

SETH M. R. JAIPURIA SCHOOLS BANARAS PARAO CAMPUS

WORKSHEET (2025-26)

Subject – MATHEMATICS

Class – XII (3 D GEOMETRY)

FOOT OF PERPENDICULAR ON A LINE (WITH ANSWER)

1. Find the perpendicular distance of the point $(3, -1, 11)$ from the line $\frac{x}{2} = \frac{y-2}{-3} = \frac{z-3}{4}$.
2. Find the perpendicular distance of the point $(1, 0, 0)$ from the line $\frac{x-1}{2} = \frac{y+1}{-3} = \frac{z+10}{8}$. Also, find the coordinates of the foot of the perpendicular. [CBSE 2005]
3. Find the foot of the perpendicular drawn from the point $A(1, 0, 3)$ to the joint of the points $B(4, 7, 1)$ and $C(3, 5, 3)$.
4. $A(1, 0, 4)$, $B(0, -11, 3)$, $C(2, -3, 1)$ are three points and D is the foot of perpendicular from A on BC . Find the coordinates of D .
5. Find the foot of perpendicular from the point $(2, 3, 4)$ to the line $\frac{4-x}{2} = \frac{y}{6} = \frac{1-z}{3}$. Also, find the perpendicular distance from the given point to the line.
6. Find the equation of the perpendicular drawn from the point $P(2, 4, -1)$ to the line $\frac{x+5}{1} = \frac{y+3}{4} = \frac{z-6}{-9}$. Also, write down the coordinates of the foot of the perpendicular from P .
7. Find the length of the perpendicular drawn from the point $(5, 4, -1)$ to the line $\vec{r} = \hat{i} + \lambda(2\hat{i} + 9\hat{j} + 5\hat{k})$.
8. Find the foot of the perpendicular drawn from the point $\hat{i} + 6\hat{j} + 3\hat{k}$ to the line $\vec{r} = \hat{j} + 2\hat{k} + \lambda(\hat{i} + 2\hat{j} + 3\hat{k})$. Also find the length of the perpendicular
9. Find the equation of the perpendicular drawn from the point $P(-1, 3, 2)$ to the line $\vec{r} = (2\hat{j} + 3\hat{k}) + \lambda(2\hat{i} + \hat{j} + 3\hat{k})$. Also find the coordinates of the foot of the perpendicular from P .
10. Find the foot of the perpendicular from $(0, 2, 7)$ on the line $\frac{x+2}{-1} = \frac{y-1}{3} = \frac{z-3}{-2}$
11. Find the foot of the perpendicular from $(1, 2, -3)$ to the line $\frac{x+1}{2} = \frac{y-3}{-2} = \frac{z}{-1}$
12. Find the equation-of line passing through the points $A(0, 6, -9)$ and $B(-3, -6, 3)$. If D is the foot of perpendicular drawn from a point $C(7, 4, -1)$ on the line AB , then find the coordinates of the point D and the equation of line CD . [CBSE 2010]

ANSWERS

1. $\sqrt{53}$
2. $2\sqrt{6}, (3, -4, -2)$
3. $\left(\frac{5}{3}, \frac{7}{3}, \frac{17}{3}\right)$
4. $\left(\frac{22}{9}, \frac{-11}{9}, \frac{5}{9}\right)$
5. $\left(\frac{170}{49}, \frac{78}{49}, \frac{10}{49}\right), 3\sqrt{\frac{101}{49}}$
6. $(-4, 1, -3), \frac{x-2}{-6} = \frac{y-4}{-3} = \frac{z+1}{-2}$
7. $\sqrt{\frac{2109}{110}}$
8. $\hat{i} + 3\hat{j} + 5\hat{k}, \sqrt{13}$
9. $\vec{r} = (-\hat{i} + 3\hat{j} + 2\hat{k}) + \lambda(3\hat{i} - 9\hat{j} + \hat{k}), \left(-\frac{4}{7}, \frac{12}{7}, \frac{15}{7}\right)$
10. $\left(-\frac{5}{2}, \frac{5}{2}, 2\right)$
11. $(1, 1, -1)$
12. $\frac{x}{1} = \frac{y-6}{4} = \frac{z+9}{-4}; \frac{x-7}{4} = \frac{y-4}{1} = \frac{z+1}{2}$
13. $(1, 0, 7)$