

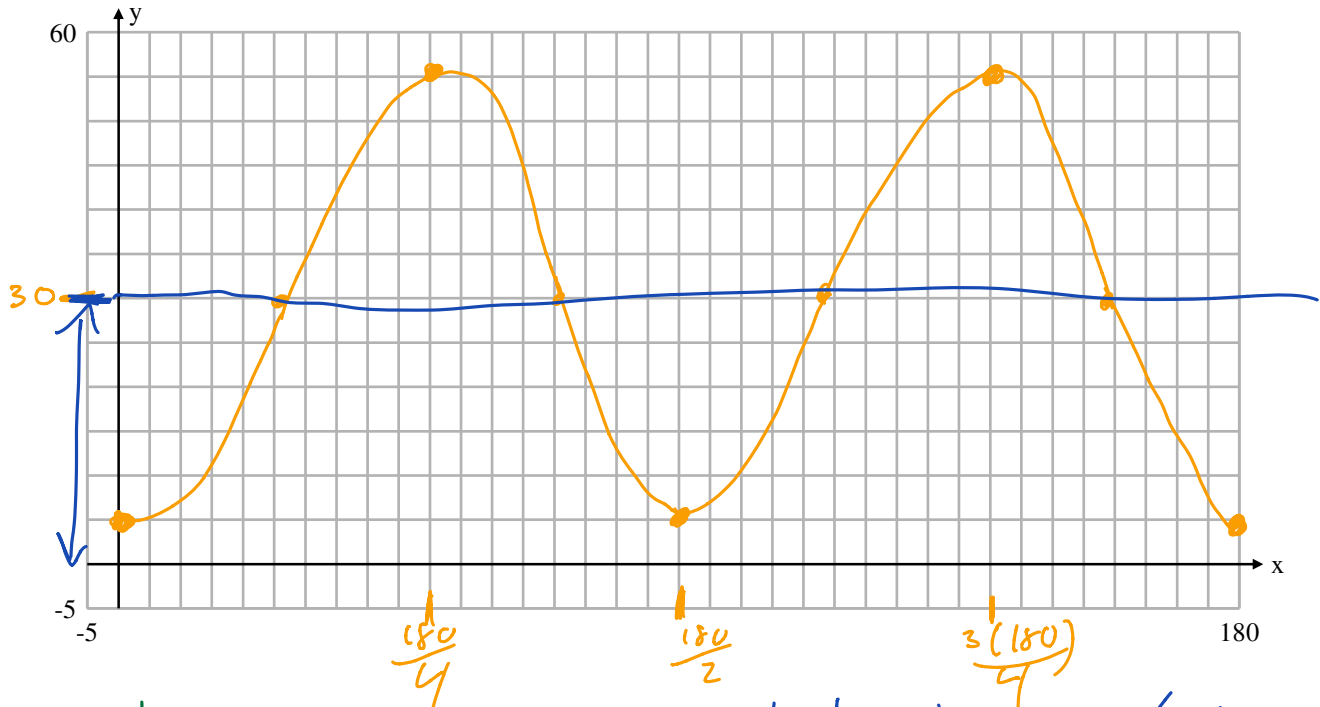
5.5 Modeling with Trigonometric Functions:



Johnny gets on a Ferris Wheel, it has a radius of 25 m and the centre is 30 m of the ground. Two complete revolutions take 180 seconds.

Johnny gets on the Ferris Wheel at the bottom.

- Graph Johnny's height, h , at any time t .
- Write a sinusoidal function that represents Johnny's height h at any time t .
- Predict Johnny's height at 152 seconds
- What is the first time that Johnny is 20 m off the ground.



$\rightarrow h_{min} @ 5m$
 $\rightarrow h_{max} @ 55m$
 $\rightarrow P = 90$
 $\rightarrow \text{Peak} \rightarrow \text{Trough}$
 $\quad \quad \quad 50$
 $\therefore a = 25$

