## Warm Up

1) **Solve the triangle:**

**a = 24, b = 28 and c = 32**

$$32^2 = 24^2 + 28^2 - 2(24)28\cos C$$

$$\cos^{-1}\left(\frac{32^2 - 24^2 - 28^2}{-2(24)28}\right) = C$$

$$180 - 76 - 47 = B$$

$$\frac{\sin A}{24} = \frac{\sin 76}{32}$$

$$\sin^{-1}\left(\frac{24\sin 76}{32}\right)$$

**C = 76°**

**A = 47°**

**B = 57°**

**2) There is a 70% chance of rain, a 30% chance of lightning and a 25% chance of both. What is the probability of lightning if it is raining outside?**

Cond. $\frac{\text{Both}}{\text{Known}}$ $\frac{25}{70} \rightarrow$ **5 / 14**

**3) In a 5 day forcast there is an 4/5 chance of rain each day. What is the probability that it rains all five days? Exactly 3 of the 5 days?**

$$\frac{4}{5} \cdot \frac{4}{5} \cdot \frac{4}{5} \cdot \frac{4}{5} \cdot \frac{4}{5}$$

$$\left(\frac{4}{5}\right)^5$$

**1024 / 3125**

$${}_5C_3 \left(\frac{4}{5}\right)^3 \left(\frac{1}{5}\right)^2$$

**128 / 625**

A Ferris wheel is 50 meters in diameter and rotates once every three minutes.

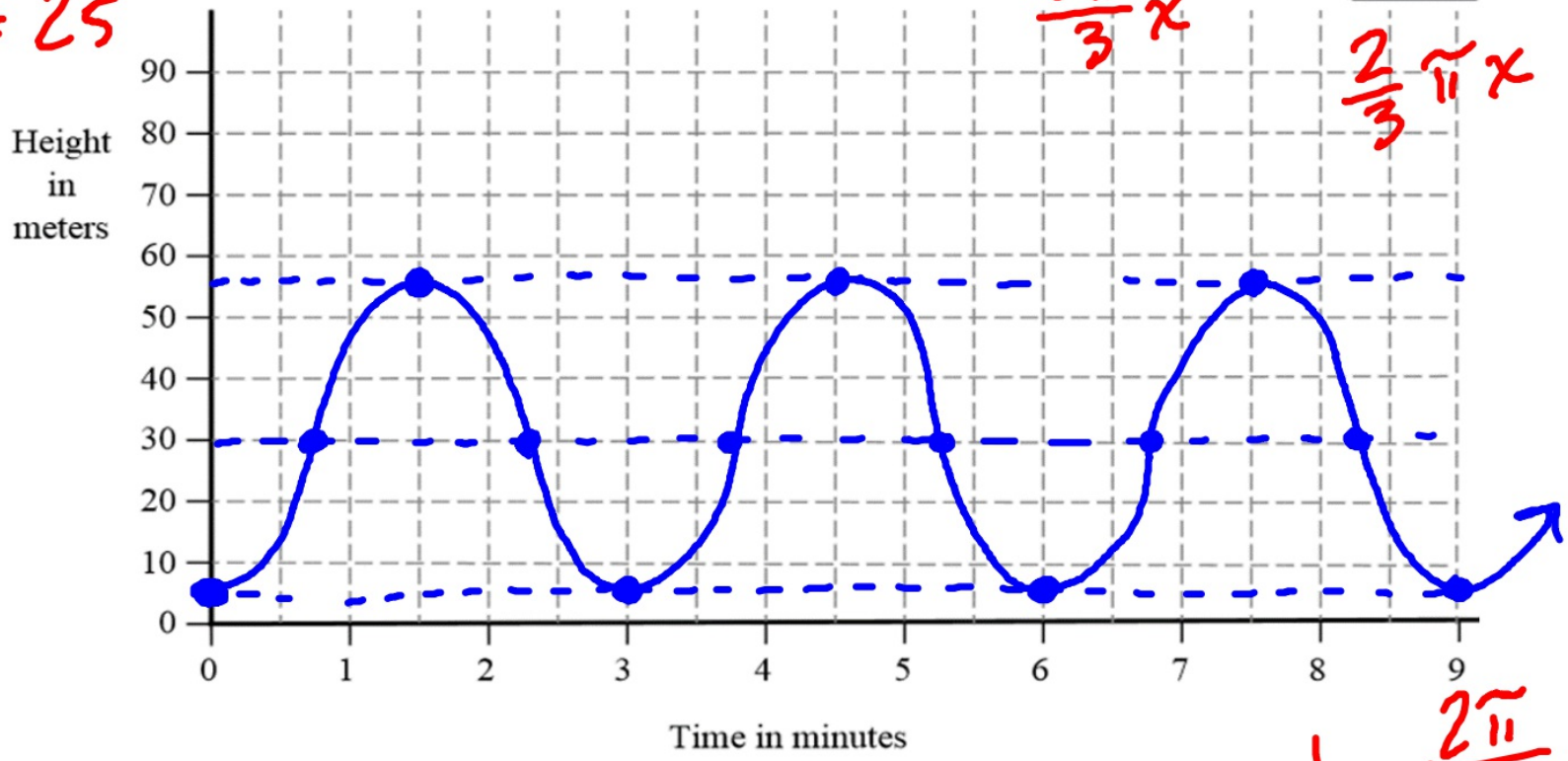
The center axle of the Ferris wheel is 30 meters from the ground.

