Vectors in three dimensions: magnitude, operations and the dot product worksheet – Grade 12

Grade 12 · Mixed level · 20 questions · **Version X5544**

Name: _____ Date: _____ Score: ___ / 20

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1. Work out the magnitude of $\vec{v} = [2, -9, 6]$.

   Answer: _____

2. Find $\overrightarrow{AB}$ for A(1, −1, 5) and B(0, −3, −8). Type it as [a, b, c].

   Answer: _____

3. If $\vec{u} = [1, 6, 3]$ and $\vec{v} = [3, -3, 6]$, find $\vec{u} - 3\vec{v}$. Type it as [a, b, c].

   Answer: _____

4. What is the magnitude of $\vec{v} = [-4, -12, 3]$?

   Answer: _____

5. Find the magnitude of $\vec{v} = [6, 7, -6]$.

   Answer: _____

6. Work out the magnitude of $\vec{v} = [2, 1, 2]$.

   Answer: _____

7. What is the magnitude of $\vec{v} = [-7, -6, -6]$?

   Answer: _____

8. What is the angle between $\vec{u} = [6, -5, 2]$ and $\vec{v} = [2, -3, 2]$, to the nearest tenth of a degree?

   Answer: _____ °

9. For what value of k are $\vec{u} = [-3, -7, 4]$ and $\vec{v} = [1, -1, k]$ perpendicular?

   Answer: _____

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10. Find $\vec{u} \cdot \vec{v}$ for $\vec{u} = [-1, -5, 1]$ and $\vec{v} = [-9, 6, -4]$.

    Answer: _____

11. Work out the angle between $\vec{u} = [1, 5, -1]$ and $\vec{v} = [-4, 6, 4]$, to the nearest tenth of a degree.

    Answer: _____ °

12. Find the angle between $\vec{u} = [-4, 2, 6]$ and $\vec{v} = [-5, 1, 5]$, to the nearest tenth of a degree.

    Answer: _____ °

13. For what value of k are $\vec{u} = [-5, -1, -1]$ and $\vec{v} = [-7, -3, k]$ perpendicular?

    Answer: _____

14. Work out the angle between $\vec{u} = [4, -6, 3]$ and $\vec{v} = [-2, -1, 1]$, to the nearest tenth of a degree.

    Answer: _____ °

15. Find the angle that $\vec{v} = [-1, -8, 4]$ makes with the positive x-axis, to the nearest tenth of a degree.

    Answer: _____ °

16. What is the angle that $\vec{v} = [4, -4, 7]$ makes with the positive z-axis, to the nearest tenth of a degree?

    Answer: _____ °

17. Work out the angle that $\vec{v} = [2, 6, 3]$ makes with the positive z-axis, to the nearest tenth of a degree.

    Answer: _____ °

18. Find s and t so that $[-2, -6, 19] = s[-2, -2, -1] + t[2, 3, -4]$. Type s and t, separated by a comma.

    Answer: _____

19. Triangle ABC has vertices A(−6, −7, 7), B(−2, 2, −3) and C(−7, 1, −5). Find $\angle$BAC, to the nearest tenth of a degree.

    Answer: _____ °

20. What is the angle that $\vec{v} = [6, 6, -7]$ makes with the positive z-axis, to the nearest tenth of a degree?

    Answer: _____ °

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Answer key · Version X5544

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1. **11**
2. **[-1, -2, -13]**
3. **[-8, 15, -15]**
4. **13**
5. **11**
6. **3**
7. **11**
8. **21.2**
9. **-1**
10. **-25**
11. **59.1**
12. **13.3**
13. **38**
14. **87.0**
15. **96.4**
16. **38.9**
17. **64.6**
18. **-3,-4**
19. **22.1**
20. **129.5**

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