# BACCALAURÉAT 2013

## Epreuve de Discipline Non Linguistique - Mathématiques/Anglais

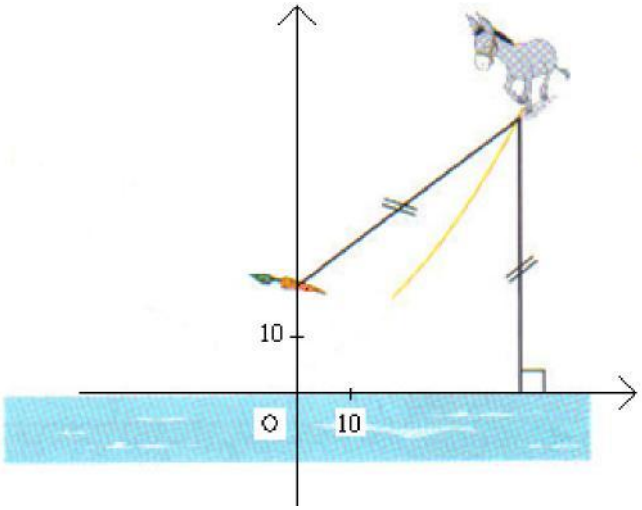
### Buridan's donkey

Buridan's donkey is an illustration of a paradox in philosophy in the conception of free will.

It refers to a hypothetical situation wherein a donkey is placed precisely midway between a stack of hay and a pail of water. Since the paradox assumes the donkey will always go to whichever is closer, it will die of both hunger and thirst since it cannot make any rational decision to choose one over the other. The paradox is named after the 14th century French philosopher Jean Buridan. Of course, for a human being, the question is not "should I eat or should I drink?" Nevertheless we are regularly obliged to face the dilemma of having to choose between things that look equally appealing and unappealing, and sometimes we end up feeling stuck.

Let us now suppose a donkey is at the same distance from a river and a stack of carrots. The carrots are 20m far from the river. Instinctively the donkey keeps on moving forward staying always at the same distance from the water and the food because it is like the Buridan's donkey.

To answer this question we are going to plot a graph. In a rectangular coordinate system the *x*-axis represents the river, point C has coordinates (0 ; 20) and represents the carrots, point D has coordinates (*x* ; *y*) and represents the donkey and point H has coordinates (*x* ; 0).




*Adapted from Wikipedia*

**Questions**

1. a Locate point H on the graph.

1. b Express $HD^2$ in terms of *y*.

1. c Express $CD^2$ in terms of *x* and *y*.

1. d Work out the equality : $y = \frac{1}{40}x^2 + 10$.

1. e What sort of path does the donkey follow?

2. a Find out the minimum distance of the donkey to the river.

2. b Was this result predictable?