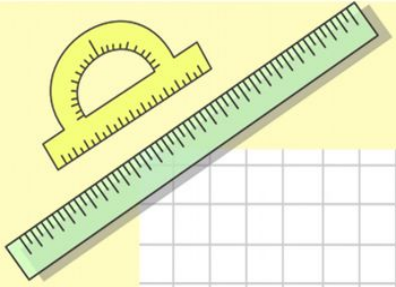
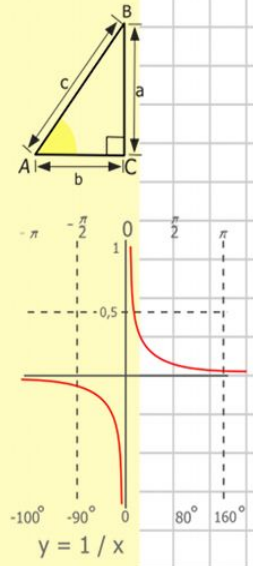
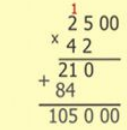
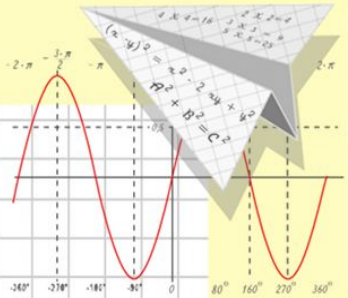
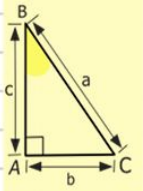
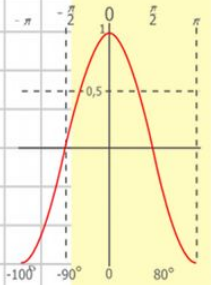
Математик
а

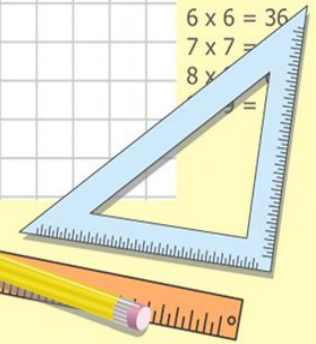
Натуральные логарифмы

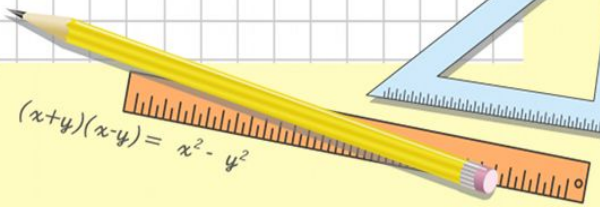
Расширить понятие логарифма, для этого введя понятие натурального логарифма, выяснить взаимное расположение графиков функции натурального логарифма и показательной, научиться использовать свойства для вычисления натуральных логарифмов

