| Question Number | Scheme | Marks | AO's |
|--------------------|--|-------|-----------|
| 2 | Attempts any one of $(\pm \overrightarrow{PQ} =) \pm (\mathbf{q} - \mathbf{p}), \ (\pm \overrightarrow{PR} =) \pm (\mathbf{r} - \mathbf{p}), \ (\pm \overrightarrow{QR} =) \pm (\mathbf{r} - \mathbf{q})$ Or e.g. $(\pm \overrightarrow{PQ} =) \pm (\overrightarrow{OQ} - \overrightarrow{OP}), \ (\pm \overrightarrow{PR} =) \pm (\overrightarrow{OR} - \overrightarrow{OP}), \ (\pm \overrightarrow{QR} =) \pm (\overrightarrow{OR} - \overrightarrow{OQ})$ | M1 | 1.1b |
| | Attempts e.g. $\mathbf{r} - \mathbf{q} = 2(\mathbf{q} - \mathbf{p})$ $\mathbf{r} - \mathbf{p} = 3(\mathbf{q} - \mathbf{p})$ $\frac{2}{3}(\mathbf{q} - \mathbf{p}) = \frac{1}{3}(\mathbf{r} - \mathbf{q})$ $\mathbf{q} = \mathbf{p} + \frac{1}{3}(\mathbf{r} - \mathbf{p})$ $\mathbf{q} = \mathbf{r} + \frac{2}{3}(\mathbf{p} - \mathbf{r})$ | dM1 | 3.1a |
| | E.g. $\Rightarrow \mathbf{r} - \mathbf{q} = 2\mathbf{q} - 2\mathbf{p} \Rightarrow 2\mathbf{p} + \mathbf{r} = 3\mathbf{q} \Rightarrow \mathbf{q} = \frac{1}{3}(\mathbf{r} + 2\mathbf{p})^*$ | A1* | 2.1 |
| | | (3) | |
| | | | (3 marks) |

Notes:

M1: Attempts any of the relevant vectors by subtracting either way around. This may be implied by sight of any one of $\pm(q-p)$, $\pm(r-p)$, $\pm(r-q)$ ignoring how they are labelled

- **dM1:** Uses the given information and writes it correctly in vector form that if rearranged would give the printed answer
- A1*: Fully correct work leading to the given answer. Allow OQ = ... as long as OQ has been defined as **q** earlier.

In the working allow use of P instead of **p** and Q instead of **q** as long as the intention is clear.