STUDENT NAME:

Calculus 1550, section 6. Wednesday, May 5, 2004. Twentieth quiz

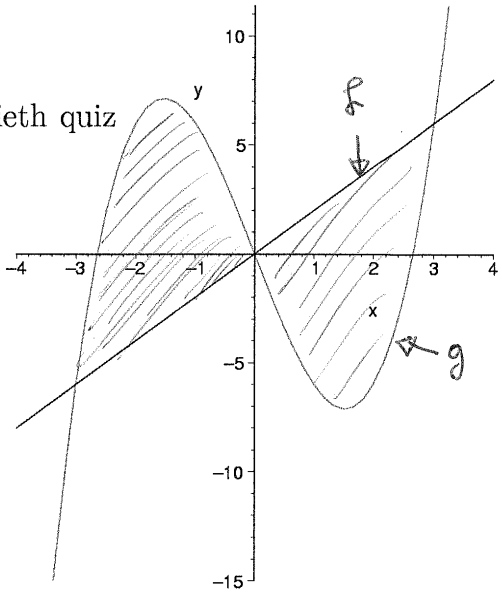
1. What is the area enclosed between the curves

$$y = f(x) := 2x$$

and

$$y = g(x) := x^3 - 7x,$$

which is sketched to the right?



area $= \int_a^b |f(x) - g(x)|\,dx$

intersection of f & g is at $2x = x^3 - 7x$

$9x = x^3 \Rightarrow x = 0$ or ± 3

Area $= \int_{-3}^{3} |x^3 - 7x - 2x|\,dx = \int_{-3}^{3} \underbrace{|x^3 - 9x|}\,dx$

this is even (abs. val of odd function is even)

$= 2\int_0^3 (9x - x^3)\,dx$

$= 2\left[9x^2/2 - x^4/4\right]_0^3$

$= 2\left(9 \times 9/2 - 81/4\right) = 2 \times 81/4 = 81/2 = 40.5$