

Difficulty level: Advanced

1. Compute the product of the scalar  $-\sqrt{3}$  and vector  $(\frac{4}{5}, 3, -1)$ .

- ☒  $(-\frac{4\sqrt{3}}{5}, -3\sqrt{3}, \sqrt{3})$
- ☐  $(-\frac{4\sqrt{3}}{5}, 3 + \sqrt{3}, \sqrt{3})$
- ☐  $(-\frac{4}{5} - \sqrt{3}, -3 - \sqrt{3}, 1 - \sqrt{3})$
- ☐  $(\frac{4}{5} - \sqrt{3}, 3 - \sqrt{3}, -1 - \sqrt{3})$

2. Compute the product:  $\sqrt{11}(-7, -\frac{1}{2}, -\frac{3}{4})$ .

- ☐  $(\sqrt{11} - 7, \sqrt{11} - \frac{1}{2}, \sqrt{11} - \frac{3}{4})$
- ☐  $(7 + \sqrt{11}, \frac{1}{2} + \sqrt{11}, \frac{3}{4} + \sqrt{11})$
- ☒  $(-7\sqrt{11}, -\frac{\sqrt{11}}{2}, -\frac{3\sqrt{11}}{4})$
- ☐  $(-7\sqrt{11}, -\frac{1}{2\sqrt{11}}, -\frac{3\sqrt{11}}{4})$

Difficulty level: Advanced

3. Multiply the vector  $(-6, -\frac{7}{8}, -\frac{2}{7})$  by the scalar  $\sqrt{5}$ .

- ☐  $(6 + \sqrt{5}, \frac{7}{8} + \sqrt{5}, \frac{2}{7} + \sqrt{5})$
- ☐  $(\sqrt{5} - 6, \sqrt{5} - \frac{7}{8}, \sqrt{5} - \frac{2}{7})$
- ☐  $(-6\sqrt{5}, -\frac{7}{8} - \sqrt{5}, -\frac{2\sqrt{5}}{7})$
- ☒  $(-6\sqrt{5}, -\frac{7\sqrt{5}}{8}, -\frac{2\sqrt{5}}{7})$

4. Compute the product:  
 $-\sqrt{3} (6, 6, 7)$ .

- ☐  $(-6 - \sqrt{3}, -6 - \sqrt{3}, -7 - \sqrt{3})$
- ☐  $(6 - \sqrt{3}, 6 - \sqrt{3}, 7 - \sqrt{3})$
- ☐  $(-6\sqrt{3}, -6\sqrt{3}, 7)$
- ☒  $(-6\sqrt{3}, -6\sqrt{3}, -7\sqrt{3})$

Difficulty level: Advanced

5. Calculate the product:

$$\sqrt{3} \left(-4, -4, \frac{9}{8}\right).$$

- ☐  $\left(-4\sqrt{3}, -\frac{4}{\sqrt{3}}, \frac{9\sqrt{3}}{8}\right)$
- ☐  $\left(4 + \sqrt{3}, 4 + \sqrt{3}, \sqrt{3} - \frac{9}{8}\right)$
- ☒  $\left(-4\sqrt{3}, -4\sqrt{3}, \frac{9\sqrt{3}}{8}\right)$
- ☐  $\left(\sqrt{3} - 4, \sqrt{3} - 4, \frac{9}{8} + \sqrt{3}\right)$

6. Calculate the product:

$$\sqrt{5} \left(\frac{6}{5}, -5, 3\right).$$

- ☐  $\left(\sqrt{5} - \frac{6}{5}, 5 + \sqrt{5}, \sqrt{5} - 3\right)$
- ☐  $\left(\frac{6}{5}, -5\sqrt{5}, 3\sqrt{5}\right)$
- ☐  $\left(\frac{6}{5} + \sqrt{5}, \sqrt{5} - 5, 3 + \sqrt{5}\right)$
- ☒  $\left(\frac{6}{\sqrt{5}}, -5\sqrt{5}, 3\sqrt{5}\right)$

