The Gram-Schmidt Procedure

We have seen the value of having an orthonormal basis, but where do we find one? We descibe now the **Gram-Schmidt procedure** for beginning with any basis and slowly changing it into an orthonormal basis. We illustrate it with three vectors a, b and c and create from them orthonormal vectors q_1, q_2, q_3.

Step 1: Normalize a

$$q_1 = \frac{1}{\|a\|}a$$

Step 2: Remove from b its projection onto q_1

$$B = b - (q_1, b)q_1$$

Step 3: Normalize B

$$q_2 = \frac{1}{\|B\|}B$$