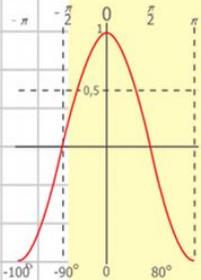
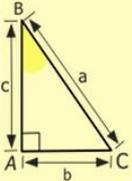
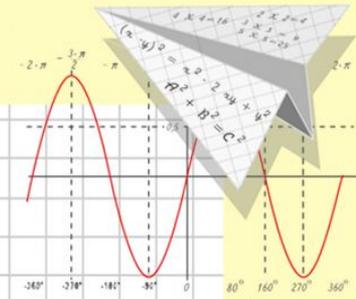
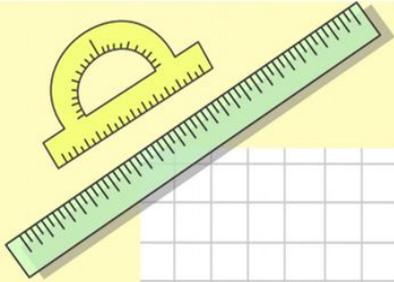


Математик

а

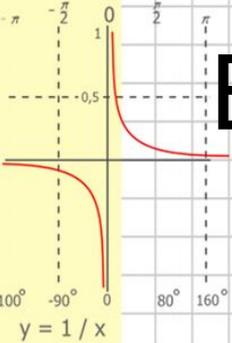
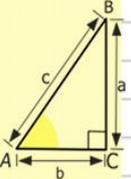
Занятие 107.

Вычисление неопределенных интегралов



$y = \cos x$

- $2 \times 2 = 4$
- $3 \times 3 = 9$
- $4 \times 4 = 16$
- $5 \times 5 = 25$
- $6 \times 6 = 36$
- $7 \times 7 = 49$
- $8 \times 8 = 64$



$$\begin{array}{r} 2500 \\ \times 42 \\ \hline 210 \\ + 84 \\ \hline 10500 \end{array}$$



$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

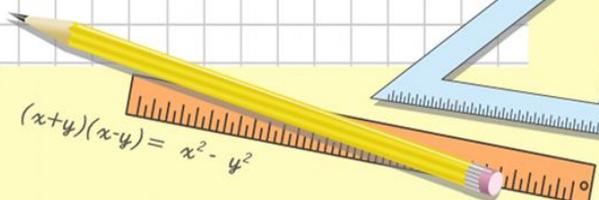
$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$



$$\sin 90^\circ = 1$$



$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \\ y = 1 \\ x = 25 + 45 \\ \hline x = 70 \end{cases}$$



$$(x+y)(x-y) = x^2 - y^2$$

Вычисление неопределенных интегралов

Основное свойство дроби

$$\frac{x + y}{z} = \frac{x}{z} + \frac{y}{z}$$

$$\frac{x + 5}{x^2} = \frac{x}{x^2} + \frac{5}{x^2} = \frac{1}{x} + 5x^{-2}$$

$$\begin{aligned} \frac{2x^5 - 3x - 2}{x^3} &= \frac{2x^5}{x^3} - \frac{3x}{x^3} - \frac{2}{x^3} = 2x^2 - \frac{3}{x^2} - \frac{2}{x^3} = \\ &= 2x^2 - 3x^{-2} - 2x^{-3} \end{aligned}$$

$$\frac{a}{A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

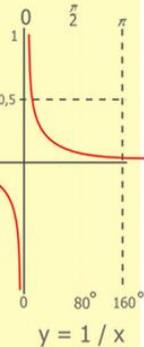
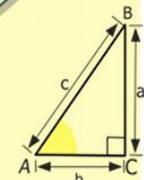
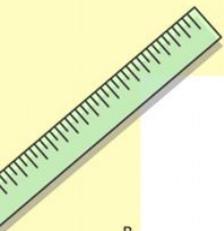
$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$

$$\sin 90^\circ = 1$$

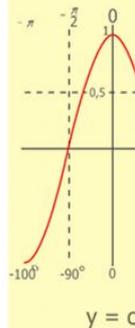
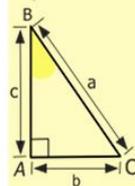
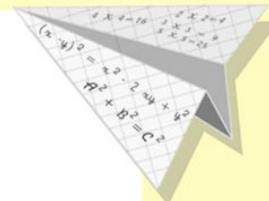
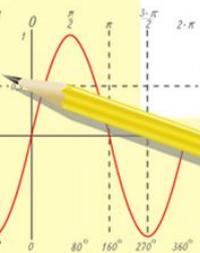
$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

