**Defining Vectors**

**Decode the Maths Joke**

Each vector in terms of $a$ and $b$ defines a path which starts at X and ends at a given letter. Find each of the letters and then decode the joke.



|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Vector | $$a+2b$$ | $$-b$$ | $$-a-b$$ | $$-a+2b$$ | $$-a-b$$ |  | $$-2b$$ |
| Letter |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Vector | $$2a-b$$ |  | $$-a+b$$ | $$-2a-2b$$ | $$a+b$$ | $$-b$$ | $$2a$$ |
| Letter |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Vector | $$a+b$$ | $$-a-b$$ | $$-2a-2b$$ | $$-2a-b$$ | $$-b$$ | $$-a-b$$ | $$-a+2b$$ |
| Letter |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Vector | $$2a$$ |  | $$a-2b$$ | $$2a-b$$ |  | $$2a-b$$ | $$-2a+2b$$ |
| Letter |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Vector | $$-b$$ | $$2a-b$$ | $$a-b$$ | $$-a$$ | $$-2b$$ | $$-2a-2b$$ | $$2a+2b$$ |
| Letter |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Vector | ? |  | $$a+b$$ | $$-a$$ | $$-a+b$$ | $$-a-b$$ | $$2a$$ |
| Letter |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Vector | $$2a$$ | $$b$$ | $$2b$$ | $$-2a-2b$$ | $$-a+2b$$ | $$-a-b$$ | ! |
| Letter |  |  |  |  |  |  |  |