1. Using the axes below, sketch a graph to show how the height of a passenger will vary with time.
Assume that the wheel starts rotating when the passenger is at the bottom.

Radius = 25

$\frac{2\pi}{3}x$

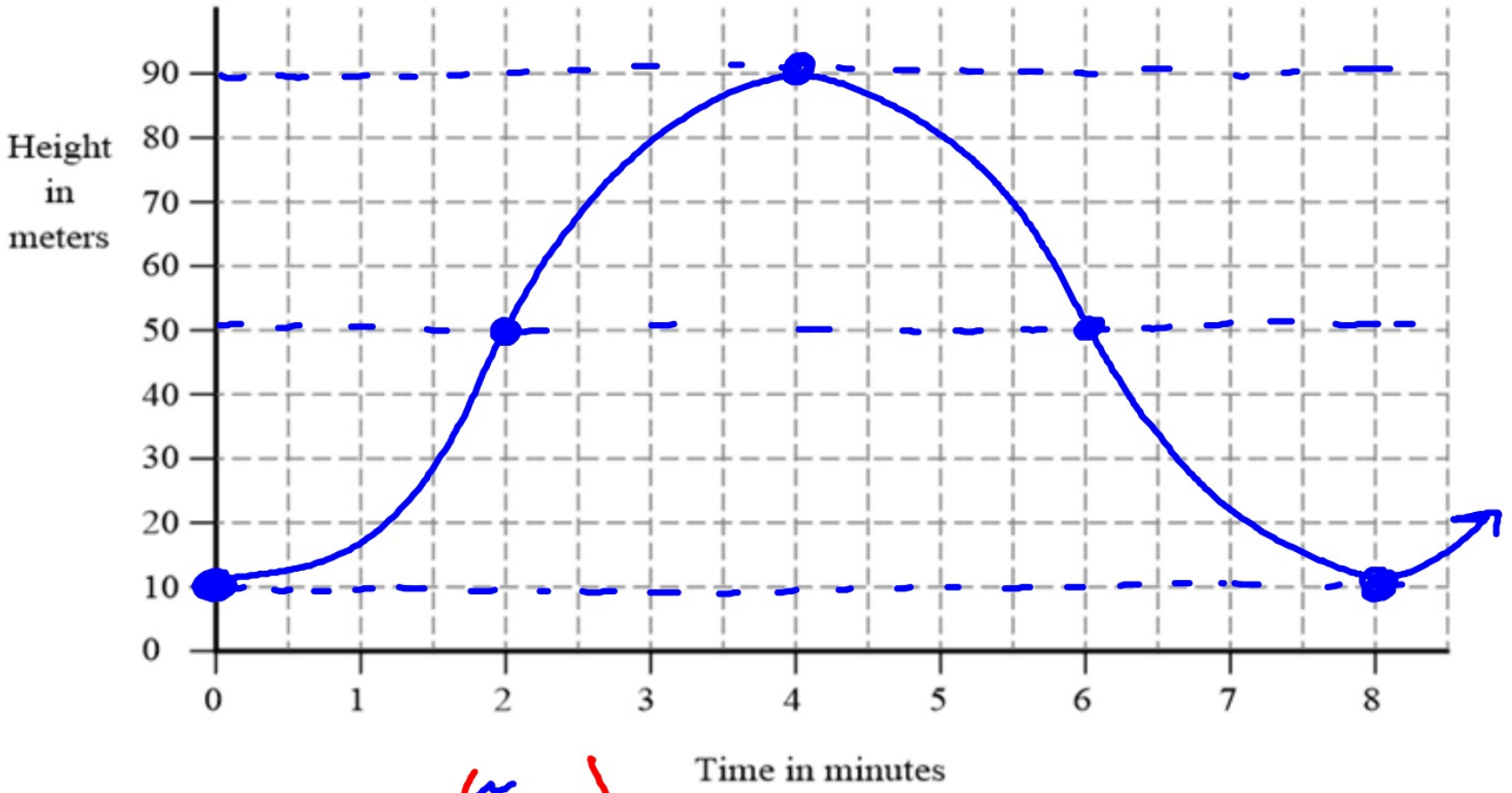
$\frac{2}{3}\pi x$




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

$y = -25\cos\frac{2\pi x}{3} + 30$

3) A Ferris wheel's axis is 50 feet off the ground. The diameter is 80 meters and it takes 8 minutes for the wheel to complete 1 rotation. Sketch a graph that matches the information and write an equation for the height of someone riding the Ferris wheel.




$H(t) = -40\cos\left(\frac{\pi x}{4}\right) + 50$

U4: Trig Part II

# Word Problems

Law of Sine
Law of Cosine
Sinusoidal Functions

**Ex1) The annual high temperature in Cookville is about 96º and the low is 12º. Write an equation to model that starts in the fall.**

$y = -42\sin(2\pi x) + 54$ $\frac{96+12}{2}$

$\frac{2\pi}{1}$ $96-54$ Fall Per = 1 year

**Ex2) A ferris wheel's axle is 35 feet off the ground, has a radius of 32 feet and takes 5 min to rotate. Write an equation to match.**

$y = -32\cos\left(\frac{2\pi x}{5}\right) + 35$

Radius F.W. $\frac{2\pi}{5}$ Axle

Ex1) The following equation represents the daylight hours in a small town:

$$d(t) = 4\sin(2\pi x) + 12$$

Diff  Mid to Max  Middle

a. What is the longest day the town has each year? 12 + 4 = 16 hr.

b. What is the shortest day? 12 − 4 = 8 hr.

c. How long before the daylight hour pattern repeats? 1 year

