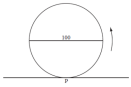


# IB Functions Problem 009



The wheel at an amusement park has a diameter of 100 metres. Figure A.

Table B shows the heights of  $P$  in metres above the ground after  $t$  minutes. Table B.

$t$	height
0	0.0
1	2.0
2	24.0
3	90.0
4	146.0
5	202.0

Let  $P$  be a point on the wheel. The wheel starts with  $P$  at its lowest point, at ground level.

The wheel rotates at a constant speed, counter-clockwise. One full rotation takes 20 minutes.

A. Find the height of  $P$  above the ground after:

- i. 10 minutes.
- ii 15 minutes.

B. Let  $h(t)$  be the height of  $P$  above the ground in metres after  $t$  minutes.

- i. Show that  $h(8) = 90.5$ .
- ii Find  $h(21)$ .

C. Sketch the graph of  $h$ , for  $0 \leq t \leq 40$ .

D. Given that  $h$  can be expressed in the form  $h(t) = a \cos bt + c$ , find  $a$ ,  $b$  and  $c$ .