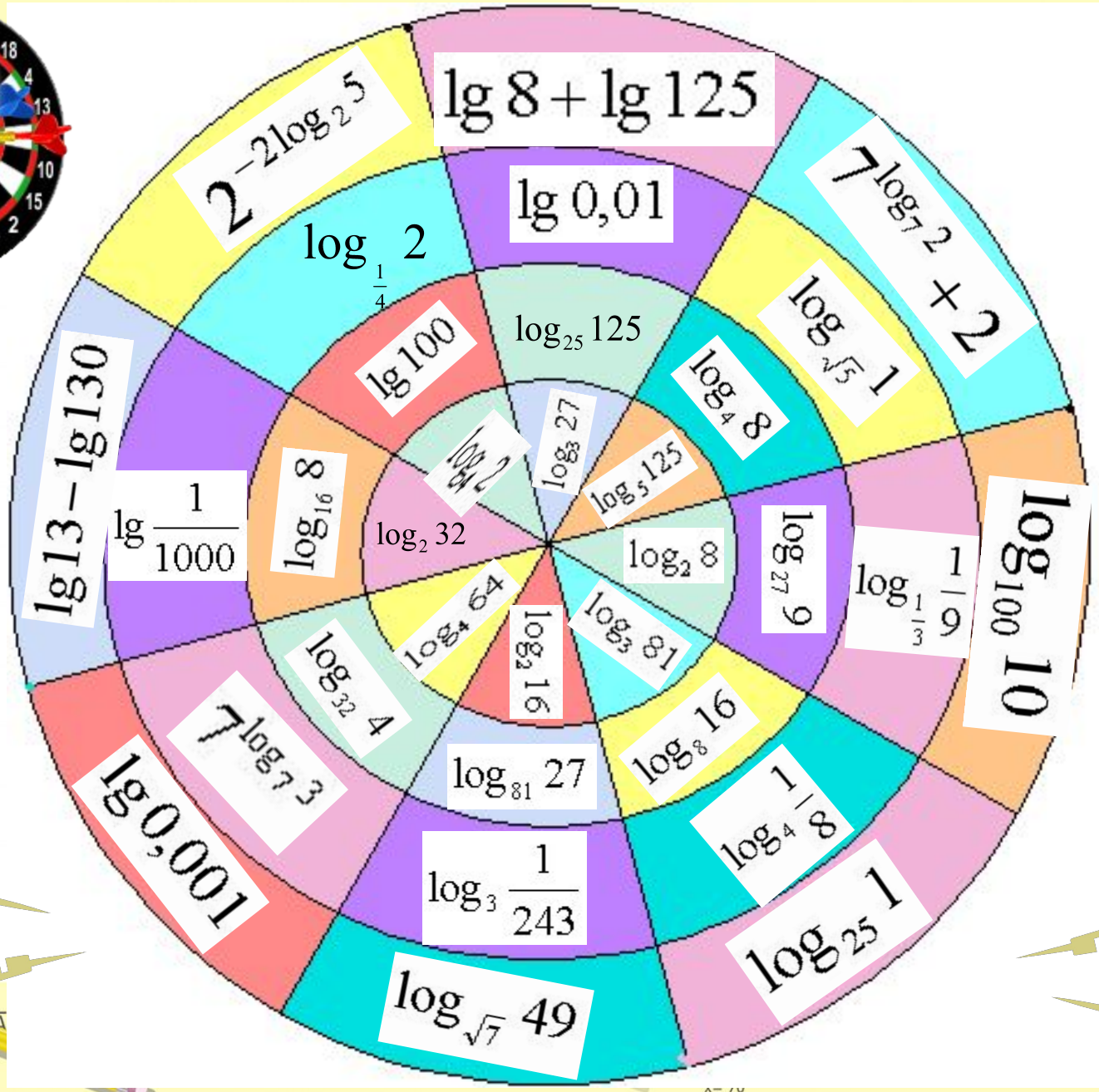


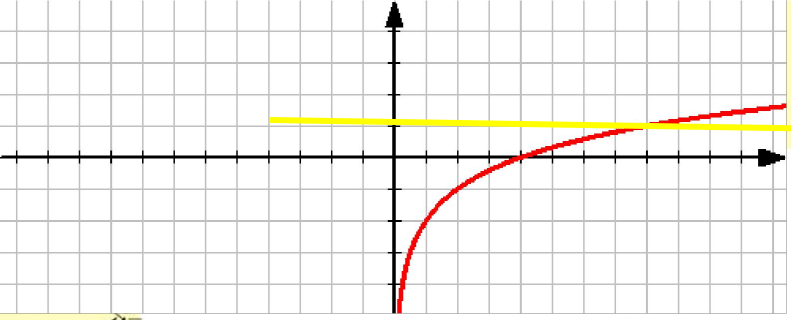




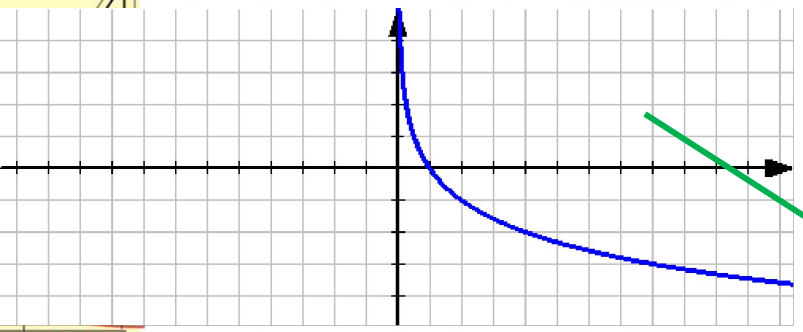
«Логарифмический дартс»



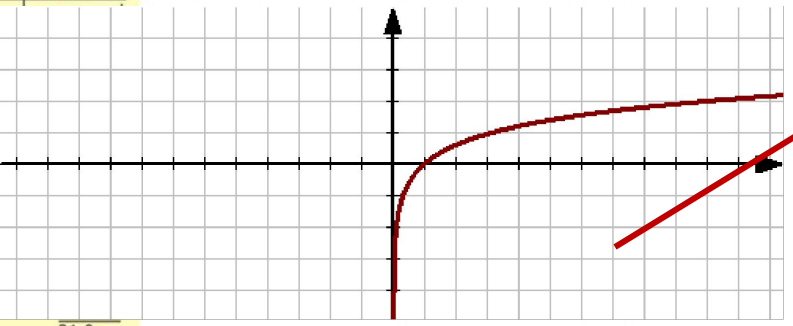
1	$\log_5 5^7$	-2	11	$\lg 1$	7
2	$\log_{11} x = 2$	4	12	$\log_x 7 = 1$	2
3	$\log_{\frac{1}{2}} 4$	4	13	$\log_2 16 = x$	4
4	$\log_5 x = -3$	0,1	14	$\log_7 7^4$	0
5	$\lg 1000$	7	15	$\log_{\frac{1}{5}} 3125$	4
6	$\log_2 x = 2$	121	16	$\log_x \frac{1}{343} = 3$	4
7	$\lg x = -1$	3	17	$\log_6 x = -2$	-5
8	$\log_x 4 = 1$	-4	18	$\log_7 49$	$\frac{1}{36}$
9	$\log_5 \frac{1}{625}$	0,04	19	$\log_x 256 = 4$	-5
10	$\log_{0.2} x = 2$	$\frac{1}{125}$			



