Outcome 4 - Calculating Magnitude

Bronze example

Silver example

Gold example

Examples... **|a| means the magnitude of a.**

Vector $\mathbf{a} = {5 \choose 3}$ and vector $\mathbf{b} = {4 \choose -7}$.

Calculate |a+b|.

To calculate the magnitude of a vector; \mathbf{J} (all the components squared and added together) $\mathbf{a} + \mathbf{b} = {5 \choose 3} + {4 \choose -7} = {9 \choose -4}$ $|a+b| = \sqrt{81+16} = \sqrt{97}$

Examples... **|a| means the magnitude of a.**

Vector
$$\mathbf{a} = \begin{pmatrix} 2 \\ 0 \\ 5 \end{pmatrix}$$
 and vector $\mathbf{b} = \begin{pmatrix} 7 \\ -4 \\ 1 \end{pmatrix}$.

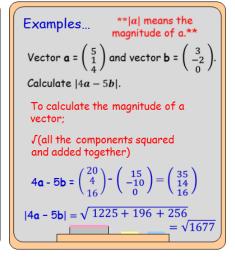
Calculate $|a+b|$.

To calculate the magnitude of a vector;

$$J(\text{all the components squared and added together})}$$

$$\mathbf{a} + \mathbf{b} = \begin{pmatrix} 2 \\ 0 \\ 5 \end{pmatrix} + \begin{pmatrix} 7 \\ -4 \\ 1 \end{pmatrix} = \begin{pmatrix} 9 \\ -4 \\ 6 \end{pmatrix}$$

$$|a+b| = \sqrt{81+16+36} = \sqrt{133}$$



Bronze Questions

Calculate the magnitude for the following vectors...

- $\text{Vector } \mathbf{h} = \begin{pmatrix} 8 \\ -3 \end{pmatrix}.$ Calculate $|\mathbf{h}|$.
- Vector $\mathbf{m} = \begin{pmatrix} 3 \\ 9 \end{pmatrix}$ and vector $\mathbf{n} = \begin{pmatrix} 2 \\ 1 \end{pmatrix}$.

 Calculate $|\mathbf{m} + \mathbf{n}|$.
- Vector $\mathbf{r} = \begin{pmatrix} 7 \\ -4 \end{pmatrix}$ and vector $\mathbf{s} = \begin{pmatrix} -2 \\ 1 \end{pmatrix}$.

 Calculate |r s|.

Gold Questions

Calculate the magnitude for the following vectors...

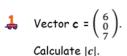
- Vector $\mathbf{c} = \begin{pmatrix} 3 \\ 0 \\ 7 \end{pmatrix}$.

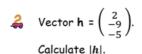
 Calculate |3c|.
- $\text{Vector } \mathbf{h} = \begin{pmatrix} 4 \\ -1 \\ -5 \end{pmatrix}.$ Calculate |5h|.
- Vector $\mathbf{m} = \begin{pmatrix} 2 \\ 0 \\ -6 \end{pmatrix}$ and vector $\mathbf{n} = \begin{pmatrix} 1 \\ -5 \\ 3 \end{pmatrix}$.

 Calculate |3m + 4n|.

Silver Questions







- Vector $\mathbf{m} = \begin{pmatrix} 4 \\ 0 \\ -5 \end{pmatrix}$ and vector $\mathbf{n} = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$.

 Calculate $|\mathbf{m} + \mathbf{n}|$.
- Vector $\mathbf{r} = \begin{pmatrix} 8 \\ -5 \\ 0 \end{pmatrix}$ and vector $\mathbf{s} = \begin{pmatrix} -1 \\ -2 \\ 6 \end{pmatrix}$.

 Calculate $|\mathbf{r} \mathbf{s}|$.

Bronze Answers

- **1**. 10
- **2**. √73
- 3. $\sqrt{125} = 5\sqrt{5}$ 4. $\sqrt{106}$

Silver Answers

- 1. $\sqrt{85}$ 2. $\sqrt{110}$
- 3. $\sqrt{33}$ 4. $\sqrt{126} = 3\sqrt{14}$

Gold Answers

- 1. $\sqrt{58}$ 2. $\sqrt{1050} = 5\sqrt{42}$
- 3. $\sqrt{536} = 2\sqrt{134}$ 4. $\sqrt{884} = 2\sqrt{221}$