**1** *A*, *B* and *C* are three points such that

$\overrightarrow{AB} = 3\mathbf{a} + 4\mathbf{b}$

$\overrightarrow{AC} = 15\mathbf{a} + 20\mathbf{b}$

(a) Prove that *A*, *B* and *C* lie on a straight line.

**(2)**

*D*, *E* and *F* are three points on a straight line such that

$\overrightarrow{DE} = 3\mathbf{e} + 6\mathbf{f}$

$\overrightarrow{EF} = -10.5\mathbf{e} - 21\mathbf{f}$

(b) Find the ratio

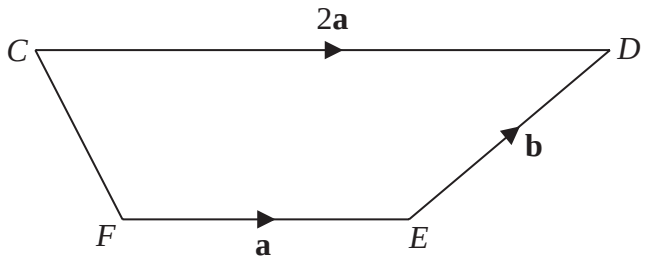
length of *DF* : length of *DE*

.....

**(3)**

**(Total for Question 1 is 5 marks)**

**2** *CDEF* is a quadrilateral.




$\overrightarrow{FE} = \mathbf{a}$ $\overrightarrow{ED} = \mathbf{b}$ $\overrightarrow{CD} = 2\mathbf{a}$

The point *P* is such that *CEP* is a straight line and that *CE* = *EP*

Use a vector method to prove that *CF* is parallel to *DP*.

**(Total for Question 2 is 4 marks)**