3. The triangle PQR is such that $\overrightarrow{PQ} = 3i + 5j$ and $\overrightarrow{PR} = 13i - 15j$
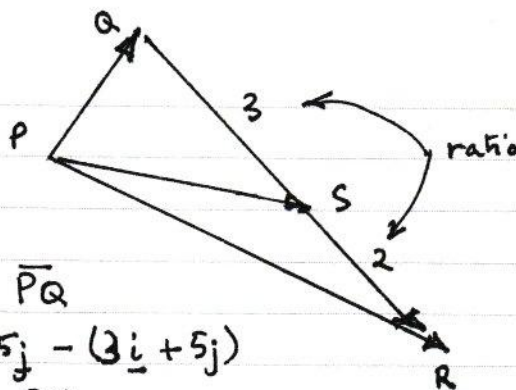
(a) Find $\overrightarrow{QR}$

(2)

(b) Hence find $|\overrightarrow{QR}|$ giving your answer as a simplified surd.

(2)

The point S lies on the line segment QR so that $QS:SR = 3:2$

(c) Find $\overrightarrow{PS}$

(2)

(a) $\overline{PQ} + \overline{QR} = \overline{PR}$

   $\overline{QR} = \overline{PR} - \overline{PQ}$

   $= 13\underline{j} - 15\underline{j} - (3\underline{i} + 5j)$

   $= 10\underline{j} - 20j$

(b) $|QR| = \sqrt{10^2 + 20^2} = \sqrt{500} = \underline{10\sqrt{5}}$

Draw in S and $\overline{PS}$

(c) $\overline{PS} = \overline{PQ} + \frac{3}{5}\overline{QR}$

   $= 3\underline{j} + 5j + \frac{3}{5}\left(10\underline{i} - 20\underline{j}\right)$

   $= 3\underline{i} + 5\underline{j} + 6\underline{i} - 12\underline{j}$

   $= \underline{9\underline{i} - 7\underline{j}}$

P 6 9 2 0 1 A 0 8 4 8