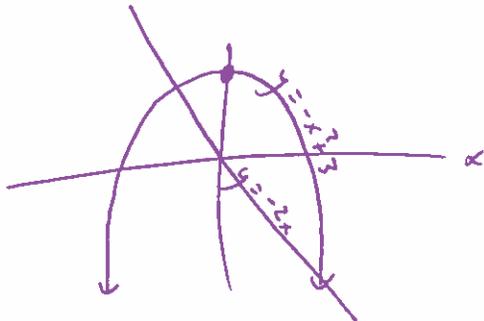


Quick Hit 5.4 (1)

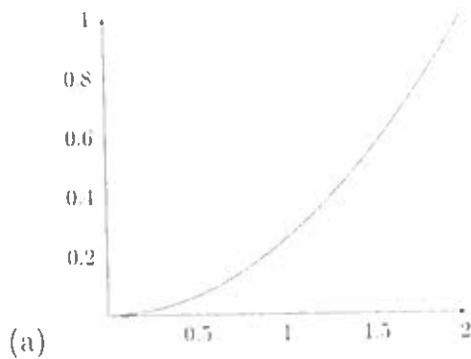
1. Find the area of the region bounded by the curves $f(x) = -x^2 + 3$ and $g(x) = -2x$.



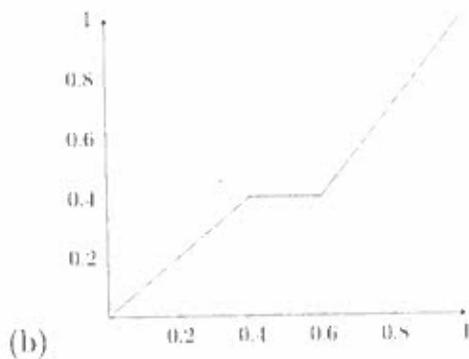
intersection points: $-x^2 + 3 = -2x$
 $0 = x^2 - 2x - 3 = (x-3)(x+1)$
 $\rightarrow x = 3$ or $x = -1$

area: $\int_{-1}^3 (-x^2 + 3 - (-2x)) dx = \int_{-1}^3 (-x^2 + 2x + 3) dx$
 $= \left. \frac{-x^3}{3} + x^2 + 3x \right|_{-1}^3$
 $= (-9 + 9 + 9) - \left(\frac{1}{3} + 1 - 3 \right)$
 $= 9 - \left(-\frac{5}{3} \right)$
 $= \frac{32}{3} \approx 10.67$

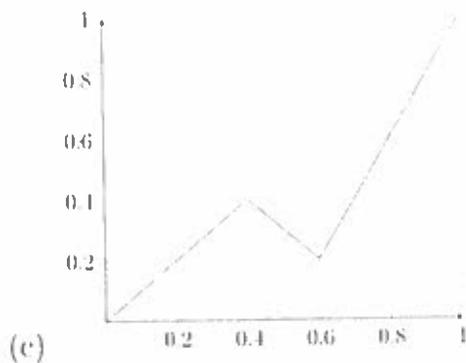
2. Is it possible for the given curve to be a Lorenz curve for some society? If no, why not? If yes, no explanation is necessary.



No: A Lorenz curve is defined only on $[0, 1]$; the depicted function is defined on $[0, 2]$



Yes



No: A Lorenz curve must be nondecreasing; the depicted function decreases on $[0.4, 0.6]$