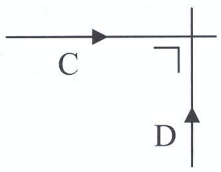
RELATIVE VELOCITY SOLUTIONS

2008 **2.** **(a)** Two straight roads cross at right angles.
A woman C, is walking towards the intersection with a uniform speed of 1.5 m/s.
Another woman D is moving towards the intersection with a uniform speed of 2 m/s.



C is 100 m away from the intersection as D passes the intersection.

Find **(i)** the velocity of C relative D

(ii) the distance of C from the intersection when they are nearest together.

(*i*) $\vec{V}_C = 1.5\vec{i} + 0\vec{j}$

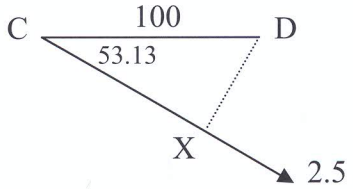
$\vec{V}_D = 0\vec{i} + 2\vec{j}$

$\vec{V}_{CD} = \vec{V}_C - \vec{V}_D$

$= 1.5\vec{i} - 2\vec{j}$ 5

magnitude : 2.5 m/s 5

direction : East 53.13° South 5



(*ii*) $\text{time} = \dfrac{|CX|}{|\vec{V}_{CD}|}$

$= \dfrac{100\cos 53.13°}{2.5}$

$= 24$ s 5

In this time C travels $1.5 \times 24 = 36$ m

distance of C from the intersection $= 100 - 36$

$= 64$ m 5

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