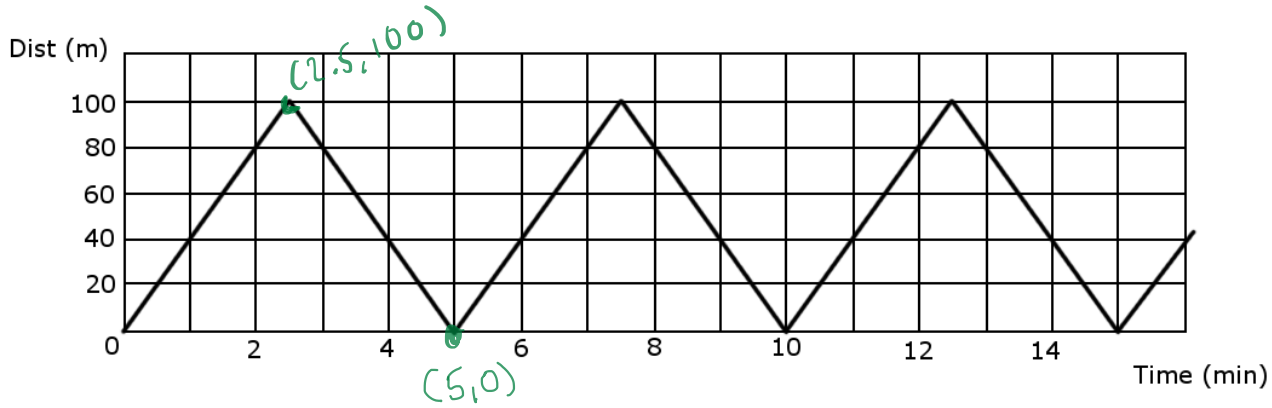
Name: Homework
Date: _____

1. Mr. Auger is swimming laps in a 100 m long pool.
He starts at the near side (distance from the starting point is 0 m).



If Auger finally collapses from exhaustion after swimming for **2 hrs, 8 min, and 45 seconds**, **how far** from the starting point will he be?

cycle = 5 minutes

length = 60×2 = 120 + 8 + 45 ÷ 60

128.75

full cycles: 128.75 / 5 = 25.75

25 full

amount left: 25 × 5 = 125

128.75 − 125 = 3.75

(2.5, 100) → y_1

(5, 0) → x_2, y_2

$\frac{y_2 - y_1}{x_2 - x_1} = \frac{0 - 100}{5 - 2.5} = \frac{-100}{2.5} = -40$

$y = ax + b$

$100 = 2.5(-40) + b$

$100 = -100 + b$

$+100 \quad +100$

$200 = b$

$y = ax + b$

$y = -40(3.75) + 200$

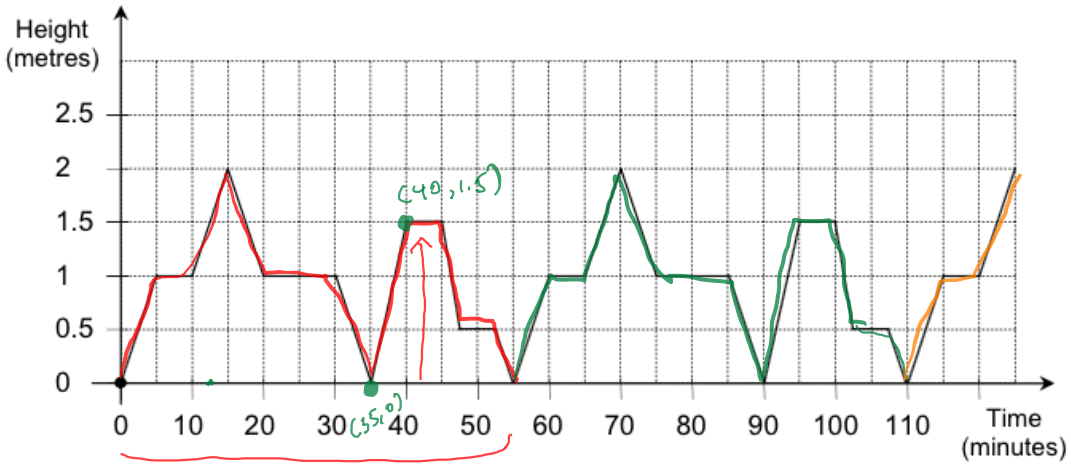
$y = -150 + 200$

$y = 50$

Answer: Auger will be 50 meters from the starting point.

