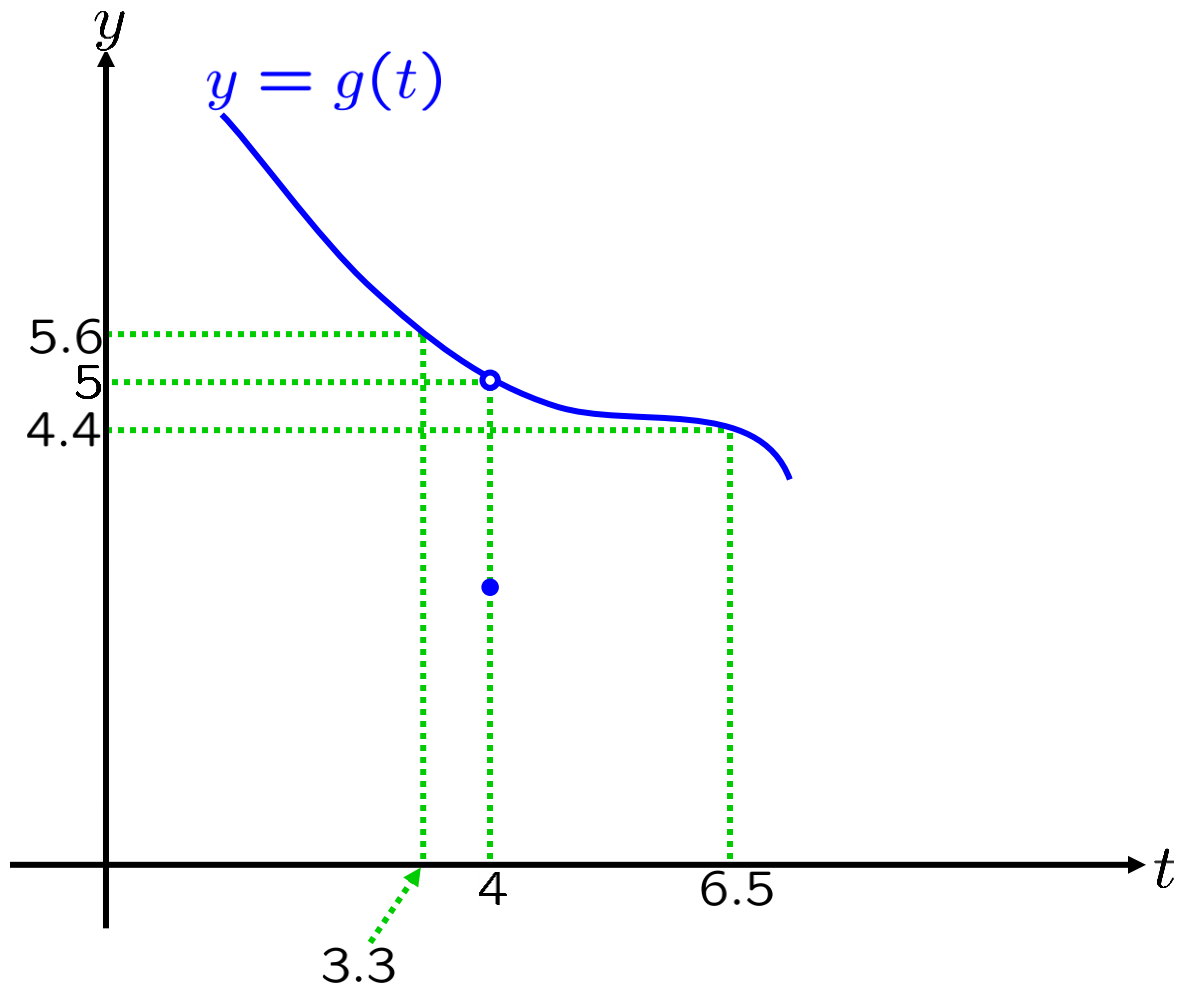


CALCULUS
The limit game and
the exact definition of a limit
OLD2

0150-1. For the function g graphed below,
what is the largest number δ such that

$$0 < |t - 4| < \delta \Rightarrow |(g(t)) - 5| < 0.6 \quad ?$$



0150-2. Let $f(x) = 3x - 4$.

OLD2

Show a graph of $y = f(x)$ that includes the points $(1, -1)$, $(2, 2)$ and $(3, 5)$.

Find the largest number δ such that

$$|x - 2| < \delta \Rightarrow |(f(x)) - 2| < 0.9.$$

0150-3. Let $g(x) = [3x - 4] \left[\frac{x - 2}{x - 2} \right]$.

OLD2

Show a graph of $y = g(x)$ that includes the points $(1, -1)$ and $(3, 5)$.

Find the largest number δ such that

$$0 < |x - 2| < \delta \Rightarrow |(g(x)) - 2| < 0.9.$$

^{OLD2}0150-4. In shop class, you are asked to build a square sheet of metal of area 400 square inches.

The area can be slightly off, but must be between 399 and 401 square inches.

Say you have access to a machine that will punch out a perfect square, and the side length (in inches) is controlled by a dial.

How close to 20 must you set the dial to get the area to be in the specified range?

Give your answer to five decimal places.

0150-5. Prove that $\lim_{x \rightarrow 6} 4x = 24$.
OLD2

Your writeup should read:

Given $\varepsilon > 0$.

Let $\delta = \dots$.

Assume $0 < |x - 6| < \delta$.

Then $|4x - 24| < 4\delta$.

←-----penultimate sentence

Then $|4x - 24| < \varepsilon$.

←-----last sentence

All you need do is fill in the ellipsis (\dots) with a carefully chosen expression of ε .

Hint: The last sentence in the writeup clearly follows from the penultimate sentence if $4\delta = \varepsilon$.