

**2.2. Example.** The point  $P$  has coordinates  $(2, 3)$ ; the point  $Q$  has coordinates  $(8, 6)$ .

The vector  $\overrightarrow{PQ}$  is therefore

$$\overrightarrow{PQ} = \begin{pmatrix} 8 - 2 \\ 6 - 3 \end{pmatrix} = \begin{pmatrix} 6 \\ 3 \end{pmatrix}.$$

This vector is the position vector of the point  $R$  whose coordinates are  $(6, 3)$ . Thus

$$\overrightarrow{PQ} = \overrightarrow{OR} = \begin{pmatrix} 6 \\ 3 \end{pmatrix}.$$

The distance from  $P$  to  $Q$  is the length of the vector  $\overrightarrow{PQ}$ , i.e.

$$\text{distance } P \text{ to } Q = \left\| \begin{pmatrix} 6 \\ 3 \end{pmatrix} \right\| = \sqrt{6^2 + 3^2} = 3\sqrt{5}.$$

