



MATHS

BOOKS - IA MARON MATHS (HINGLISH)

BASIC CLASSES OF INTEGRABLE FUNCTIONS

5 1 Integration Of Rational Functions

1. Integration of rational functions

$$\int \frac{15x^2 - 4x - 81}{(x - 3)(x - 4)(x - 1)} dx.$$



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2. Integration of rational functions

$$I = \int \frac{x^4 dx}{(2 + x)(x^2 - 1)}$$



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3. Integration of rational functions

$$I = \int \frac{2x^2 - 3x + 3}{x^3 - 2x^2 + x} dx.$$



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4. Integration of rational functions

$$I = \int \frac{x^3 + 1}{x(x - 1)^3} dx.$$



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5. Integration of rational functions

$$I = \int \frac{x dx}{x^3 + 1}.$$



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6. Integration of rational functions

$$I = \int \frac{dx}{(x^2 + 1)(x^2 + 4)}$$



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7. Integration of rational functions

$$I = \int \frac{(x + 1)dx}{(x^2 + x + 2)(x^2 + 4x + 5)}$$



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8. Integration of rational functions

$$\int \frac{5x^3 + 9x^2 - 22x - 8}{x^3 - 4x} dx$$



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9. Integration of rational functions

$$\int \frac{dx}{(x + 1)(x + 2)^2(x - 3)^3}$$



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10. Integration of rational functions

$$\int \frac{dx}{(x^2 - 4x + 4)(x^2 - 4x + 5)}$$



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11. Integration of rational functions

$$\int \frac{dx}{(1+x)(1+x^2)(1+x^3)}.$$



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12. Integration of rational functions

$$\int \frac{x^3 + 3}{(x+1)(x^2+1)} dx.$$



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1. Integration of certain irrational expressions

$$I = \int \frac{\sqrt{x} + 3\sqrt{x}}{4\sqrt{x^5} - 6\sqrt{x^7}} dx.$$

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2. Integration of certain irrational expressions

$$I = \int \frac{dx}{x \left(2 + 3\sqrt{\frac{x-1}{x}} \right)}.$$

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3. Integration of certain irrational expressions

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



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4. Integration of certain irrational expressions

$$\int \frac{dx}{3\sqrt{(x+1)^2(x-1)^4}}.$$



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5. Integration of certain irrational expressions

$$\int (x - 2) \sqrt{\frac{1 + x}{1 - x}} dx.$$



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5 4 Questions

$$1. I = \int \frac{(x + 3) dx}{\sqrt{4x^2 + 4x - 3}}.$$



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$$2. I = \int \frac{5x + 4}{x^2 + 2x + 5} dx.$$



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$$3. I = \int \frac{x^3 - x - 1}{x^2 + 2x + 5} dx.$$



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$$4. I = \int \sqrt{4x^2 - 4x + 3} dx$$



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5. $\int \frac{9x^3 - 3x^2 + 2}{\sqrt{3x^2 - 2x + 1}} dx.$

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

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7. $\int \frac{x^3 - 6x^2 + 11x - 6}{\sqrt{x^2 + 4x + 3}} dx.$

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8.
$$\int \frac{3x^3 + 5x^2 - 7x + 9}{\sqrt{2x^2 + 5x + 7}} dx.$$

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9.
$$\int \frac{dx}{(x + 1)^5 \sqrt{x^2 + 2x}}.$$

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10.
$$\int \frac{x dx}{(x^2 - 3x + 2)\sqrt{x^2 - 4x + 3}}.$$

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11.
$$\frac{dx}{(x + 1)^3 \sqrt{x^2 + 3x + 2}}$$



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12.
$$\int \frac{(x^2 - 1) dx}{x \sqrt{1 + 3x^2 + x^4}}$$



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5 5 Integration Of A Binomial Differential

1. Integration of a binomial differential

$$I = \int \sqrt{x} (2 + \sqrt{x})^2 dx.$$



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2. Integration of a binomial differential

$$\int x^{-\frac{2}{3}} \left(1 + x^{\frac{2}{3}}\right)^{-1} dx.$$



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3. Evaluate $\int \frac{\sqrt{1 + \sqrt[3]{x}}}{\sqrt[3]{x^2}} dx.$