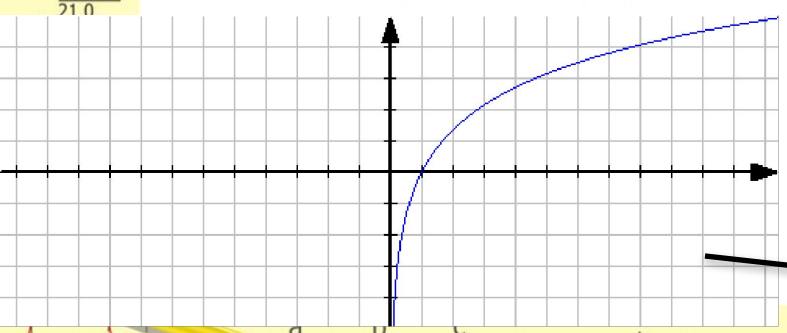
$$y = \log_2 x - 2$$



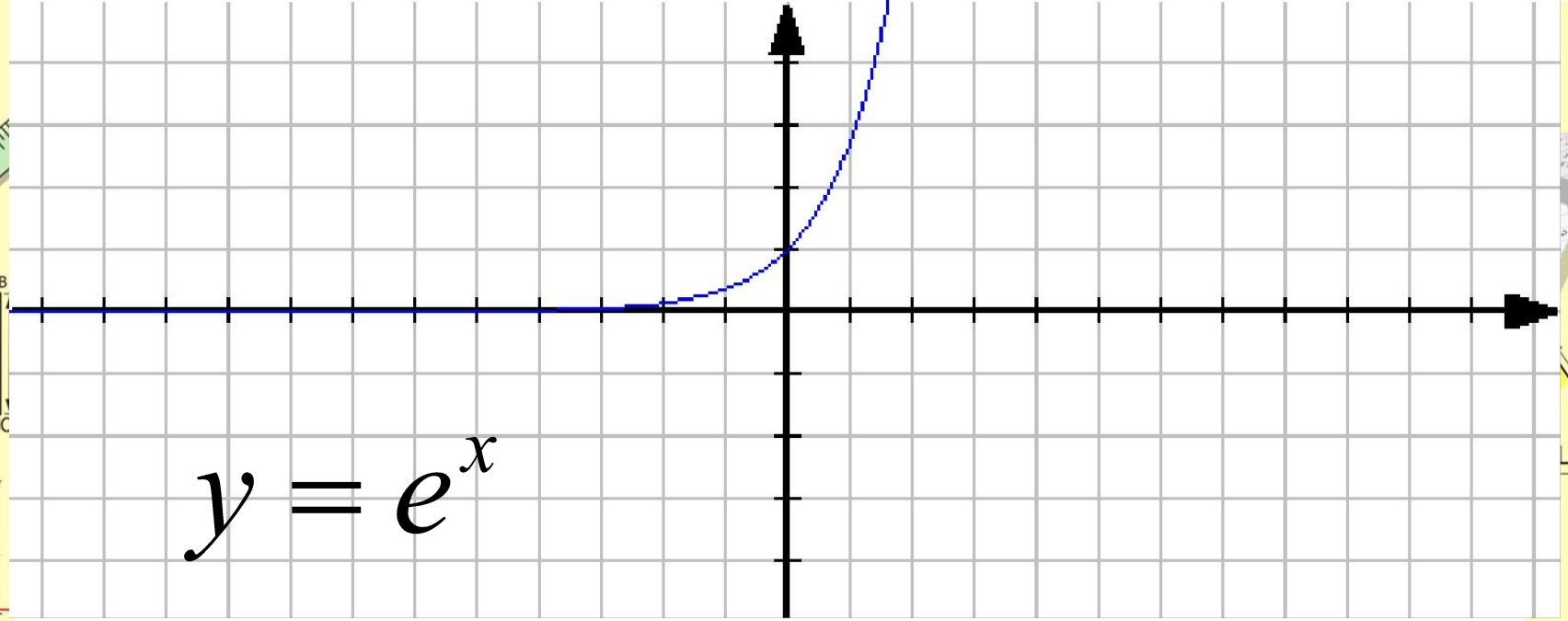
$$y = \lg x$$



$$y = \log_{\frac{1}{2}} x$$



$$y = -\log_{0,6} x$$



Не является ни четной, ни нечетной;

$$D(f) = (-\infty;+\infty)$$

Возрастает;

Не ограничена сверху, ограничена снизу

Не имеет наименьшего, наибольшего значений;

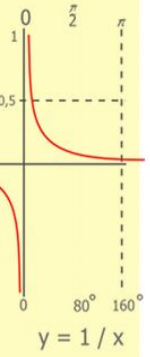
непрерывна

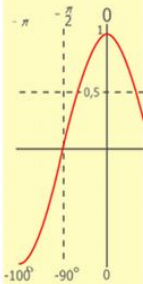
Выпукла вниз

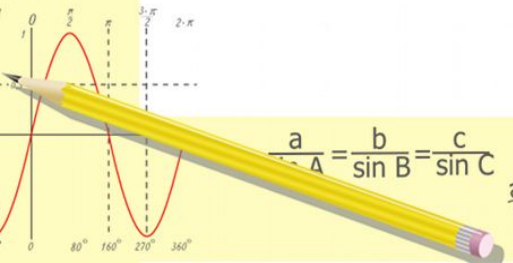
$$E(f) = (-\infty;+\infty)$$

Дифференцируема

Функция	Производная
$y = 2e^x$	$y = 2e^x$
$y = e^{2x}$	$y = 2e^{2x}$
$y = e^x - x$	$y = e^x - 1$
$y = e^{3x} - x^2$	$y = 3e^{3x} - 2x$
$y = \left(\frac{1}{e}\right)^x$	$y = -e^x$







$$\int e^x dx = e^x + C$$

x^n $\quad \frac{x^{n+1}}{n+1}$

cos x $\quad$ -sin x

sin x $\quad$ cos x

$\frac{1}{x^2}$ $\quad -\frac{1}{x}$

$\frac{1}{\sqrt{x}}$ $\quad 2\sqrt{x};(x>0)$

y= f(kx+b) $\quad y = \frac{1}{k}F(kx+b)$

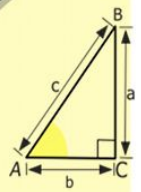
$\frac{1}{\sin^2 x}$ $\quad$ -ctg x

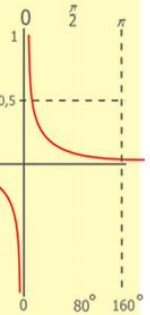
y=f(x)+g(x) $\quad$ Y=F(x)+G(x)

$\frac{1}{\cos^2 x}$ $\quad$ tg x

y=kf(x) $\quad$ Y=kF(x)

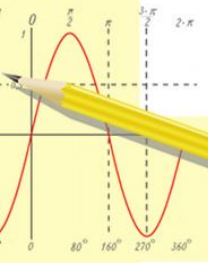
$$=F(b) - F(a).$$





y = 1 / x

$$\begin{array}{r} 2\,5\,00 \\ \times\ 4\,2 \\ \hline 21\,0 \\ +\ 84 \\ \hline 105\,0\,00 \end{array}$$



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

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

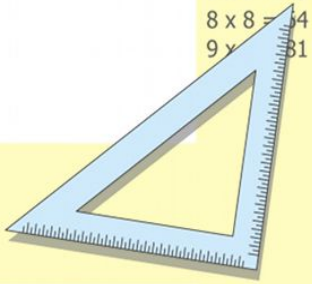
$$\sin 90° = 1$$

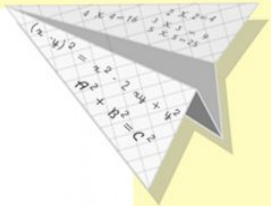
$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

