Mathematics 122

Quiz #35 Name: Key

You must show your work to get full credit.

1. Compute the following antiderivatives (don't forget the $+c$).

(a) $\int \left(6x^3 + 12x^2 + 4x^2\right)\, dx$ $\frac{3}{2}x^4 + \frac{16x^3}{3} + C$

$= \frac{6x^4}{4} + \frac{12x^3}{3} + \frac{4x^3}{3} + C$

$= \frac{3}{2}x^4 + \frac{16x^3}{3} + C$

(b) $\int \left(6\sqrt{u} - \frac{4}{u^3}\right)\, du = \int (6u^{\frac{1}{2}} - 4u^{-3})\, du$ $= 4u^{\frac{3}{2}} + \frac{2}{u^2} + C$

$= 6\left(\frac{2}{3}\right)u^{\frac{3}{2}} - \frac{4u^{-2}}{(-2)} + C$

$= 4u^{3/2} + \frac{2}{u^2} + C$

2. Find the antiderivitive, $F(x)$, of $f(x) = 6x^2 - 12x$ with $F(1) = 10$.

$F(x) = 2x^3 - 6x^2 + C$

$F(x) = \int (6x^2 - 12x)\, dx$

$= \frac{6x^3}{3} - \frac{12x^2}{2} + C$

$= 2x^3 - 6x^2 + C$

To find C use

$F(1) = 2(1)^3 - 6(1)^2 + C = 10$

$2 - 6 + C = 10$

$C - 4 = 10$

$C = 14$