

	$0.0258 > 0.025$ Alternative: CR $X \leq 1, X \geq 10$ 9 not in CR \therefore insufficient evidence to reject H_0 \therefore claim is incorrect	A1
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4a		B1 $P(A \cap B \cap C) = 0$ B1 2 of $P(A \cap B) = 24$ $P(B \cap C) = 6$ $P(A \cap C) = 0$ B1 2 of $P(A) = 40$ $P(B) = 50$ $P(C) = 20$ B1 correct answer including 25 out of circles
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4b	$P(\text{shoes} \text{bag}) = \frac{P(\text{shoes} \cap \text{bag})}{P(\text{bag})} = \frac{24}{50}$	M1A1
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4c	$P(\text{shoes} \text{bag}) = 0.48$ $P(\text{shoes}) = 0.48$ $P(\text{shoes}) = P(\text{shoes} \text{bag})$ $\therefore \text{independent}$	M1 A1
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5a	$X \sim N(\mu, 18^2)$ $P(X > 80) = 0.75$ $P\left(X > \frac{80 - \mu}{18}\right) = 0.75$ $\frac{80 - \mu}{18} = -0.674$ $\mu = 92.14$	M1A1 M1 A1
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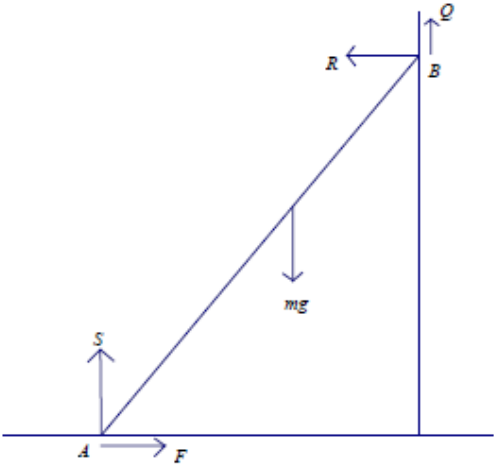
5b	$H_0: \mu = 92.14$ $H_1: \mu < 92.14$ $X \sim N\left(92.14, \frac{18^2}{7}\right)$ $CR X < 80.9$	B1 M1 M1 A1
	80 is in CR \therefore reject null hypothesis \therefore * person is correct	

1a	$s = ut + \frac{1}{2}at^2$ $3 = u_y 2.5 + \frac{1}{2}(-9.8)(2.5)^2$ $u_y = 13.45$ $42 = u_x(2.5)$ $u_x = 16.8$	M1A1 A1 A1
1b	$v = u + at$ $v = 13.45 - 9.8(2.5)$ $v = -11.05$ $v = \sqrt{16.8^2 + (11.05)^2}$ $v = 20.1$ $\tan \theta = \frac{11.05}{16.8}$ $\theta = 33.5$	M1A1 M1A1 M1A1
2a	$v = u + at$ $0 = 15 + (-2.5)t$ $t = 6$	
2b		

(c)	$\frac{1}{2}15\left(\frac{4}{3}T + 6 + T\right) = 885$ $\frac{7}{3}T = 118 - 6$ $T = 112 \times \frac{3}{7} = 48$	ft their 6	M1 A1ft	
(d)	$a = \frac{15}{\frac{1}{3}T} = \frac{15}{16}, 0.9375, 0.938, 0.94$		M1 A1	(4)
(e)		3 horizontal lines Correctly placed; no cts vert line -2.5, ft their $\frac{15}{16}$	B1 B1 B1	(3)
(13 marks)				

Question Number	Scheme	Marks
8.		
(a)	For A, $T = 2ma$	B1
	For B, $3mg - T = 3ma$	M1 A1
	$3mg = 5ma$	DM1
	$\frac{3g}{5} = a$ (5.9 or 5.88 m s ⁻²)	A1
		(5)
(b)	$T = 6mg/5; 12m ; 11.8m$	B1
		(1)
(c)	$F = \sqrt{T^2 + T^2}$	M1 A1 ft
	$F = \frac{6mg\sqrt{2}}{5}; 1.7mg$ (or better); 16.6m; 17m	A1
	Direction clearly marked on a diagram, with an arrow, and 45° (oe) marked	B1
		(4)
		[10]

4a	$\frac{dv}{dt} = 2t + k$ $2t + k = 0$ $2(2.4) + k = 0$ $k = -4.8$	
4b	$0 = t^2 + kt + 3.2$ $t = 4 \text{ or } \frac{4}{5}$	
4c	$\int_0^{0.8} t^2 - 4.8t + 3.2 dt + \int_{0.8}^4 t^2 - 4.8t + 3.2 dt + \int_4^{6.8} t^2 - 4.8t + 3.2 dt$ $= \left[\frac{1}{3}t^2 - 2.4t^2 + 3.2t \right]_0^{0.8} + \left[\frac{1}{3}t^2 - 2.4t^2 + 3.2t \right]_{0.8}^4 + \left[\frac{1}{3}t^2 - 2.4t^2 + 3.2t \right]_4^{6.8}$ $= 15.7$	M1 (three sections) M1A1 integration M1 definite integration A1

Question Number	Scheme	Marks
3.		
(a)	$R = F$ $S + Q = mg$ $Q = \frac{2}{3}R, \quad F = \frac{1}{4}S$ $Q = \frac{2}{3}R = \frac{2}{3} \times \frac{1}{4}S, \quad S + \frac{1}{6}S = mg, \quad S = \frac{6}{7}mg$	B1 B1 B1 M1 A1 (5)
(b)	$M(A) \quad mg \times x \cos 60 = Q \times 2l \cos 60 + R \times 2l \sin 60$ $M(B) \quad mg(2l - x) \cos 60 + F \times 2l \sin 60 = S \times 2l \cos 60$ $M(c \text{ of } m)$ $Sx \cos 60 = Fx \sin 60 + R(2l - x) \sin 60 + Q(2l - x) \cos 60$ $mgx \cos 60 = \frac{1}{6} \times \frac{6}{7}mg \times 2l \cos 60 + \frac{1}{4} \times \frac{6}{7}mg \times 2l \sin 60$ $\frac{1}{2}x = \frac{1}{7} \times 2l \times \frac{1}{2} + \frac{3}{14} \times l\sqrt{3}$ $AG = x = 1.028 \dots l \quad x = 1.03l$	M1 M1 A2 DM1 A1 (5)