2. Water shoots out of the middle of a fountain. The height of the jet of water varies.

The periodic function represented below can be used to determine the height of the jet of water in relation to the time elapsed from the moment the fountain was turned on.



a) What will the height of the water be **6 hours and 12 minutes** after the fountain is turned on?

cycle = 55 minutes

full length = $6 \times 60 = 360 + 12 = 372$

$\frac{372}{55} = 6.7636$

6 full

time left = $6 \times 55 = 330$

$372 - 330 = 42$

read off graph

42 minutes = 1.5 m

b) What will the height of the water jet be **11 hours and 37 minutes** after the fountain is turned on?

cycle = 55 minutes

full length = $11 \times 60 = 660 + 37 = 697$

full cycles = $\frac{697}{55} = 12$

time left = $12 \times 55 = 660$

$697 - 660 = 37$

$y = ax + b$

$y = 0.3(37) - 10.5$

$y = 0.6$

(35, 0)
x_1 y_1

(40, 1.5)
x_2 y_2

$\frac{y_2 - y_1}{x_2 - x_1} = \frac{1.5 - 0}{40 - 35} = \frac{1.5}{5} = 0.3$

$y = ax + b$

$0 = 0.3(35) + b$

$0 = 10.5 + b$

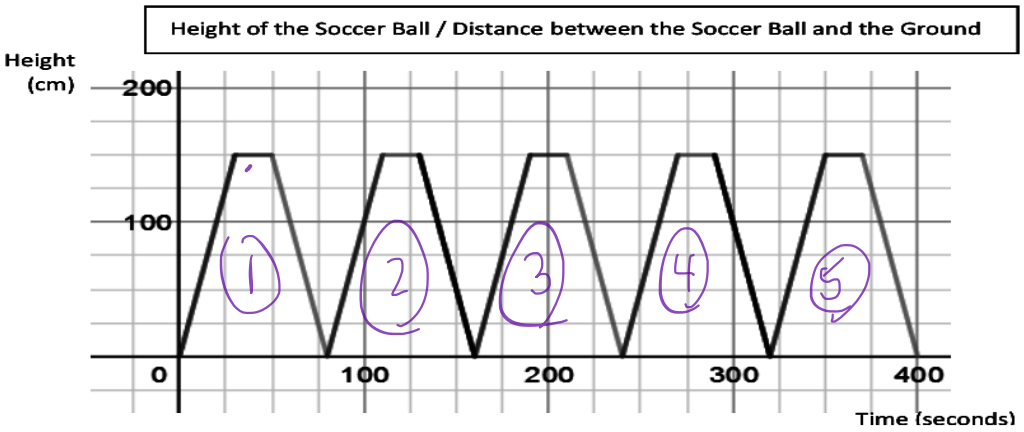
$-10.5 \quad -10.5$

$-10.5 = b$

3. A store selling World Cup memorabilia places a mechanical mascot in front of the store.

- The mascot raises a ball from the 0 cm to a max of 150 cm at a ***constant rate***,
- holds it there for **20 seconds**, and then
- lowers it back to ground level at the ***same rate***.

The graph shows the height of the ball in relation to time passed (in seconds).



A store employee turns on the mascot at **8:00AM**.
At exactly **8:15 AM**, the mascot breaks down and the soccer ball stops moving.

How high above the ground is the ball when the mascot stops moving?

(Hint: Start by working out the coordinates of the corners of the first cycle.)

cycle: $\frac{400}{5} = 80$ per cycle

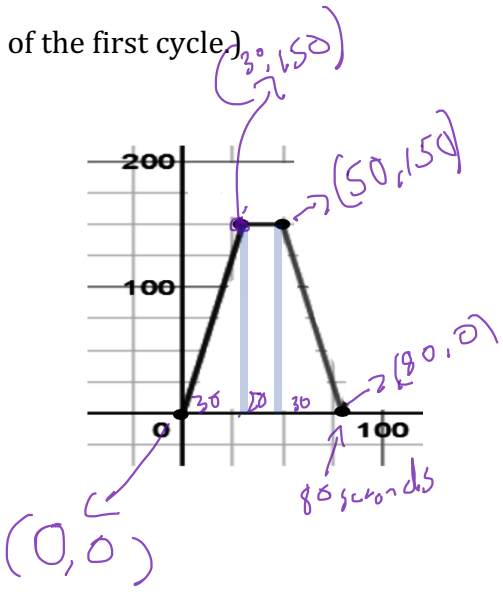
full length: $15 \times 60 = 900$

number of full cycles: $\frac{901}{80} = 11.25$

11 full

time left over: $11 \times 80 = 880$

$900 - 880 = 20$



(keep working on the next page)

(0,0) (30,150)
x_1 y_1 x_2 y_2

$\frac{y_2 - y_1}{x_2 - x_1} = \frac{150 - 0}{30 - 0} = \frac{150}{30} = 5$

$y = ax + b$

$0 = 5(0) + b$

$0 = 0 + b$

$-0 \quad -0$

$0 = b$

rule

$y = 5x + 0$

$y = 5(20) + 0$

$y = 100 + 0$

$y = 100$

Answer: The ball 100

will be _____ m above the ground.