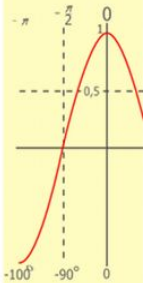
$$\begin{cases} y = 1 \\ x = 25 + 45 \end{cases}$$

$$x = 70$$

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







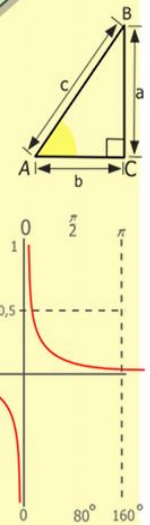
y = co

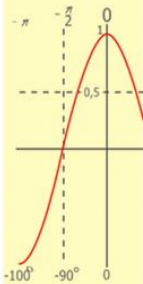
2 x 2 = 4
3 x 3 = 9
4 x 4 = 16
5 x 5 = 25
6 x 6 = 36
7 x 7 = 49
8 x 8 = 64
9 x 9 = 81

$$\int 3e^x dx$$

$$3e^x + C$$

$$\int \frac{dx}{x^2}$$





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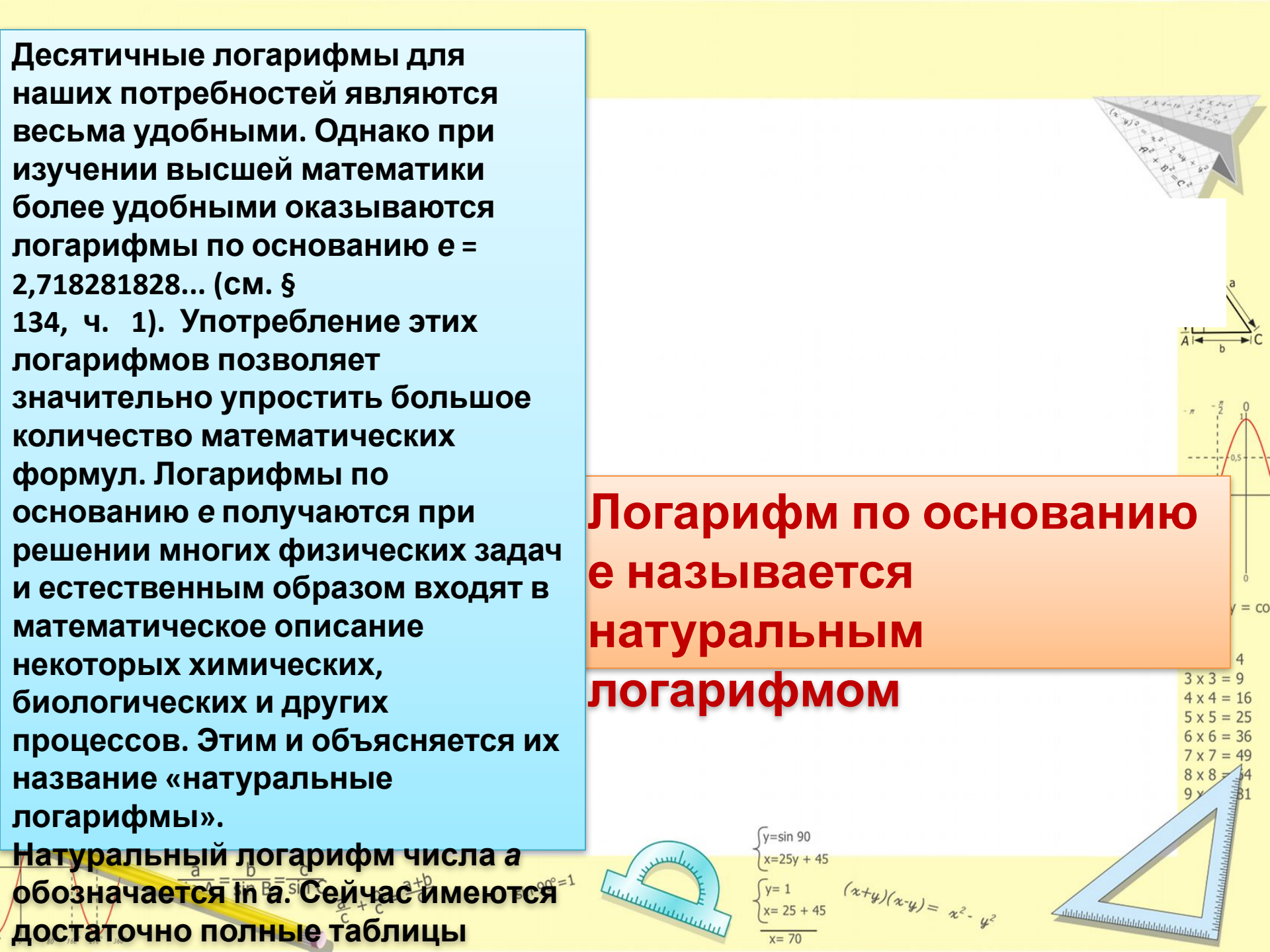
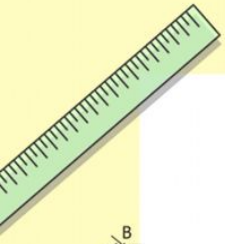
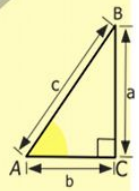
Десятичные логарифмы для наших потребностей являются весьма удобными. Однако при изучении высшей математики более удобными оказываются логарифмы по основанию *e* = 2,718281828... (см. § 134, ч. 1). Употребление этих логарифмов позволяет значительно упростить большое количество математических формул. Логарифмы по основанию *e* получаются при решении многих физических задач и естественным образом входят в математическое описание некоторых химических, биологических и других процессов. Этим и объясняется их название «натуральные логарифмы».

