

Subject 17

Functions

Please don't write on the exam paper.

INTRODUCING THE SUBJECT :

Richard Douglas “Dick” Fosbury was born in March 1947 in Portland, Oregon. He's famous as the athlete who revolutionized the High Jump event using a back-first technique now known as the Fosbury Flop. His method consists in sprint diagonally towards the bar, then curve and leap backwards over the bar.

At this time, the world record was 2.27m. First, Fosbury didn't jump so high but he continued to practice as his performances improved (he broke his high school record with a 1.905 m jump).

At the 1968 Olympic Games in Mexico City, he won the gold medal and got a new olympic record with a 2.24 m jump. He was the only one using the Fosbury flop. But four years later, in Munich, 28 of the 40 competitors used Fosbury's technique.

Nowadays, every athlete is using the Fosbury flop and the actual world record is 2.45m which was achieved by the cuban Javier Sotomayor in 1993.

High jump is also an event in decathlon. The world record for high jump in decathlon is held by two east-german athletes Beilschmidt (1977) and Schenk (1988) with a 2.27 m jump. The actual world record is 9,026 points by the Czech Roman Sebrle in 2001 but his high jump was only 2.12m.

Adapted from Wikipedia

QUESTIONS :

To mark the points N in decathlon for high jump event, you have to use a formula depending on the performance H given in centimetres, $N = 0.8465 \times (H - 75)^{1.42}$, then you need to round down to the unit.

1. How many points did Sebrle mark with his high jump in 2001 ?
2. How many points would Javier Sotomayor have marked if he had competed in decathlon with his world record ?
3. The highest mark in high jump event is 1000. Which height does it correspond to ?
4. Draw the sketch of the graph of the function N .
5. What is the minimum value ? At which height is it obtained ? What sort of function is it ?