$$\begin{cases} y = 1 \\ x = 25 + 45 \end{cases}$$

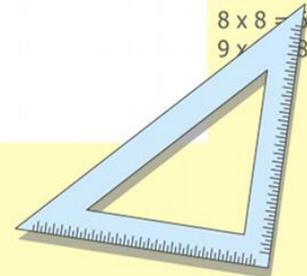
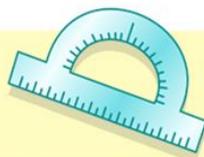
$$\frac{x}{70} \quad (x+y)(x-y) = x^2 - y^2$$



$$\begin{array}{r} 2500 \\ \times 42 \\ \hline 210 \\ + 84 \\ \hline 10500 \end{array}$$



- 2 x 2 = 4
- 3 x 3 = 9
- 4 x 4 = 16
- 5 x 5 = 25
- 6 x 6 = 36
- 7 x 7 = 49
- 8 x 8 = 64
- 9 x 9 = 81



Вычисление неопределенных интегралов

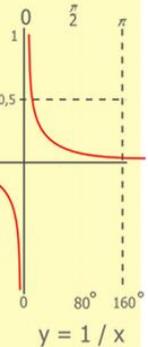
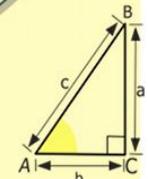
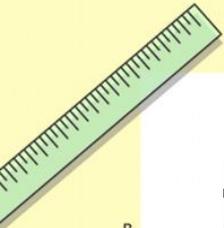
$$\int \frac{8x+1}{x^2} dx = \left| \frac{8x+1}{x^2} = \frac{8x}{x^2} + \frac{1}{x^2} = \frac{8}{x} + x^{-2} \right| = 8 \int \frac{1}{x} dx + \int x^{-2} dx =$$

$$= 8 \ln|x| + \frac{x^{-1}}{-1} + C = 8 \ln|x| - \frac{1}{x} + C$$

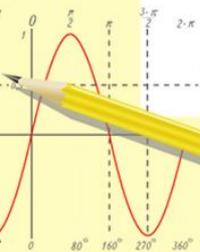
$$\int \frac{x^2 - 6x + 10}{5x} dx = \left| \frac{x^2 - 6x + 10}{5x} = \frac{x^2}{5x} - \frac{6x}{5x} + \frac{10}{5x} = \frac{1}{5}x - \frac{6}{5} + \frac{2}{x} \right| =$$

$$= \frac{1}{5} \int x dx - \int \frac{6}{5} dx + 2 \int \frac{1}{x} dx = \frac{1}{5} * \frac{x^2}{2} - \frac{6}{5}x + 2 \ln|x| + C =$$

$$= \frac{x^2}{10} - \frac{6}{5}x + 2 \ln|x| + C$$



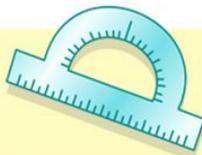
$$\begin{array}{r} 12500 \\ \times 42 \\ \hline 210 \\ + 84 \\ \hline 105000 \end{array}$$



$$\frac{a}{A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$

$$\sin 90^\circ = 1$$

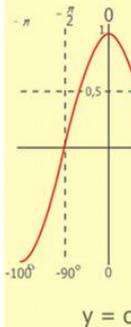
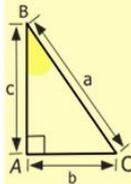
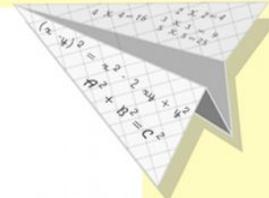


$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

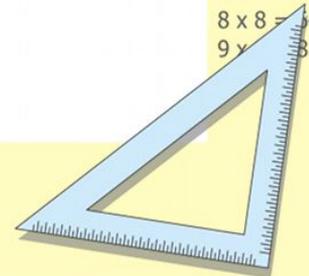
$$\begin{cases} y = 1 \\ x = 25 + 45 \end{cases}$$

$$x = 70$$

$$(x+y)(x-y) = x^2 - y^2$$



$$\begin{array}{l} 2 \times 2 = 4 \\ 3 \times 3 = 9 \\ 4 \times 4 = 16 \\ 5 \times 5 = 25 \\ 6 \times 6 = 36 \\ 7 \times 7 = 49 \\ 8 \times 8 = 64 \\ 9 \times 9 = 81 \end{array}$$