$$f(t) = h$$

graph starts at max/min
 $\therefore -\text{cosine}$

$$P \rightarrow T = 50$$

$$\therefore a = 25$$

No phase change $\therefore C = 0$

$$P = 90$$

$$b = \frac{2\pi}{90}$$

$$= \frac{\pi}{45}$$

$$\text{v.d} = \text{up } 30$$

$$f(152) = -25 \cos\left(\frac{\pi(152)}{45}\right) + 30$$

$$= 39.4m$$

$$f(t) = -25 \cos\left(\frac{\pi t}{45}\right) + 30$$

$$20 = -25 \cos\left(\frac{\pi t}{45}\right) + 30$$

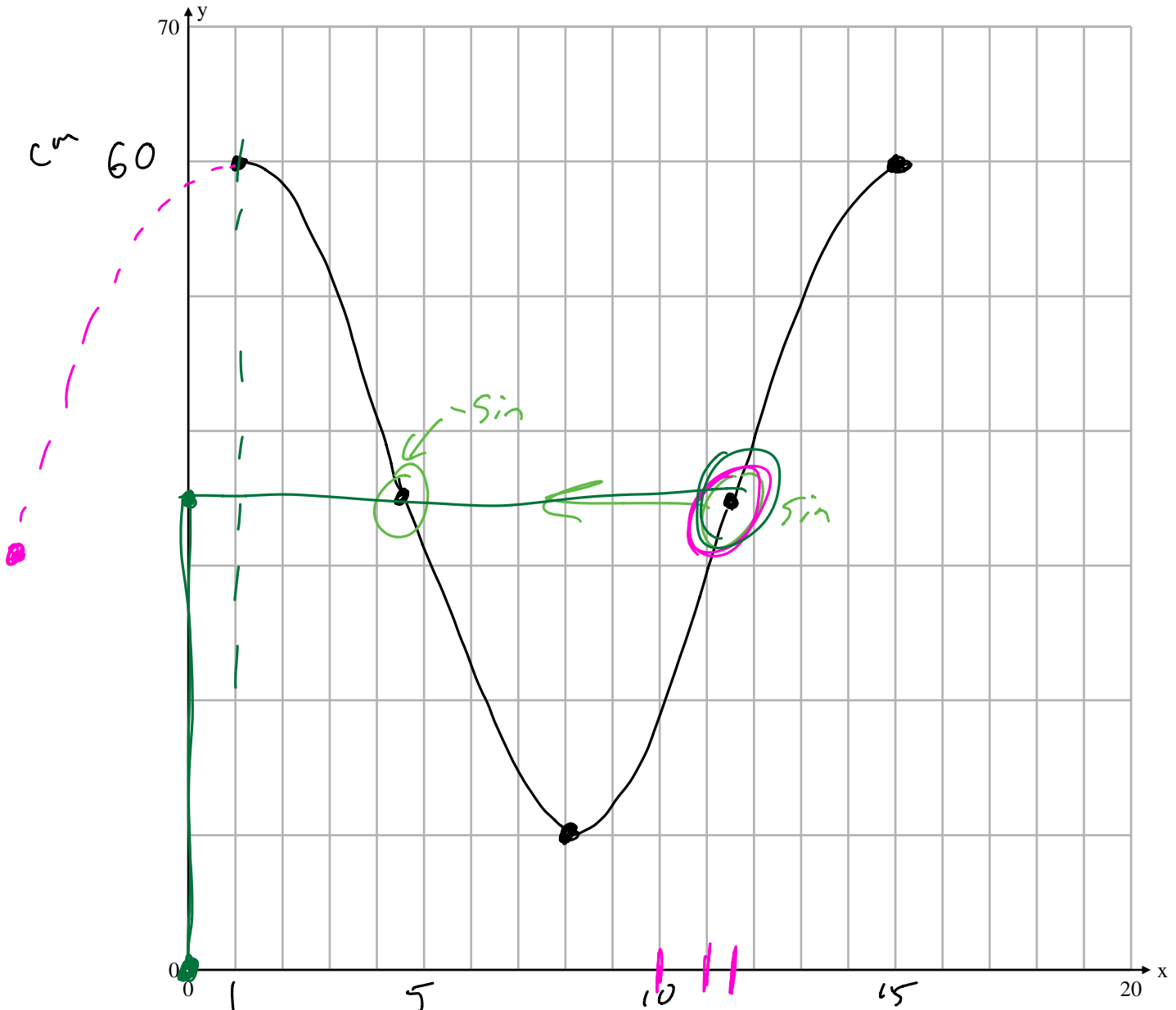
$$\rightarrow \frac{45}{\pi} \cos\left(\frac{20-30}{-25}\right) = t$$

$$16.6 =$$

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- The maximum height of a tide at Tofino on a certain day is 60 cm, this occurs at 1 AM. The next low tide is 10 cm and this occurs at 8 AM.
- Graph the height of the water, h at any time, t .
 - Determine a sinusoidal function of the height of the water, h at any time, t .



★ must be in sine !!

hours after midnight.

left = 11.5
 up = 35 ←
 a = 25
 p = 14
 b = $\frac{2\pi}{14} = \frac{\pi}{7}$

$$f(t) = 25 \sin\left[\frac{\pi}{7}(t - 11.5)\right] + 35$$

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