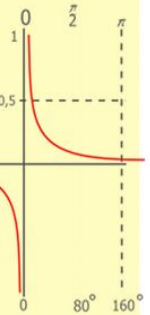
Натуральный логарифм числа *a* обозначается ln *a*. Сейчас имеются достаточно полные таблицы

Логарифм по основанию *e* называется натуральным логарифмом









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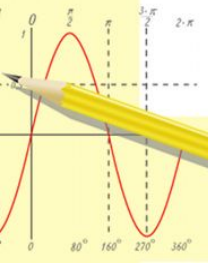
$$\begin{array}{r} {\scriptstyle 1\ \ 1} \\ 2\,5\,00 \\ \times\ 4\,2 \\ \hline 21\,0 \\ +\ 84 \\ \hline 105\,0\,00 \end{array}$$



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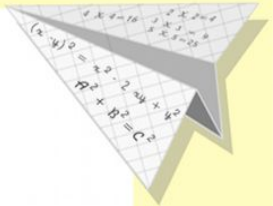

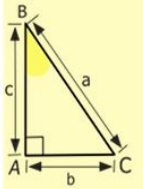

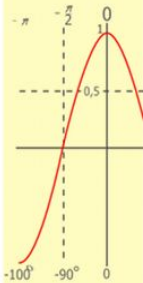

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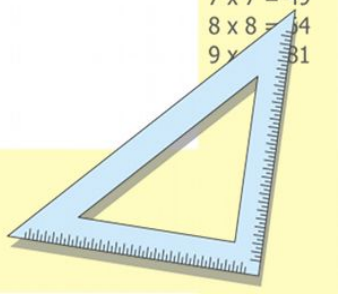
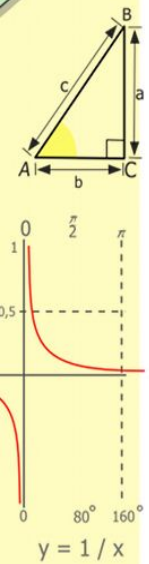
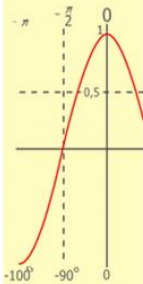


Функция вида y=lnx, свойства и график





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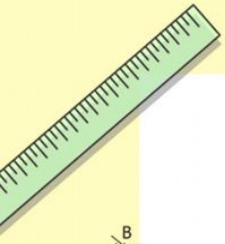

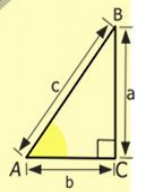

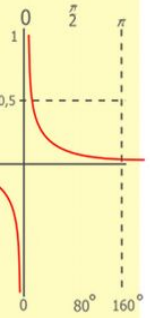

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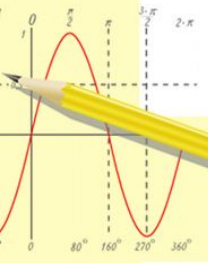

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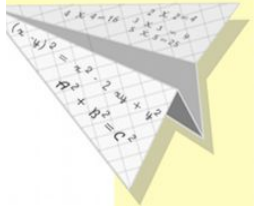

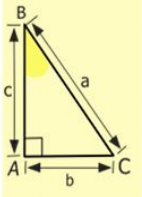

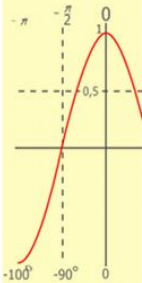

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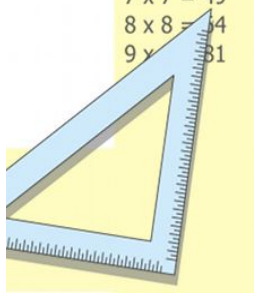
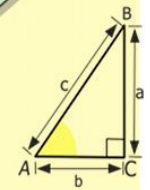
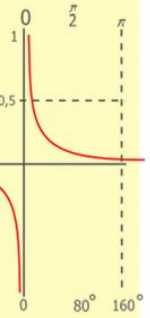
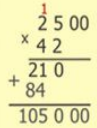
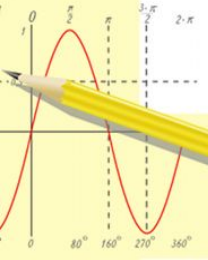
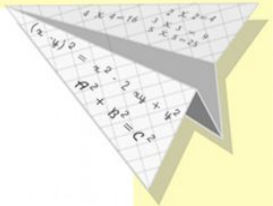


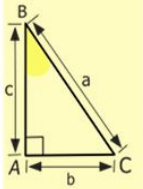


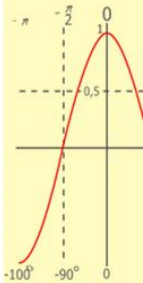


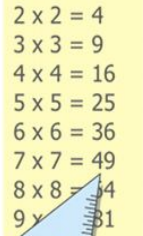


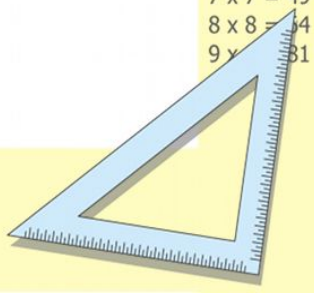






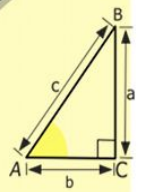


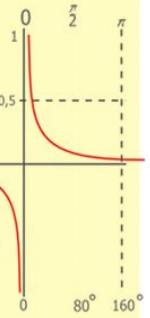




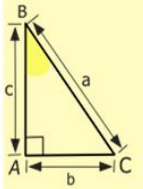
1633, 1634, 1635, 1636(а,б)
Дома: в,г

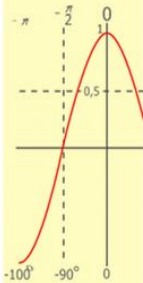
№1633





y = 1 / x

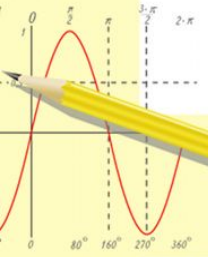




y = co

$$\begin{array}{r} {\scriptstyle 1}\\ 2\,5\,00 \\ \times\ 4\,2 \\ \hline 21\,0 \\ +\ 84 \\ \hline 105\,0\,00 \end{array}$$