Вычисление неопределенных интегралов

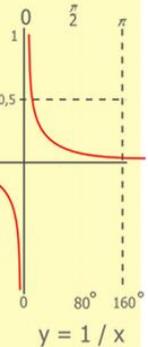
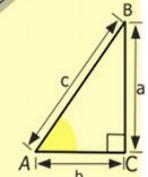
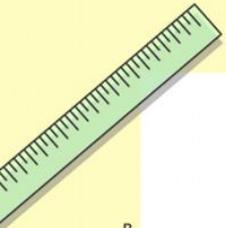
$$\int \frac{4\sqrt{x} - 9x}{\sqrt{x}} dx = \left| \frac{4\sqrt{x} - 9x}{\sqrt{x}} = \frac{4\sqrt{x}}{\sqrt{x}} - \frac{9x}{\sqrt{x}} = 4 - 9\sqrt{x} \right| =$$

$$= \int 4 dx - 9 \int \sqrt{x} dx = 4x - 9 * \frac{2}{3} \sqrt{x^3} + C = 4x - 6\sqrt{x^3} + C$$

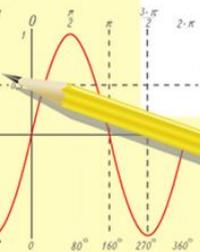
$$\int \frac{3\sqrt{x} + 4\sqrt[3]{x}}{\sqrt[4]{x}} dx = \left| \frac{3x^{\frac{1}{2}} + 4x^{\frac{1}{3}}}{x^{\frac{1}{4}}} = \frac{3x^{\frac{1}{2}}}{x^{\frac{1}{4}}} + \frac{4x^{\frac{1}{3}}}{x^{\frac{1}{4}}} = 3x^{\frac{1}{2}-\frac{1}{4}} + 4x^{\frac{1}{3}-\frac{1}{4}} = 3x^{\frac{1}{4}} + 4x^{\frac{1}{12}} \right| =$$

$$= 3 \int x^{\frac{1}{4}} dx + 4 \int x^{\frac{1}{12}} dx = 3 * \frac{x^{\frac{5}{4}}}{5/4} + 4 * \frac{x^{\frac{13}{12}}}{13/12} =$$

$$= 3 * \frac{4}{5} x^{\frac{5}{4}} + 4 * \frac{12}{13} x^{\frac{13}{12}} + C = \frac{12}{5} \sqrt[4]{x^5} + \frac{48}{13} \sqrt[12]{x^{13}} + C$$



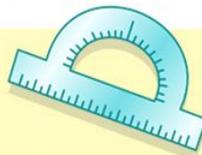
$$\begin{array}{r} 12500 \\ \times 42 \\ \hline 210 \\ + 84 \\ \hline 105000 \end{array}$$



$$\frac{a}{A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$

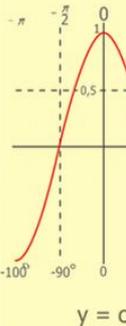
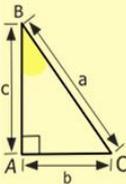
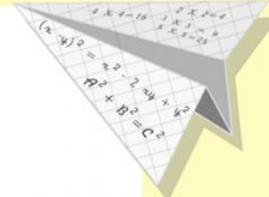
$$\sin 90^\circ = 1$$



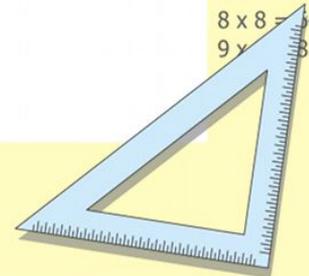
$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

$$\begin{cases} y = 1 \\ x = 25 + 45 \\ \hline x = 70 \end{cases}$$

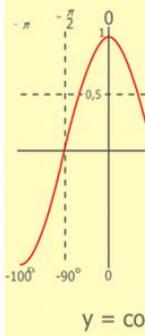
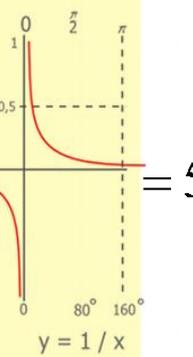
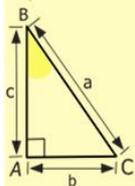
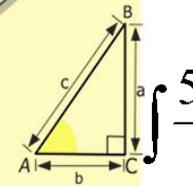
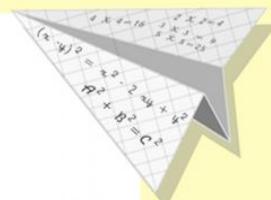
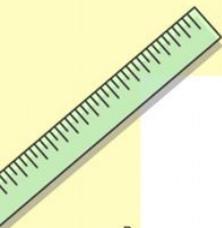
$$(x+y)(x-y) = x^2 - y^2$$



$$\begin{array}{l} 2 \times 2 = 4 \\ 3 \times 3 = 9 \\ 4 \times 4 = 16 \\ 5 \times 5 = 25 \\ 6 \times 6 = 36 \\ 7 \times 7 = 49 \\ 8 \times 8 = 64 \\ 9 \times 9 = 81 \end{array}$$