7. Calculate the product:

$$-\sqrt{7} \left(\frac{3}{2}, -\frac{3}{7}, 6\right).$$

- ☐  $\left(\frac{3}{2} - \sqrt{7}, -\frac{3}{7} - \sqrt{7}, 6 - \sqrt{7}\right)$
- ☒  $\left(-\frac{3\sqrt{7}}{2}, \frac{3}{\sqrt{7}}, -6\sqrt{7}\right)$
- ☐  $\left(-\frac{3}{2} - \sqrt{7}, \frac{3}{7} - \sqrt{7}, -6 - \sqrt{7}\right)$
- ☐  $\left(-\frac{3\sqrt{7}}{2}, \frac{3}{7\sqrt{7}}, -6\sqrt{7}\right)$

8. Multiply the vector  $(-5, -1, -2)$  by the scalar  $\sqrt{3}$ .

- ☐  $(5 + \sqrt{3}, 1 + \sqrt{3}, 2 + \sqrt{3})$
- ☒  $(-5\sqrt{3}, -\sqrt{3}, -2\sqrt{3})$
- ☐  $(\sqrt{3} - 5, \sqrt{3} - 1, \sqrt{3} - 2)$
- ☐  $(-5\sqrt{3}, -\frac{1}{\sqrt{3}}, -2\sqrt{3})$

9. Multiply the vector  $(1, -2, 1)$  by the scalar  $\sqrt{3}$ .

- ☒  $(\sqrt{3}, -2\sqrt{3}, \sqrt{3})$
- ☐  $(\sqrt{3} - 1, 2 + \sqrt{3}, \sqrt{3} - 1)$
- ☐  $(\sqrt{3}, -2 - \sqrt{3}, \sqrt{3})$
- ☐  $(1 + \sqrt{3}, \sqrt{3} - 2, 1 + \sqrt{3})$

10. Calculate the product:  
 $-\sqrt{5} (3, 5, 2)$ .

- ☒  $(-3\sqrt{5}, -5\sqrt{5}, -2\sqrt{5})$
- ☐  $(-3\sqrt{5}, -\sqrt{5}, -2\sqrt{5})$
- ☐  $(3 - \sqrt{5}, 5 - \sqrt{5}, 2 - \sqrt{5})$
- ☐  $(-3 - \sqrt{5}, -5 - \sqrt{5}, -2 - \sqrt{5})$

11. Multiply the vector  $(-1, \frac{9}{4}, -1)$  by the scalar  $-\sqrt{5}$ .

- ☐  $(1 - \sqrt{5}, -\frac{9}{4} - \sqrt{5}, 1 - \sqrt{5})$
- ☐  $(-1, -\frac{9\sqrt{5}}{4}, \sqrt{5})$
- ☐  $(-1 - \sqrt{5}, \frac{9}{4} - \sqrt{5}, -1 - \sqrt{5})$
- ☒  $(\sqrt{5}, -\frac{9\sqrt{5}}{4}, \sqrt{5})$

12. Compute the product of the scalar  $-\sqrt{11}$  and vector  $(1, -3, -2)$ .

- ☒  $(-\sqrt{11}, 3\sqrt{11}, 2\sqrt{11})$
- ☐  $(-\sqrt{11}, \frac{3}{\sqrt{11}}, 2\sqrt{11})$
- ☐  $(1 - \sqrt{11}, -3 - \sqrt{11}, -2 - \sqrt{11})$
- ☐  $(-1 - \sqrt{11}, 3 - \sqrt{11}, 2 - \sqrt{11})$

Difficulty level: Advanced

13. Compute the product of the scalar  $\sqrt{11}$  and vector  $(-\frac{3}{2}, -\frac{5}{9}, 7)$ .

- ☐  $(\frac{3}{2} + \sqrt{11}, \frac{5}{9} + \sqrt{11}, \sqrt{11} - 7)$
- ☐  $(\sqrt{11} - \frac{3}{2}, \sqrt{11} - \frac{5}{9}, 7 + \sqrt{11})$
- ☐  $(-\frac{3\sqrt{11}}{2}, -\frac{5}{9\sqrt{11}}, 7\sqrt{11})$
- ☒  $(-\frac{3\sqrt{11}}{2}, -\frac{5\sqrt{11}}{9}, 7\sqrt{11})$

