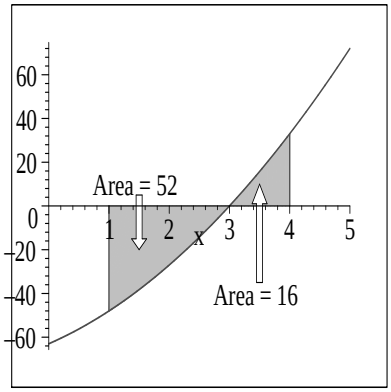
Solutions to Quiz 14

MATH 139-02
Thursday, April 8, 2004

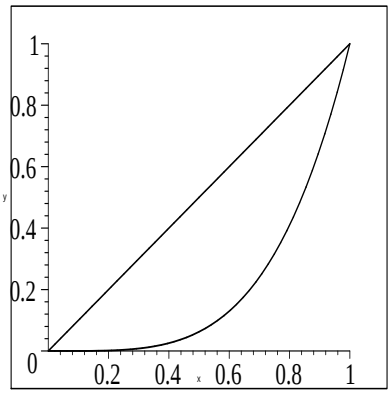
1. The graph of $y = f(x)$ is shown below. Compute $\int_1^4 f(x)dx$.



Solution: Since the first region is below the x-axis, we have $\int_1^3 f(x)dx = -52$. The second region is above the x-axis, so $\int_3^4 f(x)dx = 16$. Therefore, $\int_1^4 f(x)dx = -52 + 16 = -36$.

2. Use your graphing calculator to determine the area between the graphs of $f(x) = x$ and $f(x) = x^4$ between $x = 0$ and $x = 1$. Also sketch a graph of the region.

Solution: The area is $\int_0^1 (x - x^4)dx = 0.3$, according to MAPLE. The graph is below.



3. A forest fire covers 2000 acres at time $t = 0$. The fire is growing at a rate of $8\sqrt{t}$ acres per hour, where t is in hours. How many acres are covered 24 hours later?

Solution: There are $2000 + \int_0^{24} 8\sqrt{t}dt \approx 2627.1$ acres.