Lower 6 Chapter 13

Integration

Course Structure

1. Find y given $\frac{dy}{dx}$
2. Evaluate definite integrals, and hence the area under a curve.
3. Find areas bound between two different lines.

8 Integration	8.1	**Know and use the Fundamental Theorem of Calculus**	**Integration as the reverse process of differentiation. Students should know that for indefinite integrals a constant of integration is required.**
	8.2	**Integrate x^n (excluding $n = -1$) and related sums, differences and constant multiples.**	**For example, the ability to integrate expressions such as $\frac{1}{2}x^2 - 3x^{-\frac{1}{2}}$ and $\frac{(x+2)^2}{x^{\frac{1}{2}}}$ is expected. x** **Given $f'(x)$ and a point on the curve, Students should be able to find an equation of the curve in the form $y = f(x)$.**

8 Integration *continued*	8.3	**Evaluate definite integrals; use a definite integral to find the area under a curve** and the area between two curves	Students will be expected to be able to evaluate the area of a region bounded by a curve and given straight lines, or between two curves. This includes curves defined parametrically. For example, find the finite area bounded by the curve $y = 6x - x^2$ and the line $y = 2x$ Or find the finite area bounded by the curve $y = x^2 - 5x + 6$ and the curve $y = 4 - x^2$.

Integrating x^n terms

Integration is the **opposite of differentiation.**

Consider:

If $\frac{dy}{dx} = 3x^2$, what could $f(x)$?

Examples

Find y when:

1. $\frac{dy}{dx} = 4x^3$
2. $\frac{dy}{dx} = x^5$
3. $\frac{dy}{dx} = 3x^{\frac{1}{2}}$
4. $\frac{dy}{dx} = \frac{4}{\sqrt{x}}$

5. $\frac{dy}{dx} = 5x^{-2}$

6. $\frac{dy}{dx} = 4x^{\frac{2}{3}}$

7. $\frac{dy}{dx} = 10x^{-\frac{2}{7}}$

Test Your Understanding

Find $f(x)$ when:

$f'(x) = 2x + 7$

$f'(x) = x^2 - 1$

$f'(x) = \frac{2}{x^7}$

$f'(x) = \sqrt[3]{x} =$

$f'(x) = 33x^{\frac{5}{6}}$

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