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4. Integration of a binomial differential

$$I = \int x^5 (1 + x^3)^{\frac{2}{3}} dx.$$



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5. Integration of a binomial differential

$$\int 3 \frac{\sqrt{1 + 4\sqrt{x}}}{\sqrt{x}} dx.$$



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6. Integration of a binomial differential

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



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7. Integration of a binomial differential

$$\int x^3(1 + x^2)^{\frac{1}{2}} dx.$$



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8. Integration of a binomial differential

$$\int \frac{dx}{x^4 \sqrt{1+x^2}}.$$



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9. Integration of a binomial differential

$$\int \sqrt[3]{x^7} \sqrt{1 + \sqrt[3]{x^4}} dx.$$



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10. Integration of a binomial differential

$$\int \frac{dx}{x^3 5 \sqrt{1 + \frac{1}{x}}}.$$



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5 6 Integration Of Trigonometric And Hyperbolic Functions

1. Integration of trigonometric and hyperbolic functions

$$\int \frac{\sin^3 x}{\sqrt[3]{\cos^2 x}} dx.$$



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2. Integration of trigonometric and hyperbolic functions

$$I = \int \frac{\cos^3 x}{\sin^6 x} dx.$$



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3. Integration of trigonometric and hyperbolic functions

$$I = \int \frac{\sin^2 x}{\cos^6 x} dx.$$



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4. Integration of trigonometric and hyperbolic functions

$$I = \int \frac{dx}{\cos^4 x}.$$



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5. Integration of trigonometric and hyperbolic functions

Find the integrals of $\tan x$ and $\cot x$.



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6. Integration of trigonometric and hyperbolic functions

$$\int \tan^7 x dx.$$



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7. Integration of trigonometric and hyperbolic functions

(a) $I = \int \cot^6 x dx,$

(b) $I = \int \tan^3 x dx.$



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8. Integration of trigonometric and hyperbolic functions

$$I = \int \frac{\sin^4 x}{\cos x} dx.$$



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9. Integration of trigonometric and hyperbolic functions

$$I = \int \frac{dx}{\sin x (2 + \cos x - 2 \sin x)}.$$



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10. Integration of trigonometric and hyperbolic functions

$$I = \int \frac{dx}{5 + \sin x + 3 \cos x}.$$



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11. Integration of trigonometric and hyperbolic functions

$$I = \int \frac{2 \tan x + 3}{\sin^2 x + 2 \cos^2 x} dx.$$



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12. Integration of trigonometric and hyperbolic functions

$$I = \int \cosh^2 x dx.$$



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13. Integration of trigonometric and hyperbolic functions

$$I = \int \cosh^3 x dx.$$



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14. Integration of trigonometric and hyperbolic functions

(a) $\int \sinh^2 x \cosh^2 x dx,$

(b) $\int \frac{dx}{\sinh x + 2 \cosh x}.$



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5 7 Integration Of Certain Irrational Functions With The Aid Of Trigonometric Or Hyperbolic Substitutions

1. Integration of certain irrational functions with the aid of trigonometric or hyperbolic substitutions

$$I = \int x^2 \sqrt{x^2 - 1} dx.$$



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2. Integration of certain irrational functions with the aid of trigonometric or hyperbolic substitutions

$$I = \int \frac{\sqrt{x^2 + 1}}{x^2} dx.$$





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3. Integration of certain irrational functions with the aid of trigonometric or hyperbolic substitutions

$$I = \int \frac{dx}{(1 + \sqrt{x}) \sqrt{x - x^2}}.$$



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5. Integration of certain irrational functions with the aid of trigonometric or hyperbolic substitutions

$$I = \int \frac{dx}{(x^2 - 2x + 5)^{\frac{3}{2}}}.$$



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5 8 Integration Of Other Transcendental Functions

1. Integration of other transcendental functions

$$I = \int \frac{\ln x dx}{\sqrt{1-x}}$$



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2. Integration of other transcendental functions

$$I = \int \frac{e^x dx}{(1 + e^{2x})^2}$$



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3. Integration of other transcendental functions

$$I = \int e^{-x} \ln(e^x + 1) dx.$$



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4. Integration of other transcendental functions

$$I = \int \frac{e^{\alpha \arctan x}}{(1 + x^2)^{\frac{3}{2}}} dx.$$



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5. Integration of other transcendental functions

$$I = \int \frac{x \arctan x dx}{\sqrt{1+x^2}}.$$



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