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



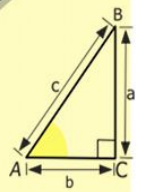
$\frac{a}{\sin A} = \frac{b}{\sin B} =$

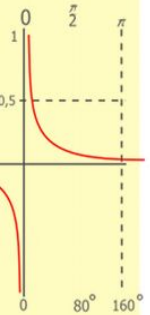
$\frac{a}{c} + \frac{}{c} -$

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

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

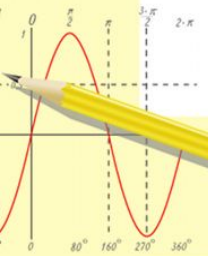
№1634





y = 1 / x

$$\begin{array}{r} {\scriptstyle 1\ \ \ \ \ \ } \\ 2\,5\,00 \\ \times\ 4\,2 \\ \hline 21\,0 \\ +\ 84 \\ \hline 105\,0\,00 \end{array}$$



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

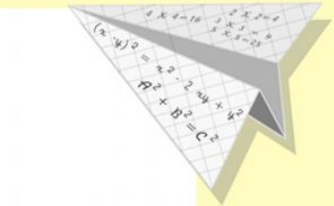
$$\frac{a}{c}+\frac{b}{c}=\frac{a+b}{c}$$

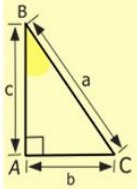
$\sin 90^\circ = 1$

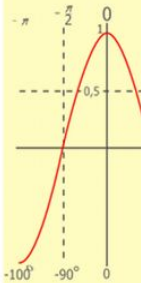
$$\begin{cases} x = 25y + 45 \\ y = 1 \\ x = 25 + 45 \end{cases}$$

$x = 70$

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

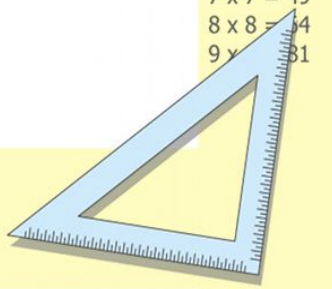




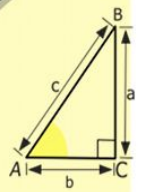


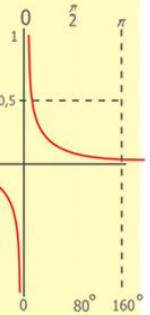
y = co

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



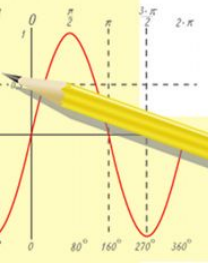
№1635





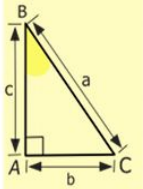
y = 1 / x

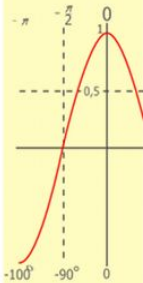
$$\begin{array}{r} {\scriptstyle 1\ \ \ \ \ \ } \\ 2\,5\,00 \\ \times\ 4\,2 \\ \hline 21\,0 \\ +\ 84 \\ \hline 105\,0\,00 \end{array}$$



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

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





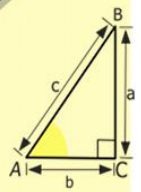
y = co

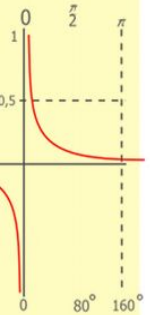
2 x 2 = 4
3 x 3 = 9
4 x 4 = 16
5 x 5 = 25
6 x 6 = 36
7 x 7 = 49
8 x 8 = 64
9 x 9 = 81

$$\begin{array}{l} x = 25 + 45 \\ \hline x = 70 \end{array}$$

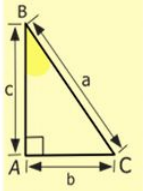
$$(x-y)^2 = x^2 - y^2$$

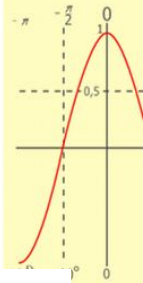
№1636





y = 1 / x

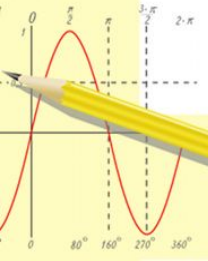




y = co

$$\begin{array}{r} {\scriptstyle 1}\\ 2\,5\,00 \\ \times\ 4\,2 \\ \hline 2\,1\,0 \\ +\ 8\,4 \\ \hline 1\,0\,5\,0\,0 \end{array}$$

= 4
= 9
= 16
= 25
= 36
= 49



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

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

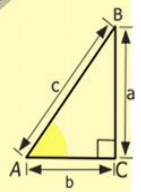
$\sin 90° = 1$

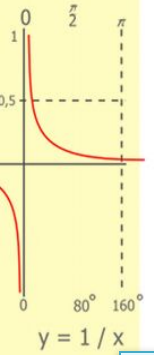
$\begin{cases} y = 1 \\ x = 25 + 45 \end{cases}$

$x = 70$

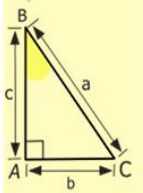
$(x+y)(x-y) = x^2 - y^2$

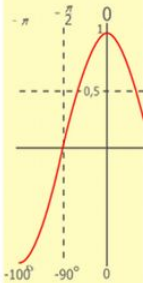
Составить уравнение касательной к графику функции y=lnx в точке x=e



