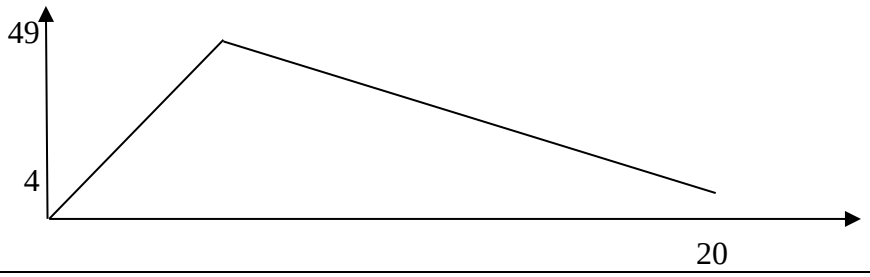
Question Number	Scheme	Marks
5(a)	$s = \frac{1}{2} \times 9.8 \times 5^2$	M1
	= 123 or 120 (m)	A1 (2)
5(b)	$v = 9.8 \times 5 = 49$ **OR** $v = \sqrt{2 \times 9.8 \times 122.5} = 49$ **OR** $122.5 = 5v - \frac{1}{2} \times 9.8 \times 5^2 \Rightarrow v = 49$	B1
	$250g - 3200 = \pm 250a$	M1A1
	Correct value for their a (3 or -3)	A1
	$v^2 = 49^2 - 2 \times 3 \times (520 - 122.5)$	M1 A1**ft**
	v = 4 (m s^{-1})	A1 (7)
	N.B. They may do (c) first and then use their t value to obtain v: $v = 49 + (-3 \times 15)$ **OR** $(520 - 122.5) = 15v - \frac{1}{2} \times (-3) \times 15^2$ M1A1**ft** v = 4 (m s^{-1}) A1	
5(c)	$4 = 49 - 3t$ **OR** $(520 - 122.5) = \frac{(49 + 4)}{2} t$ **OR** $(520 - 122.5) = 49t - \frac{1}{2} \times 3t^2$ **OR** $(520 - 122.5) = 4t + \frac{1}{2} \times 3t^2$	M1
	t = 15 (other root of quadratic is $\frac{53}{3}$ which leads to $v < 0$)	A1
	Total time = 5 + 15 = 20 (s)	A1**ft** (3)
5(d)		B1 shape B1 **ft** figs (2)
		(14)
	Notes	
5(a)	M1: Complete method to find the distance	
	A1: cao	
(b)	B1: 49 or -49. Allow 5g or -5g or 49^2 (2401) seen.	
	M1: Equation of motion, correct terms, condone sign errors	
	A1: Correct equation (allow + or $-$)	
	A1: cao	
	M1: Complete method to find speed at ground (must have found a new a) M0 if they use u = 0 either explicitly in (b) or implicitly, by using it in (c) to get the time, which is then used in (b).	
	A1**ft**: Correct equation, ft on their s, v and a . **N.B.** This mark can be awarded even if it leads to a negative value for v^2	
	A1: cao	

(c)	M1: Complete method to find time from when the parachute opens to when *P* lands on the ground (must have found and use a new *a*) M0 if they use $s = 520$ and/or $u = 0$
	A1:cao.
	A1**ft**: Their $t + 5$ **N.B.** The final answer should be rounded to 2 or 3 sf, if they haven't already been penalised following use of $g = 9.8$ earlier in the question.
(d)	B1: Correct shape (B0 if continuous vertical line at the end or graph ends on the *t*-axis)
	B1**ft**:Correct figs, ft on their 49, 4 and 20, but B0ft if they just assume it stops as it reaches the ground. The ft is only available if the graph has just 2 straight lines, one starting at the origin with positive gradient and the second line has negative gradient with second line not meeting the *t*-axis. This B1ft is available if the graph has a vertical line at the end but is otherwise correct.