

You have to talk for ten minutes about this subject. Which mathematical notion(s) do you recognise?

*The questions may help you, but answering all of them is not compulsory:
you can simply explain a way to solve an exercise, even if you can't find the solution*

Subject A: Three-sport athletic competition



Pictogram of Olympic sports - Triathlon

Gwen Rosemary takes part in a triathlon competition, which involves the completion of three endurance disciplines : swimming, cycling and running, in consecutive order.

The probability that she clocks the best lap time in swimming is 0.4, in cycling 0.8 and in running 0.9. Gwen will certainly be awarded a gold medal if she clocks the best lap time in each race.

Given that her performances in each discipline are independent:

- 1) Find the probability that Gwen Rosemary misses the gold medal.
- 2) Find the probability that Gwen Rosemary fails to achieve the best lap time in only one of the three endurance disciplines.
- 3) Given that Gwen Rosemary failed to achieve the best lap time in only one discipline, find the probability that she failed at the running race.

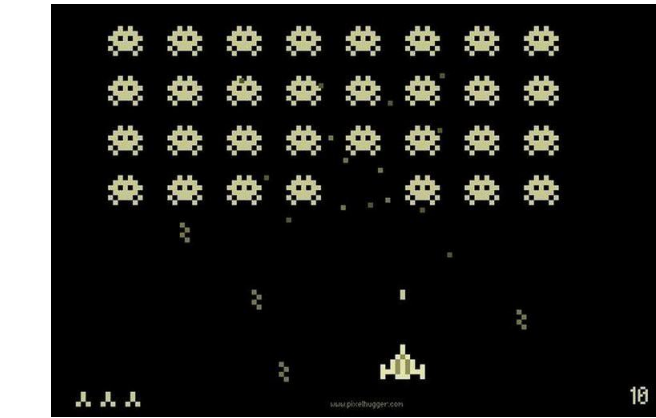
If you have time

Imagine and explain what would happen if the last performance was not independent from the two previous ones.

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Subject B: Space Invaders



Part A

Lewis played a game called Space Invaders. He scored points for each spaceship that he captured. Lewis scored 140 points for capturing his first spaceship, 160 points for his second spaceship, 180 points for his third spaceship and so on.

- 1) Find the number of points that Lewis scored for capturing his 20th spaceship.
- 2) Find the total number of points Lewis scored for capturing his first 20 spaceships.
- 3) Lewis wants to score more than 30,000 points. How many spaceships does he have to capture?

Part B

In this video game, Lewis must also make his avatar progress from Level 1 to Level 30.

15 mn are required from Level 1 to Level 2. The necessary time to progress from one level to the next always increases by 20% thereafter.

How long does it take Lewis to move up from Level 1 to Level 30?