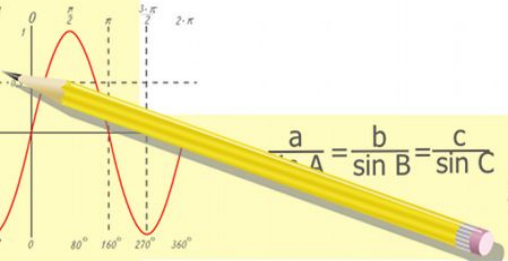


№1623,1637,1641 (а,б)
в,г - дома





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



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

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

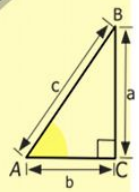
$\sin 90° = 1$

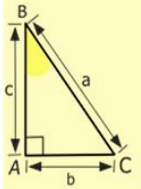
$\begin{cases} y = 1 \\ x = 25 + 45 \end{cases}$

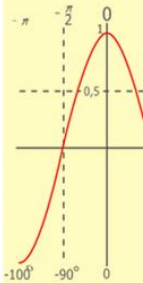
$x = 70$

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

№1642, 1643





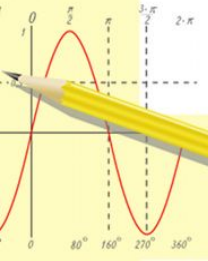


y = co

y =

$$\begin{array}{r} 2\,5\,00 \\ \times\ 4\,2 \\ \hline 21\,0 \\ +\ 84 \\ \hline 105\,0\,00 \end{array}$$

4
9
16
25
36
49
64
81

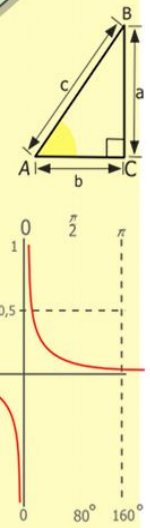


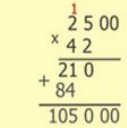
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

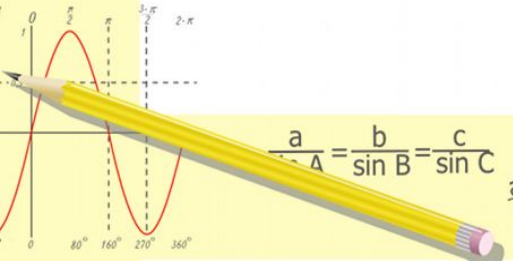
$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c}$$

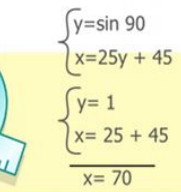
x= 70

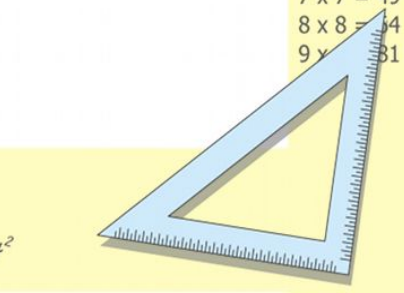
Вычислить площадь фигуры, ограниченной прямыми y=0, x=1, x=e и гиперболой

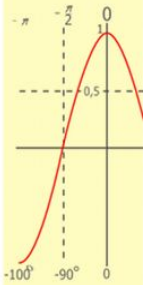


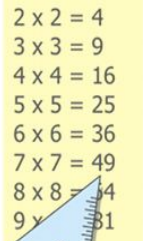




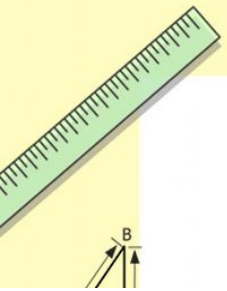


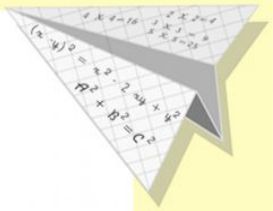


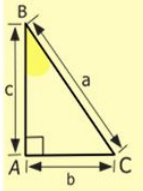


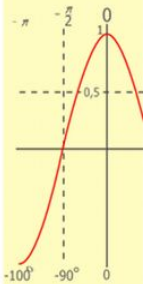


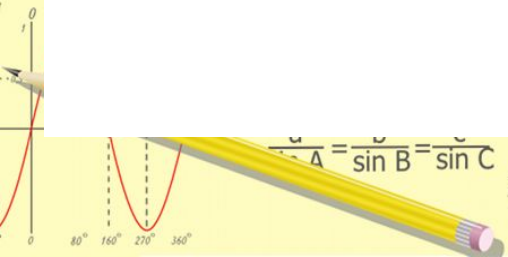
№1628, 1629, 1642, 1645 (а,б) дома: в,г











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

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

$\sin 90° = 1$

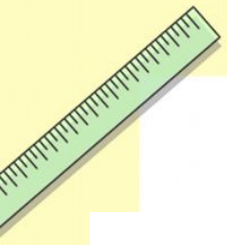
$\begin{cases} y = 1 \\ x = 25 + 45 \end{cases}$

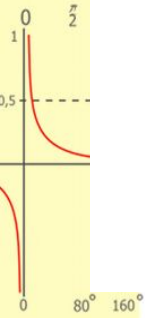
$x = 70$

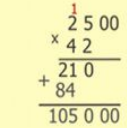
$(x+y)(x-y) = x^2 - y^2$

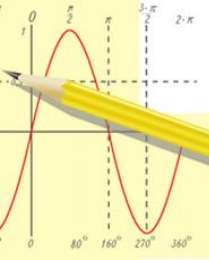
4
9
16
25
36
49
64
81

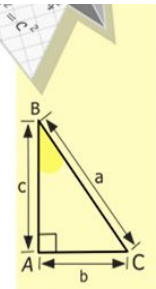
№1629 (а)

