the plane through the points A(3,4,2) and B(7,0,6)

and perpendicular to the plane 2x - 5y = 15.

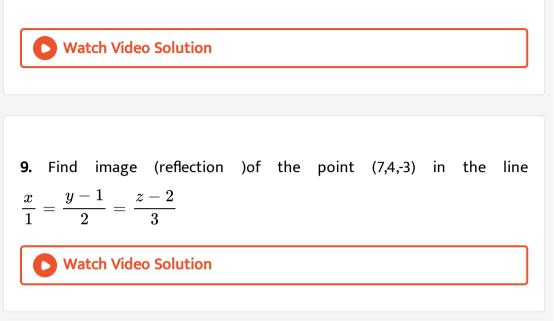
Hint: The given plane is 2x - 5y + 0z = 15.

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7. The equation of the plane through the intersection of the planes $\overrightarrow{r}.\left(2\hat{i}+6\hat{j}
ight)+12=0$ and $\overrightarrow{r}.\left(3\hat{i}-\hat{j}+4\hat{k}
ight)=0$ and at a unit distance from the origin is

distance from the origin, is

8. Find the image of point (3,-2,1) in the plane 3x - y + 4z = 2.



10. find the equation of a plane passing through the points (2, -1, 0)and (3, -4, 5) and parallel to the line 2x = 3y = 4z

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11. Find the distance of the point (-1, -5, -10) from the point of intersection of line $\frac{x-2}{3} = \frac{y+1}{4} = \frac{z-2}{2}$ and the plane x-y+z=5 measured parallel to the line $\frac{x}{2} = \frac{y}{3} = \frac{z}{-6}$

12. Find the equation of the plane passing through the points $(2,\ -1,0)$

and (3, -4, 5) and parallel to the line 2x=3y=4z.



13. Show that the lines
$$\frac{x+1}{3} = \frac{y+3}{5} = \frac{z+5}{7}$$
 and $\frac{x-2}{1} = \frac{y-4}{3} = \frac{z-6}{5}$

intersect. Also find their point of intersection.



14. Find the shortest distacne between the lines

$$egin{aligned} \overrightarrow{r} &= \hat{i} + 2\hat{j} + 3\hat{k} + \mu\Big(2\hat{i} + 3\hat{j} + 4\hat{k}\Big) \ \overrightarrow{r} &= \Big(2\hat{i} + 4\hat{j} + 5\hat{k}\Big) + \lambda\Big(3\hat{i} + 4\hat{j} + 5\hat{k}\Big) \end{aligned}$$
 and

15. Find the distacne of the point (2,3,-4) from the line $\frac{x+2}{3} = \frac{2y+3}{4} = \frac{3z+4}{5}$ measured paralle to the plane 4x+12y-3z+1=0

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16. Find the equation of plane passing through the point (-1,-1,2) and

perpendicular to each of the plane
$$\overrightarrow{r}\left(2\hat{j}-3\hat{k}
ight)=2 ext{ and } \overrightarrow{r}.\left(5\hat{i}-4\hat{j}+\hat{k}
ight)=6$$

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17. Find the equation of a plane passing through (-1,3,2) and parallel to each of the line $\frac{x}{1} = \frac{y}{2} = \frac{z}{3}$ and $\frac{x+2}{3} = \frac{y+1}{2} = \frac{z+1}{5}$ **Watch Video Solution** 18. Show that the plane \overrightarrow{r} . $(\hat{i} - 3\hat{j} + 5\hat{k}) = 7$ contains the line $\overrightarrow{r} = (\hat{i} + 3\hat{j} + 3\hat{k}) + \lambda(3\hat{i} + \hat{j})$

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19. Check the co planarity of lines

$$\overrightarrow{r}=\Big(-3\hat{i}+\hat{j}+5\hat{k}\Big)+\lambda\Big(-3\hat{i}+\hat{j}+5\hat{k}\Big).\ \overrightarrow{r}=\Big(-\hat{i}+2\hat{j}+5\hat{k}\Big)+\mu$$

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Six Mark Questions

1. Find the shortest distance between the lines $\frac{x+1}{7} = \frac{y+1}{-6} = \frac{z+1}{1}$ and $\frac{x-3}{1} = \frac{y-5}{-2} = \frac{z-7}{1}$ Watch Video Solution 2. Find the shortest distance between the lines

$$\overrightarrow{r}=(1-\lambda)\hat{i}+(\lambda-2)\hat{j}+(3-2\lambda)\hat{k}, \, \overrightarrow{r}=(\mu+1)+(2\mu-1)\hat{j}-(2\mu$$

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3. A variable plane is at a constant distance 3p from the origin and meets the coordinates axes in A,B and C if the centroid of $\triangle ABC$ is (α, β, γ) then show that $\alpha^{-2} + \beta^{-2} + \gamma^{-2} = p^{-2}$

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4. A vector \overrightarrow{n} f magnitude 8 units is inclined to x-axis at 45^{0} , y-axis at 60^{0} and an acute angle with z-axis. If a plane passes through a point $(\sqrt{2}, -1, 1)$ and is normal to \overrightarrow{n} , find its equation in vector form.

5. Find the foot of the perpendicular from the point $2\hat{i} - \hat{j} + 5\hat{k}$ on the line $\overrightarrow{r} = (11\hat{i} - 2\hat{j} - 8\hat{k}) + \lambda(10\hat{i} - 4\hat{j} - 11\hat{k})$ also find the length of the perpendicular

of the perpendicular

6. A line makes angles α , β , γ and δ with the diagonals of a cube, prove that $\cos^2 \alpha + \cos^2 \beta + \cos^2 \gamma + \cos^2 \delta = \frac{4}{3}$

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7. Find the equation of the plane passing through the intersection of the

planes 2x + 3y - z + 1 = 0 and x + y - 2z + 3 = 0 and perpendicular

to the plane 3x - y - 2z - 4 = 0.



8. Find the coordinates of the centroid of the triangle whose vertices are

(3,5); (4,6) and (2,4).



9. Show that the lines

$$rac{x-1}{2} = rac{y+1}{3} = z \;\; ext{and} \;\;\; rac{x+1}{5} = rac{y-2}{1}z = 2$$

do not intersect each other .