

习题 5.4

1. $3x - 7y + 5z - 4 = 0$.

2. $2x + 9y - 6z - 121 = 0$.

3. $x - 3y - 2z = 0$.

4. 略.

5. xOy 面: $\frac{1}{3}$; yOz 面: $\frac{2}{3}$; zOx 面: $\frac{2}{3}$.

6. $x + y - 3z - 4 = 0$.

7. $(1, -1, 3)$.

8. $(1)y + 5 = 0$; $(2)x + 3y = 0$; $(3)9y - z - 2 = 0$.

9. 1.

10. $\frac{x-4}{2} = \frac{y+1}{1} = \frac{z-3}{5}$.

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

12. 对称式方程: $\frac{x-1}{2} = \frac{y-1}{-1} = \frac{z-1}{-3}$; 参数方程: $\begin{cases} x = 1 + 2t, \\ y = 1 - t, \\ z = 1 - 3t. \end{cases}$

13. $16x - 14y - 11z - 65 = 0$.

14. 0.

15. 证明: 直线 $\begin{cases} x + 2y - z = 7 \\ -2x + y + z = 7 \end{cases}$ 的对称式方程为: $\frac{x+2}{3} = \frac{y-4}{1} = \frac{z+1}{5}$.

直线 $\begin{cases} 3x + 6y - 3z = 8 \\ 2x - y - z = 0 \end{cases}$ 的对称式方程为: $\frac{x-1}{3} = \frac{y-\frac{11}{9}}{1} = \frac{z-\frac{7}{9}}{5}$, 因为

$3:1:5 \neq (-1-2):(-\frac{11}{9}+4):(-\frac{7}{9}-1)$, 所以两直线平行.

16. $\frac{x}{-2} = \frac{y-2}{3} = \frac{z-4}{1}$.

17. $8x - 9y - 22z - 59 = 0$.

18. 0.

19. (1)平行; (2)垂直; (3)直线在平面上.

20. $x - y + z = 0$.

21. $(-\frac{5}{3}, \frac{2}{3}, \frac{2}{3})$. 22. $\frac{3\sqrt{2}}{2}$.

23. 证明: 点 M_0 到直线 L 上的距离 d 是以 $\overrightarrow{MM_0}$, $\vec{S}$ 为邻边的平行四边形底边上的高, 因而 $d = \frac{|\overrightarrow{MM_0} \times \vec{S}|}{|\vec{S}|}$.

24. $\begin{cases} x + 3y - z - 9 = 0 \\ 4x - y + z = 1 \end{cases}$.