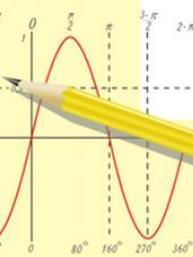


Вычисление неопределенных интегралов



$$\begin{array}{r} 1 \\ \times 2500 \\ \times 42 \\ \hline 210 \\ + 84 \\ \hline 105000 \end{array}$$

$2 \times 2 = 4$
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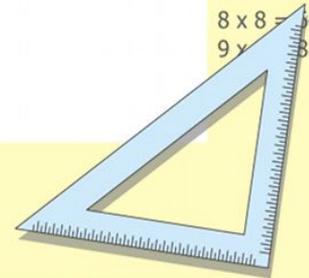
$$\sin 90^\circ = 1$$



$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

$$\begin{cases} y = 1 \\ x = 25 + 45 \\ \hline x = 70 \end{cases}$$

$$(x+y)(x-y) = x^2 - y^2$$



$$\int \frac{5e^{4x} + 3e^{2x} + 2}{e^{3x}} dx = \left| \frac{5e^{4x} + 3e^{2x} + 2}{e^{3x}} = \frac{5e^{4x}}{e^{3x}} + \frac{3e^{2x}}{e^{3x}} + \frac{2}{e^{3x}} = 5e^x + 3e^{-x} + 2e^{-3x} \right| =$$

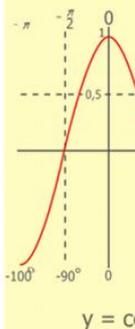
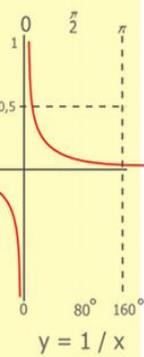
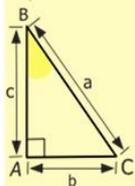
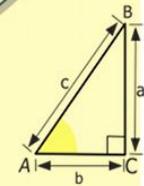
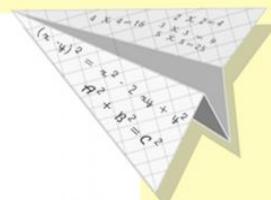
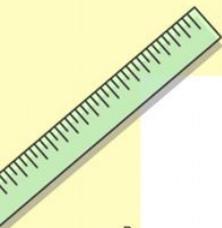
$$= 5 \int e^x dx + 3 \int e^{-x} dx + 2 \int e^{-3x} dx = \left| \begin{array}{l} 1) \int e^{-x} dx = \left| \begin{array}{l} kx + b = -x, k = -1 \\ f(t) = e^t \Rightarrow F(t) = e^t \end{array} \right| = -e^{-x} \\ 2) \int e^{-3x} dx = \left| \begin{array}{l} kx + b = -3x, k = -3 \\ f(t) = e^t \Rightarrow F(t) = e^t \end{array} \right| = -\frac{1}{3} e^{-3x} \end{array} \right| =$$

$$= 5e^x + 3 * (-e^{-x}) + 2 * \left(-\frac{1}{3} * e^{-3x} \right) + C = 5e^x - \frac{3}{e^x} - \frac{2}{3e^{3x}} + C$$

Вычисление неопределенных интегралов

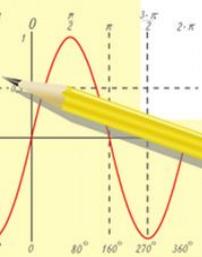
$$\int x^3 \cdot \sqrt[5]{x^2} dx = \left| x^3 \cdot \sqrt[5]{x^2} = x^3 \cdot x^{\frac{2}{5}} = x^{3+\frac{2}{5}} = x^{\frac{17}{5}} \right| =$$

$$= \int x^{\frac{17}{5}} dx = \frac{x^{\frac{22}{5}}}{22/5} + C = \frac{5}{22} x^{\frac{22}{5}} + C = \frac{5}{22} \sqrt[5]{x^{22}} + C$$



$$\begin{array}{r} \frac{1}{2} 500 \\ \times 42 \\ \hline 210 \\ + 84 \\ \hline 10500 \end{array}$$

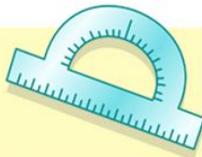
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