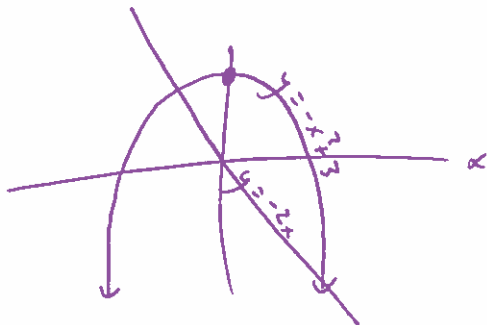


Quick Hit 5.4 (1)

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



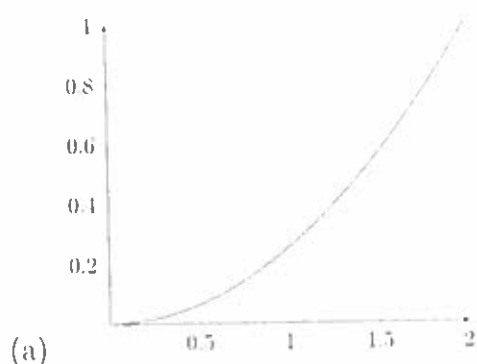
intersection points:  $-x^2 + 3 = -2x$   
 $0 = x^2 - 2x - 3 = (x-3)(x+1)$   
 $\rightarrow x = 3 \text{ or } x = -1$

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

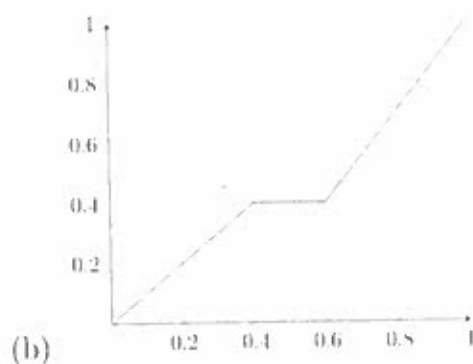
$$= (-9 + 9 + 9) - \left( \frac{1}{3} + 1 - 3 \right)$$
$$= 9 - \left( -\frac{5}{3} \right)$$

$$= \frac{32}{3} \approx 10.67$$

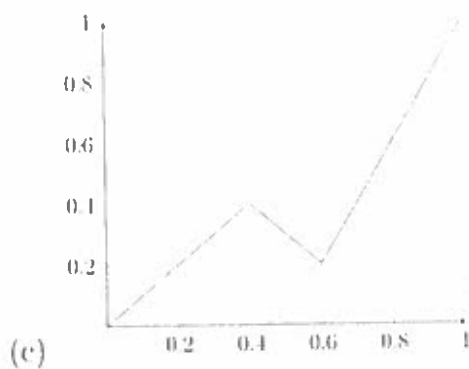
2. Is it possible for the given curve to be a Lorenz curve for some society? If no, why not? If yes, no explanation is necessary.



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  $[0.4, 0.6]$