$Per = \frac{2\pi}{b}$  Period?

$\frac{2\pi}{2\pi} = 1$

Ex2) In another city the longest day is 15 hours of daylight and the shortest is 9 hours. If it takes 1 year for the pattern of hours to repeat, write a sine equation that represents the daylight hours?

$$y = 3\sin(2\pi x) + 12$$

Ex3) During high tide Jeff put a stake in the ground to remember how high the water got. The lowest the tide ever got was 30 feet from the stake, which was 11 hours later. Write an equation that would represent the tides.

Dist. 0 → 30

$y = 15\cos\left(\frac{\pi x}{11}\right) - 15$


0 − −15 = 15

Per = 22 hr.  $\frac{2\pi}{22}$


Ex4) At another beach Jeff created the following equation to represent the tides in relation to his chair on the beach:

$$h(t) = 18\sin\left(\frac{\pi}{5}x\right) + 20$$

a. How far was the water when he started measuring? 20 ft

b. What is the maximum distance the tide was away? 38 ft

20 + 18

c. What is the shortest distance the tide was away? 2 ft

20 − 18

d. How long will it take for the tide to repeat its cycle? 10 hr.

Period?

$\frac{2\pi}{b}$  $\frac{2\pi}{\frac{\pi}{5}} = 2/(1/5)$

# Assignment::

WB 404: → All

#4-12, 13-18 Odd

E.C. for All

(2.) Amp = 5  Period = $\pi$  PS = $\frac{\pi}{4}$  VS = 0

$$y = 5\sin\left(2x - \frac{\pi}{2}\right)$$

$$Per = \frac{2\pi}{b} \qquad \frac{2\pi}{\pi}$$

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

$$PS = \frac{-c}{b}$$

$$PS \cdot b = -c$$

$$PS(-b) = c$$

$$c = -b(PS)$$

$$-2\left(\frac{\pi}{4}\right)$$