

No.	Solution	Remarks
1.	Prob. = P(WW) + P(RW) $\frac{4}{9} \times \frac{4}{10} + \frac{5}{9} \times \frac{3}{10} = \frac{31}{90}$	B mark for each arm and method mark for attempting to add. B ₁ B ₁ M ₁ A ₁ TOTAL = 04
2.	$\frac{1}{2} \times 5 \times k = 1$ $\therefore k = \frac{2}{5}$ (i) $\text{Grad.} = \frac{\frac{2}{5} - 0}{0 - 5} = -\frac{2}{25}$ $\frac{f(x)}{x - 5} = -\frac{2}{25}$ $f(x) = \frac{10 - 2x}{25}$ $f(x) = \begin{cases} \frac{10 - 2x}{25} & 0 \leq x \leq 5 \\ 0 & \text{else where} \end{cases}$ (ii) $P(X < 3) = 1 - \frac{1}{2} \times 2 \times \frac{4}{25} = \frac{21}{25}$ (iii) $E(X) = \int_0^5 x \left(\frac{10 - 2x}{25} \right) dx$ $= \left[\frac{5x^2}{25} - \frac{2x^3}{75} \right]_0^5$ $= \left(5 - \frac{10}{3} \right) - 0 = 1\frac{2}{3}$ (iv) $E(X^2) = \int_0^5 \frac{10x^2 - 2x^3}{25} dx$ $= \left[\frac{2x^3}{15} - \frac{x^4}{50} \right]_0^5 = 4\frac{1}{6}$ $\text{Var}(X) = \frac{25}{6} - \left(\frac{5}{3} \right)^2 = \frac{25}{18}$	 B ₁ B ₁ M ₁ A ₁ For all intervals M ₁ A ₁ M ₁ Correct integral with limits. M ₁ A ₁ . M for correct substitution. M ₁ B ₁ Method mark for correct integral with limits. A ₁ TOTAL = 12

3.	<p>(a)</p> $(i) T = \frac{2u \sin \theta}{g} = \frac{2 \times 50 \times \sin 40}{9.8} = 6.5591 \text{ s}$ $(ii) H = \frac{(u \sin \theta)^2}{2g} = \frac{(50 \sin 40)^2}{2 \times 9.8} = 52.7010 \text{ m}$ <p>(b)</p> $x_1 = (u \cos \theta)t \text{ and } y_1 = \left[(u \sin \theta)t - \frac{1}{2}gt^2 \right]$ $x_2 = (v \cos \alpha)t \text{ and } y_2 = \left[(v \sin \alpha)t - \frac{1}{2}gt^2 \right]$ $\text{Grad.} = \frac{\left[(u \sin \theta)t - \frac{1}{2}gt^2 \right] - \left[(v \sin \alpha)t - \frac{1}{2}gt^2 \right]}{(u \cos \theta)t - (v \cos \alpha)t}$ $\text{Grad.} = \frac{u \sin \theta - v \sin \alpha}{u \cos \theta - v \cos \alpha}$ <p>\therefore Line joining them makes an angle to the horizontal</p> $= \tan^{-1} \left(\frac{u \sin \theta - v \sin \alpha}{u \cos \theta - v \cos \alpha} \right).$	<p>M₁A₁</p> <p>M₂A₁</p> <p>B₁B₁ For each coordinate</p> <p>B₁B₁ For each coordinate</p> <p>M₁</p> <p>B₁</p> <p>A₁</p> <p>TOTAL = 12</p>
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