

Qu 2	Scheme	Marks	AO
(a)	e.g. The <u>height</u> ( $h$ ) <u>decreases</u> by about <u>1.28 m</u> for <u>each second</u> of the flight	B1	3.4
(b)	$H_0 : \rho = 0 \quad H_1 : \rho < 0$	B1	(1) 2.5
	[5% 1-tail cv = ] $(\pm) 0.5494$	M1	1.1a
	[ $r = -0.510$ not sig] there is <u>insufficient</u> (o.e.) evidence of a negative <u>correlation</u> between <u>height</u> (or $h$ ) and <u>time</u> (or $t$ )	A1	2.2b
		(3)	
(c)	No – since points seem to follow a curve/quadratic (rather than a line) or since points are “non-linear” but regression line/ model is linear or e.g. between ( $t = 5$ and $7$ ) height drops by much more than 2.56 m or e.g. gradient is positive up to $t = 3.5$ (line gradient $< 0$ ) or e.g. gradient is positive initially (line gradient $< 0$ ) or e.g. gradient is positive and then negative	B1	2.4
(d)	[ $h = 38.1 - 0.78 (t - k)^2$ with] a suitable $k$ i.e. in the range 3~4.5	(1)	
		B1	3.3
		(1)	
( 6 marks)			
Notes			
(a)	B1 for a suitable interpretation in context [value can be 1.3 or 1.28 or “just over 1”] per sec Must have underlined words (o.e.) and units “m” or metres and “s” or seconds NB “descends” implies “height decreases” Condone e.g. “decreases by – 1.28 m”		
(b)	B1 for both hypotheses correct in terms of $\rho$ [accept a $p$ or $p$ but not $r$ or $r$ ] Must be attached to $H_0$ and $H_1$ M1 for a critical value corresponding to their $H_1$ : 1-tail: awrt $\pm 0.549$ or 2-tail (B0 scored for $H_1$ ) : awrt $\pm 0.632$ (tables 0.6319) If hypotheses are in words and can deduce whether one or two-tail then use their words. If no hypotheses or their $H_1$ is not clearly one or two-tail assume one-tail A1 a correct conclusion in context mentioning <u>correlation</u> and <u>height</u> and <u>time</u> A comparison or statement such as “not sig” is not needed but if seen must be correct. Do NOT award this A mark if contradictory comments or working seen e.g. “reject $H_0$ ” or comparison of 0.510 with significance level of 0.05 or e.g. $-0.549 > -0.510$		
NB	Can award B0M1A1		
SC	B0(for 2-tail) M0(for cv = $\pm 0.549$ ) scored: Allow 1 mark (score as B0M0A1) for conclusion such as: “ <u>insufficient</u> evidence of (negative) <u>correlation</u> between <u>height</u> and <u>time</u> of flight”		
(c)	B1 for saying no and giving a suitable supporting reason Don’t allow “correlation” on its own instead of “gradient” B0 for simply saying “points don’t lie close to a straight line” Need mention of curve or some other feature of scatter plot that <u>differs</u> from regression line. B0 for just “non-linear” without mention of the model being linear B0 for simply comparing 1 or 2 points – need a comment about general pattern		
(d)	B1 for a value of $k$ in the range [3, 4.5] Do not need $k = \dots$ Accept a value embedded in Jane’s model. ISW any errors in multiplying out bracket.		