In Problems 13–22, the given vectors span a subspace V of the indicated Euclidean space. Find a basis for the orthogonal complement $V^{\perp}$ of V.

13. $\mathbf{v}_1 = (1, -2, 3)$

14. $\mathbf{v}_1 = (1, 5, -3)$

15. $\mathbf{v}_1 = (1, -2, -3, 5)$

16. $\mathbf{v}_1 = (1, 7, -6, -9)$

17. $\mathbf{v}_1 = (1, 3, 2, 4)$, $\mathbf{v}_2 = (2, 7, 7, 3)$

18. $\mathbf{v}_1 = (1, -3, 3, 5)$, $\mathbf{v}_2 = (2, -5, 9, 3)$

19. $\mathbf{v}_1 = (1, 2, 5, 2, 3)$, $\mathbf{v}_2 = (3, 7, 11, 9, 5)$

20. $\mathbf{v}_1 = (2, 5, 5, 4, 3)$, $\mathbf{v}_2 = (3, 7, 8, 8, 8)$

21. $\mathbf{v}_1 = (1, 2, 3, 1, 3)$, $\mathbf{v}_2 = (1, 3, 4, 3, 6)$, $\mathbf{v}_3 = (2, 2, 4, 3, 5)$

22. $\mathbf{v}_1 = (1, 1, 1, 1, 3)$, $\mathbf{v}_2 = (2, 3, 1, 4, 7)$, $\mathbf{v}_3 = (5, 3, 7, 1, 5)$