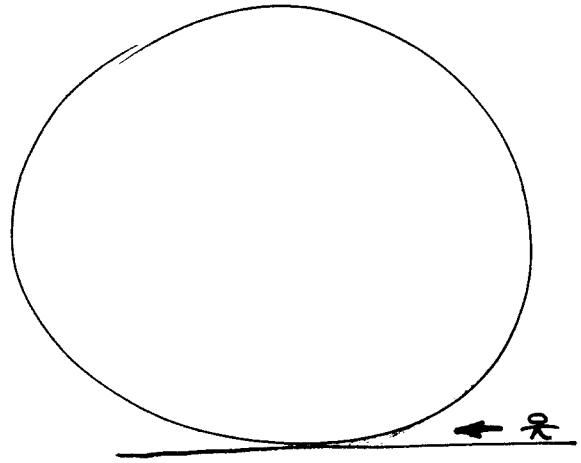
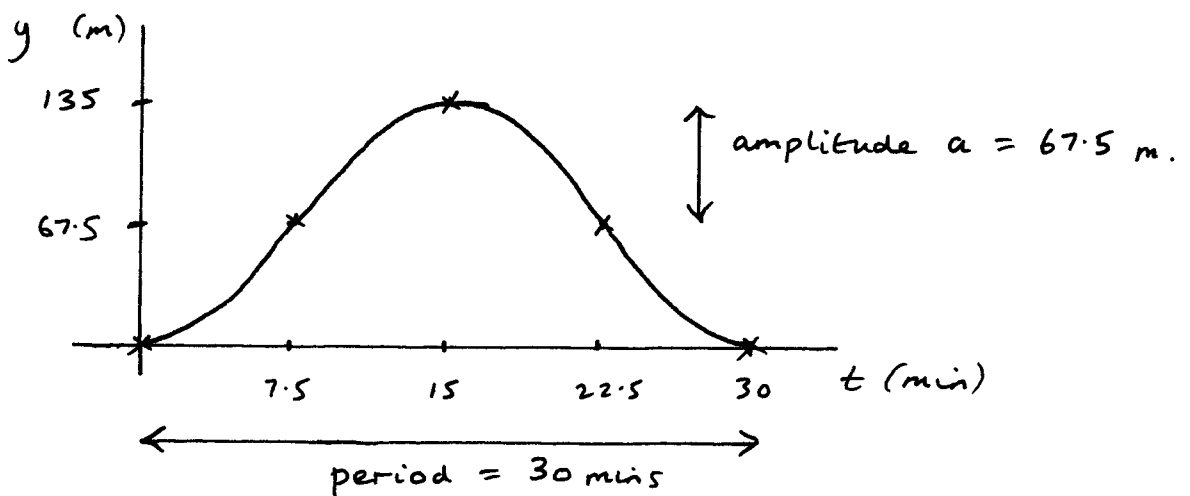


Millennium Wheel  
 diameter 135m  
 rotation 30 mins



- 1) How high is a person after 6 minutes?
- 2) When are you 50 metres above the ground?

Sketch graph of height against time



Consider equation:

$$y = a \sin\left(\frac{t-h}{b}\right) + k$$

$$b \times 2\pi = \text{period}$$

$$b \times 2\pi = 30$$

$$b = \frac{30}{2\pi}$$

$$\therefore y = 67.5 \sin\left(\frac{t-h}{\frac{30}{2\pi}}\right) + k$$

$$y = 67.5 \sin \frac{2\pi}{30}(t-h) + k$$

\* Students may prefer to remember the equation in the form:

$$y = a \sin \frac{2\pi}{\text{period}}(x-h) + k$$

omit?  
\*

Drawing the graph of  $y = 67.5 \sin \frac{2\pi}{30}t$  shows that the curve can be obtained by a horizontal shift ( $h = 7.5$ ) and a vertical shift ( $k = 67.5$ ).

$$\therefore y = 67.5 \sin \frac{2\pi}{30}(t - 7.5) + 67.5$$

1) Using the trace feature:

$$\text{when } t = 6, y \approx 46.6$$

$\therefore$  After 6 minutes the height is approximately 46.6 m.

2) Draw the graph  $y = 50$  and using the intersect feature:

$$\text{when } y = 50, t \approx 6.2478 \text{ or } t \approx 23.7522$$

$\therefore$  The height is 50 m after 6 mins 15 secs and 23 mins 45 secs.