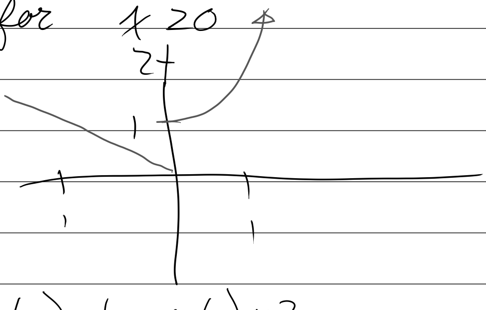
# Recitation 07

## 2.8 #19 for [-1, 1]

$$g(x) = \begin{cases} -x & \text{for } x < 0 \\ x^3+1 & \text{for } x \geq 0 \end{cases}$$




$\lim_{x \to 0^-} g(x) = 0$

$\lim_{x \to 0^+} g(x) = 1$

$g(-1) = 1 \quad g(1) = 2$

$g(x)$ skips no values between $g(-1)$ & $g(1)$.

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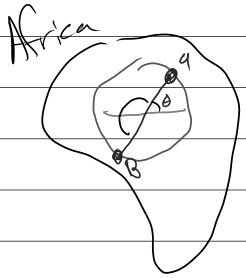
## 2.8 #32




$f(\theta) = T(\theta) - T(\theta + \pi)$

f: difference | Prove $f(\theta)$ takes
T: temperature | on 0 for some value

1) f is continuous
2) pick $\theta_0$ such that $T(\theta_0) > T(\theta_0 + \pi)$
   Then $f(\theta_0) > 0$ and $f(\theta_0 + \pi) < 0$

By IVT, $\exists\, \theta_0 < \theta_1 < \theta_0 + 1$ such that $f(\theta_1) = 0$

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Wksht #1 Can the IVT be used for $1/(x-1)$ on the interval $[0, 2]$?

$$\frac{1}{x-1} \to \frac{x-1}{(x-1)^2} = \frac{x-1}{(x-1)(x-1)} = \frac{x-1}{x^2-2x+2}$$

$f(0)$ $\frac{0-1}{0^2-2(0)+2} = \frac{-1}{2}$ $\quad f(2)$ $\frac{2-1}{2^2-2(2)+2} = \frac{1}{4-4+2} = \frac{1}{2}$

$\boxed{\text{yes}}$

Wksht #2 a) $3x^3 = 1 - \sin(x)$