Exercise 3

Paper 2 style · Graphic display calculator

3 6 marks SL 3.7 ●●○ Typical

The height, h metres, of a seat on a Ferris wheel t minutes after it starts is $h(t) = 25 - 22\cos\left(\frac{\pi t}{10}\right)$, for $t \geq 0$.

(a) Write down the greatest height of the seat. **[1]**

(b) Find the time for one revolution. **[1]**

(c) Find the height of the seat when $t = 4$. **[1]**

(d) Find, for one revolution, the length of time during which the seat is higher than 35 m. **[3]**

The markscheme is on the next page: try the question first. Written and verified by a practising IB mathematics teacher, produced with AI assistance; solved twice and recomputed by software. Not affiliated with or endorsed by the International Baccalaureate Organization.
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MARKSCHEME (a)

47 m — **A1**

Total 1 mark

MARKSCHEME (b)

$\frac{2\pi}{\pi/10} = 20$ minutes — **A1**

Total 1 mark

MARKSCHEME (c)

18.2 m (18.2016…) — **A1**

Total 1 mark

MARKSCHEME (d)

$25 - 22\cos\left(\frac{\pi t}{10}\right) = 35$ — **(M1)**

$t = 6.50198\ldots$ and $t = 13.4980\ldots$ — **(A1)**

7.00 minutes (6.99603…) — **A1**

Total 3 marks

Note Or the graph of h with the line $h = 35$.