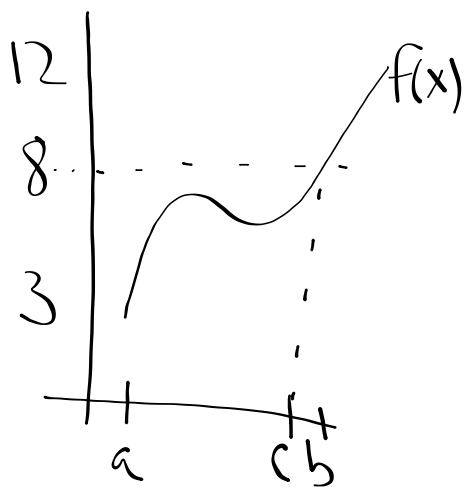
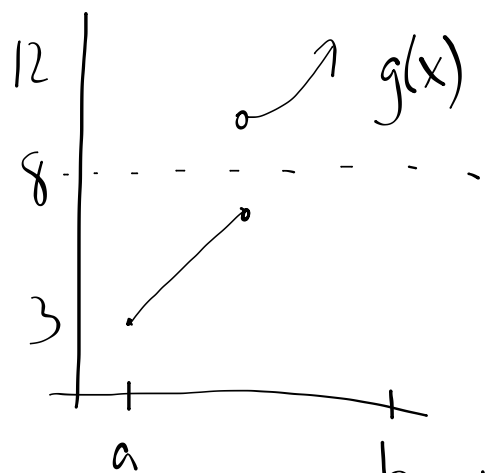


Intermediate Value Theorem (IVT)

"If a function is continuous on $[a, b]$ then there exists for every d between $f(a)$ & $f(b)$ at least one value c such that $f(c) = d$."



but



If $f(x)$ is continuous and goes from 3 to 12, it must hit 8 at least once.

Since $g(x)$ is not continuous, IVT does not apply.

ex) Use IVT to prove that there is at least one real number that is exactly one less than its cube.

Let x be the number. We need to

show that $x = x^3 - 1$, or $x + 1 = x^3$, or

$$(x^3 - x = 1), \text{ or } x^3 - x - 1 = 0$$

$x^3 - x = 1$ is continuous, so IVT applies.

$$x=1 : x^3 - x = 1^3 - 1 = 0 \quad (f(a))$$

$$x=2 : x^3 - x = 2^3 - 2 = 6 \quad (f(b))$$

By the IVT, since $x^3 - x$ is continuous, and goes from 0 to 6, it must equal 1 somewhere.

ie. $f(c) = 1$ for some c .

Read about IVT on page 79

pg. 80-81 #1-9 odd, 11-18, 20-26 even,

#39, 40 (Prove using IVT)

#41