Solutions to Quiz 15

MATH 139-01 and -02
Thursday, November 6, 2003

Be sure to **show your work**. Unsupported answers receive no credit.

1. In the graph of $y = f(x)$ shown below, the areas are as marked. Compute each of the following.

   (a) $\displaystyle\int_{-4}^{0} f(x)dx$

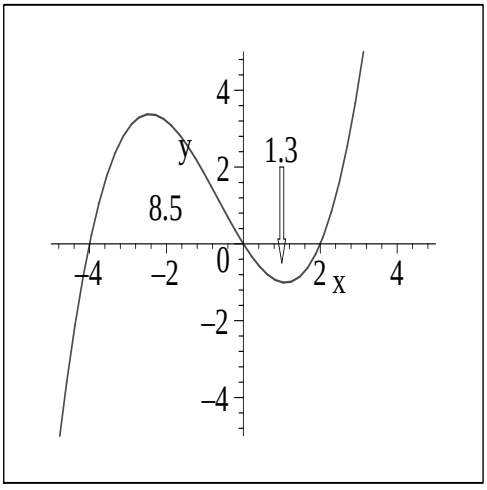
   Solution: The integral gives the area since the graph is above the x-axis. We have $\displaystyle\int_{-4}^{0} f(x)dx = 8.5$.

   (b) $\displaystyle\int_{0}^{2} f(x)dx$

   Solution: The integral gives the negative of the area since the graph is below the x-axis. We have $\displaystyle\int_{0}^{2} f(x)dx = -1.3$.

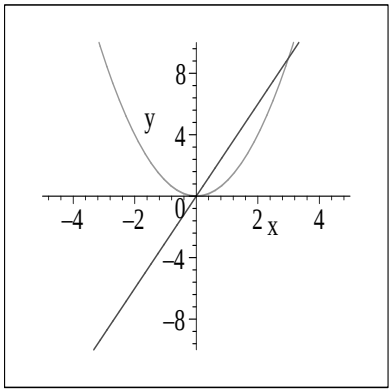
   (c) $\displaystyle\int_{-4}^{2} f(x)dx$

   Solution: We may simply add the two prior results: we have $\displaystyle\int_{-4}^{2} f(x)dx = 8.5 - 1.3 = 7.2$.



2. Compute the area between the graphs of $y = x^2$ and $y = 3x$. (You will need to determine what region these surround.)

   Solution: The graph of $y = 3x$ lies above the graph of $y = x^2$ on $[0, 3]$. (The two functions meet if $3x = x^2$, which implies $x = 0$ or $x = 3$.) This is the only portion of the plane actually enclosed by the two graphs (see below). Thus, the area is $\displaystyle\int_{0}^{3} (3x - x^2)dx = 4.5$ according to my calculator.


8
y
4
0
–4
–2
2
x
4
–4
–8