(3) (a) $\overrightarrow{BE} = -\underset{\sim}{p} + \underset{\sim}{r}$ (b) $\overrightarrow{EF} = -\underset{\sim}{r} + \underset{\sim}{p} + \frac{3}{4}\underset{\sim}{q}$

√2014 H2 Q3

(a) $\overrightarrow{BE} = -\underline{p} + \underline{r}$

(b) F divides BC in ratio 3:1

~~$\overrightarrow{EF} = \overrightarrow{EB} + \overrightarrow{CF}$~~

$\overrightarrow{EF} = \overrightarrow{EB} + \overrightarrow{BF} = \overrightarrow{EB} + \frac{3}{4}\overrightarrow{BC}$

$= \underline{p - r + \frac{3}{4}q}$

Question			Generic scheme	Illustrative scheme	Max mark
3.	(a)		•1 identify pathway	•1 $-\mathbf{p}+\mathbf{r}$	**1**
Notes:					
1. Accept $-\mathbf{P}+\mathbf{R}$ for •1.					
Commonly Observed Responses:					
	(b)		•2 state an appropriate pathway •3 express pathway in terms of $\mathbf{p}$, $\mathbf{q}$ and $\mathbf{r}$	•2 eg $\overrightarrow{EB}+\overrightarrow{BF}$ stated or implied by •3 •3 $\mathbf{p}-\mathbf{r}+\frac{3}{4}\mathbf{q}$ or equivalent	**2**
Notes:					
2. •3 can only be awarded for a vector expressed in terms of all three of $\mathbf{p}$, $\mathbf{q}$ and $\mathbf{r}$.					
Commonly Observed Responses:					
Candidate A - incorrect expression in $\mathbf{p}$, $\mathbf{q}$ and $\mathbf{r}$ and no pathway stated $\mathbf{p}-\mathbf{r}\ldots$ Award 1/2				**Candidate B -** incorrect expression in $\mathbf{p}$, $\mathbf{q}$ and $\mathbf{r}$ and no pathway stated $\ldots+\frac{3}{4}\mathbf{q}$ or $\ldots+\mathbf{q}-\frac{1}{4}\mathbf{q}$ Award 1/2	