

QUESTION 8

After flying a short distance, an insect came to rest on a wall. Thereafter the insect started crawling on the wall. The path that the insect crawled can be described by $h(t) = (t - 6)(-2t^2 + 3t - 6)$, where h is the height (in cm) above the floor and t is the time (in minutes) since the insect started crawling.

- 8.1 At what height above the floor did the insect start to crawl? (1)
- 8.2 How many times did the insect reach the floor? (3)
- 8.3 Determine the maximum height that the insect reached above the floor. (4)

[8]

QUESTION/VRAAG 8

8.1	36cm	✓ answer (1)
8.2	$\therefore t = 6$ $(-2t^2 + 3t - 6)$ have no real roots Insect reaches the floor only once.	✓✓✓ only once (3)
8.3	$h(t) = -2t^3 + 15t^2 - 24t + 36$ $h'(t) = -6t^2 + 30t - 24$ $-6t^2 + 30t - 24 = 0$ $t^2 - 5t + 4 = 0$ $(t - 4)(t - 1) = 0$ $t = 4$ or $t = 1$ Only $t = 4$ because maximum value required $h = -2(4)^3 + 15(4)^2 - 24(4) + 36 = 52 \text{ cm}$	✓ expansion ✓ $-6t^2 + 30t - 24 = 0$ ✓ both values ✓ answer (4)
		[8]

MAKE $t=0$ IN THE ORIGINAL EQUATION BECAUSE THE FLY STARTS ON THE WALL WHEN TIME = 0