14. Compute the product of the scalar  $\sqrt{5}$  and vector  $(-3, 3, -2)$ .

- ☐  $(3 + \sqrt{5}, \sqrt{5} - 3, 2 + \sqrt{5})$
- ☐  $(\sqrt{5} - 3, 3 + \sqrt{5}, \sqrt{5} - 2)$
- ☐  $(-3\sqrt{5}, \frac{3}{\sqrt{5}}, -2\sqrt{5})$
- ☒  $(-3\sqrt{5}, 3\sqrt{5}, -2\sqrt{5})$

15. Compute the product:

$$-\sqrt{7} (3, 1, 2).$$

- ☐  $(3 - \sqrt{7}, 1 - \sqrt{7}, 2 - \sqrt{7})$
- ☐  $(-3 - \sqrt{7}, -1 - \sqrt{7}, -2 - \sqrt{7})$
- ☒  $(-3\sqrt{7}, -\sqrt{7}, -2\sqrt{7})$
- ☐  $(-3\sqrt{7}, -\sqrt{7}, 2)$

16. Multiply the vector  $(5, -6, -4)$  by the

$$\text{scalar } -\sqrt{7}.$$

- ☐  $(5, 6\sqrt{7}, 4\sqrt{7})$
- ☐  $(5 - \sqrt{7}, -6 - \sqrt{7}, -4 - \sqrt{7})$
- ☒  $(-5\sqrt{7}, 6\sqrt{7}, 4\sqrt{7})$
- ☐  $(-5 - \sqrt{7}, 6 - \sqrt{7}, 4 - \sqrt{7})$

17. Compute the product:

$$\sqrt{5} (-3, \frac{9}{5}, 1).$$

- ☐  $(\sqrt{5} - 3, \frac{9}{5} + \sqrt{5}, 1 + \sqrt{5})$
- ☐  $(-3, \frac{9}{\sqrt{5}}, \sqrt{5})$
- ☒  $(-3\sqrt{5}, \frac{9}{\sqrt{5}}, \sqrt{5})$
- ☐  $(3 + \sqrt{5}, \sqrt{5} - \frac{9}{5}, \sqrt{5} - 1)$

18. Compute the product of the

$$\text{scalar } \sqrt{3} \text{ and vector } (-1, -7, \frac{2}{3}).$$

- ☐  $(-\sqrt{3}, -7\sqrt{3}, \frac{2}{3})$
- ☐  $(1 + \sqrt{3}, 7 + \sqrt{3}, \sqrt{3} - \frac{2}{3})$
- ☒  $(-\sqrt{3}, -7\sqrt{3}, \frac{2}{\sqrt{3}})$
- ☐  $(\sqrt{3} - 1, \sqrt{3} - 7, \frac{2}{3} + \sqrt{3})$

Difficulty level: Advanced

19. Multiply the vector  $(4, 5, 2)$  by the scalar  $\sqrt{3}$ .

- ☐  $(4 + \sqrt{3}, 5 + \sqrt{3}, 2 + \sqrt{3})$
- ☒  $(4\sqrt{3}, 5\sqrt{3}, 2\sqrt{3})$
- ☐  $(4\sqrt{3}, 5\sqrt{3}, 2)$
- ☐  $(\sqrt{3} - 4, \sqrt{3} - 5, \sqrt{3} - 2)$

20. Compute the product of the scalar  $-\sqrt{5}$  and vector  $(\frac{5}{7}, -5, -\frac{4}{3})$ .

- ☐  $(-\frac{5}{7} - \sqrt{5}, 5 - \sqrt{5}, \frac{4}{3} - \sqrt{5})$
- ☐  $(-\frac{5\sqrt{5}}{7}, \sqrt{5}, \frac{4\sqrt{5}}{3})$
- ☐  $(\frac{5}{7} - \sqrt{5}, -5 - \sqrt{5}, -\frac{4}{3} - \sqrt{5})$
- ☒  $(-\frac{5\sqrt{5}}{7}, 5\sqrt{5}, \frac{4\sqrt{5}}{3})$