SOLUTIONS CHAPTER 16.2

MATH 132 - WI01

2. $y = \int(x^2 - x)\,dx = \frac{x^3}{3} - \frac{x^2}{2} + C$. Using $y(3) = 4 \to \frac{3^3}{3} - \frac{3^2}{2} + C = 4 \to C = -\frac{1}{2}$.
Thus $y = \frac{x^3}{3} - \frac{x^2}{2} - \frac{1}{2}$.

•

6. $y'' = x + 1 \to y' = \int(x+1)\,dx = \frac{x^2}{2} + x + C_1$.
Using $y'(0) = 0 \to 0 + 0 + C_1 = 0 \to C_1 = 0$.
Thus $y = \int[\frac{x^2}{2} + x]\,dx = \frac{1}{2}\int x^2\,dx + \int x\,dx = \frac{1}{2}\frac{x^3}{3} + \frac{x^2}{2} + C_2 = \frac{x^3}{6} + \frac{x^2}{2} + C_2$.
$y(0) = 5 \to 0 + 0 + C_2 = 5$, so $C_2 = 5$.
Thus $y = \frac{x^3}{6} + \frac{x^2}{2} + 5$.

•

12. $r' = 10000 - 2(2q + q^3)$, so $r = \int(10000 - 4q - 2q^3)\,dq = 10000q - 4\frac{q^2}{2} - 2\frac{q^4}{4} + C = 10000q - 2q^2 - \frac{q^4}{2} + C$.
When $q = 0 \to r = 0$, hence $0 - 0 - 0 + C = 0 \to C = 0 \to r = 10000q - 2q^2 - \frac{q^4}{4}$.
Therefore, the demand function is $p = \frac{r}{q} = 10000 - 2q - \frac{q^3}{2}$.

•

22. $f''(x) = 6x + 2 \to f'(x) = \int(6x+2)\,dx = 6\frac{x^2}{2} + 2x + C_1 = 3x^2 + 2x + C_1$.
From $f'(-1) = 5 \to 3(-1)^2 + 2(-1) + C_1 = 3 - 2 + C_1 = 1 + C_1 = 5 \to C_1 = 4$.
Thus $f'(x) = 3x^2 + 2x + 4$.
$f(x) = \int(3x^2 + 2x + 4)\,dx = 3\frac{x^3}{3} + 2\frac{x^2}{2} + 4x + C_2 = x^3 + x^2 + 4x + C_2$
Thus $f(1) - f(-1) = (1 + 1 + 4 + C_2) - (-1 + 1 - 4 + C_2) = 6 + C_2 - (-4) - C_2 = 6 + 4 = 10$.

•

Date: 02/23/2001.