Ch. 23 - Board Problems

① $\int x^{-2}(x^3 - 2x^2)\,dx =$

② $\int \frac{2 - x}{\sqrt{x}} =$

③ Find the curve for which y" = 12x and which has a critical point at (1, -3)

Ch.23 - INTEGRATION FORMULAS

Integration Formulas

These integration formulas follow as an extension of our rules for differentiation

Fundamental Integration Formulas

1. $\int du = u + C$
2. $\int (du + dr + ... + dv) = \int du + \int dr + \int .... + \int dv$
3. $\int c\,du = c \int du$ where "c" is a constant
4. $\int u^n du = \frac{u^{n+1}}{n+1} + C \quad (n \neq -1)$
5. $\int \frac{du}{u} = \ln u + C$
6. $\int e^u du = e^u + C$
7. $\int \cos(u)\,du = \sin(u) + C$
8. $\int \sin(u)\,du = -\cos(u) + C$
9. $\int \sec^2(u)\,du = \tan(u) + C$
10. $\int \csc^2(u)\,du = -\cot(u) + C$
11. $\int \sec(u)\tan(u)\,du = \sec(u) + C$
12. $\int \csc(u)\cot(u)\,du = -\csc(u) + C$

EX. 1 USING SUBSTITUTION

$$\int 2 \cdot \cos(2x)\, dx$$

$u =$ $\quad \frac{du}{dx} =$ $\quad du =$

EX. 2 $$\int 3\sec(3x) \cdot \tan(3x)\, dx$$

EX. 3 $$\int \sec^2(2x)\, dx$$

Ex. 4 $\int 2x(1+x^2)^8\,dx$

Ex. 5 $\int x(1-x^2)^7\,dx$

Ex. 6 $\int e^{5x} \cdot dx$

Ex. 7 $\int \frac{\cos(2\theta)}{\sin^2(2\theta)} \cdot 5\, d\theta$

Ex. 8 $\int \frac{(x^2-1)^2}{x^2}$

Evaluate the following integrals. Check your answers by differentiation.

1. $\int (x-3)^{21}dx$

2. $\int x\sqrt{2x^2+1}\cdot dx$

3. $\int \frac{x^2}{\sqrt{1-x^3}}dx$

4. $\int (1+x^3)^3 3x^2 dx$

5. $\int \cos(2x-3)dx$

6. $\int \frac{\cos(\sqrt{\theta})d\theta}{\sqrt{\theta}}$

7. $\int \sqrt{\tan\theta}\ \sec^2(\theta)d\theta$

8. $\int e^{2x}(2-e^{2x})dx$

9. $\int \frac{dx}{1-x}$

10. $\int \frac{(x+1)dx}{\sqrt[3]{x^2+2x-1}}$