14.

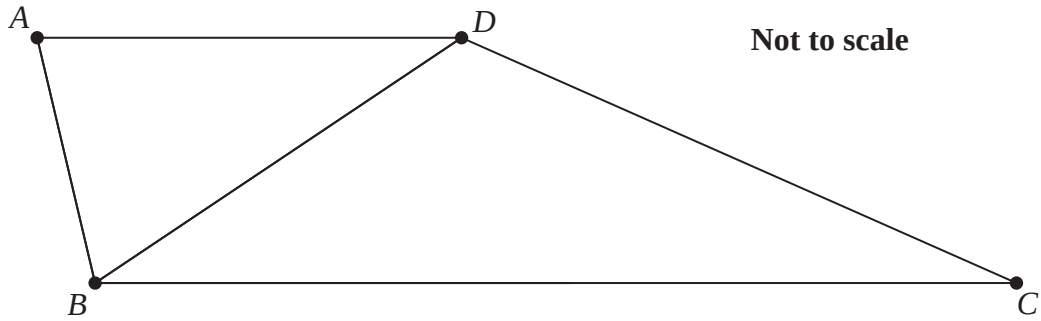

Figure 4

In this question you must show detailed reasoning.

Figure 4 shows a trapezium $ABCD$ where AD is parallel to BC

Given that

- $\overrightarrow{AB} = 2\mathbf{a} + 3\mathbf{b}$
- $\overrightarrow{BC} = 15\mathbf{a} - 5\mathbf{b}$
- $\overrightarrow{DB} = -4\mathbf{a} + k\mathbf{b}$ where k is an integer

(a) show that $k = 5$

(3)

Given also that

- the point N lies on BC such that $BN : NC = 1 : 4$
- AN intersects BD at X

(b) find $BX : XD$

(5)