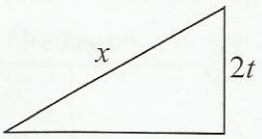
Some Alternative Solutions

2 (a)



(ii)

$$x^2 = (100-1.5t)^2 + 4t^2$$

$$2x\frac{dx}{dt} = 2(100-1.5t)(-1.5)+8t$$

$$= 0$$

$$\text{if} \quad t = 24$$

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

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

$= 64$ m

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2 (b)

$$\vec{V}_M = a\ \vec{i}$$

$$\vec{V}_{WM} = \frac{2v}{\sqrt{5}}\ \vec{i} - \frac{v}{\sqrt{5}}\ \vec{j}$$

$$\vec{V}_W = \vec{V}_{WM} + \vec{V}_M$$

$$= \left(\frac{2v}{\sqrt{5}} + a\right)\vec{i} - \frac{v}{\sqrt{5}}\ \vec{j}$$

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$$= x\ \vec{i} - 3\ \vec{j}$$

$$\Rightarrow v = 3\sqrt{5} \quad \text{and} \quad a = x - 6$$

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$$\vec{V}_M = a\ \vec{j}$$

$$\vec{V}_{WM} = \frac{3w}{\sqrt{13}}\ \vec{i} - \frac{2w}{\sqrt{13}}\ \vec{j}$$

$$\vec{V}_W = \vec{V}_{WM} + \vec{V}_M$$

$$= \left(\frac{3w}{\sqrt{13}}\right)\vec{i} + \left(a - \frac{2w}{\sqrt{13}}\right)\vec{j}$$

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$$= x\ \vec{i} - 3\ \vec{j}$$

$$\Rightarrow w = \frac{(a+3)\sqrt{13}}{2} \quad \text{and} \quad a = \frac{2x-9}{3}$$

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