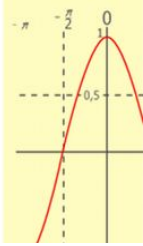


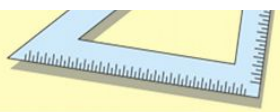




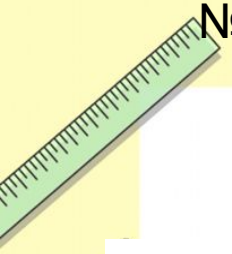


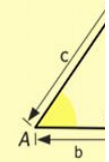


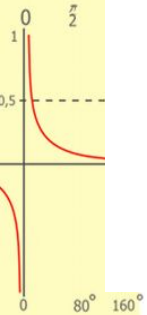




№1629(б)

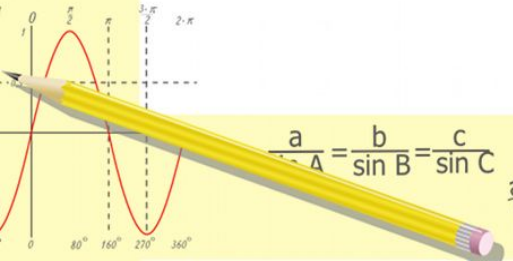






y = 1 / x

$$\begin{array}{r} 2\,5\,00 \\ \times\ 4\,2 \\ \hline 21\,0 \\ +\ 84 \\ \hline 105\,0\,00 \end{array}$$



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

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

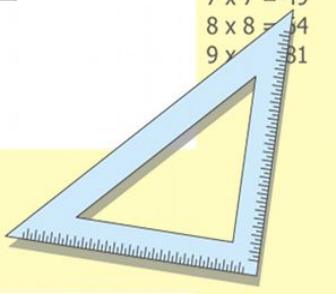
$\sin 90^\circ = 1$

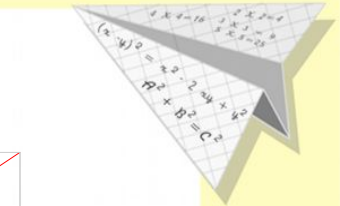
$$\begin{cases} y=\sin 90 \\ x=25y+45 \end{cases}$$

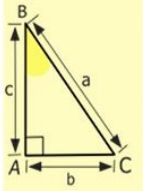
$$\begin{cases} y=1 \\ x=25+45 \end{cases}$$

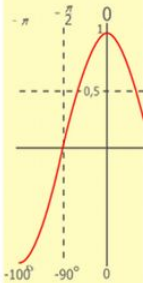
$x = 70$

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





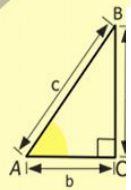


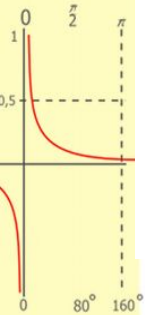


y = co

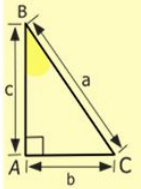
2 x 2 = 4
3 x 3 = 9
4 x 4 = 16
5 x 5 = 25
6 x 6 = 36
7 x 7 = 49
8 x 8 = 64
9 x 9 = 81

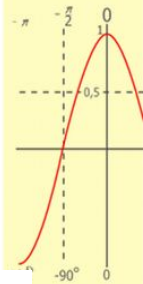
№1642





y = 1 / x

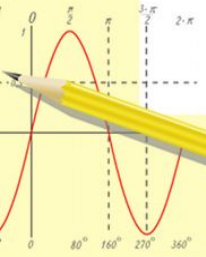




y = co

$$\begin{array}{r} 2\,5\,00 \\ \times\ 4\,2 \\ \hline 21\,0 \\ +\ 84 \\ \hline 105\,0\,00 \end{array}$$

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



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

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

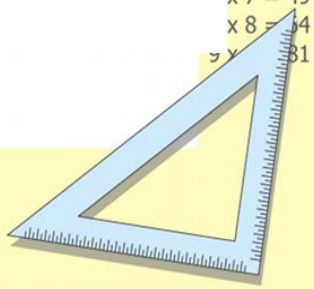
$\sin 90° = 1$

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

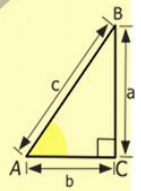
$$\begin{cases} y = 1 \\ x = 25 + 45 \end{cases}$$

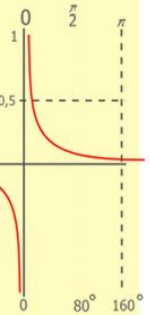
$x = 70$

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



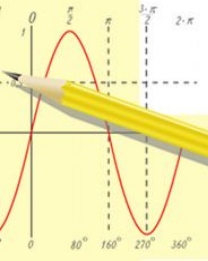
№1642(б)



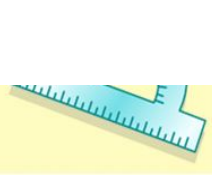


y = 1 / x

$$\begin{array}{r} {\scriptstyle 1}\\ 2\,5\,00 \\ \times\ 4\,2 \\ \hline 21\,0 \\ +\ 84 \\ \hline 105\,0\,00 \end{array}$$

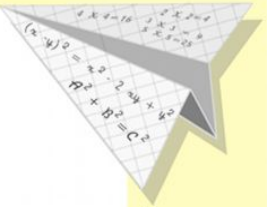


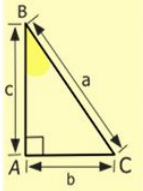
$\frac{a}{c} + \frac{b}{c} = c$

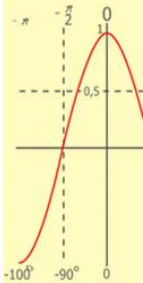


$$\begin{cases} x = 25 + 45 \\ x = 70 \end{cases}$$

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

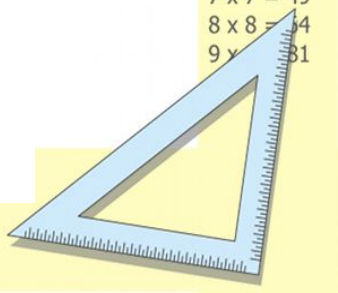




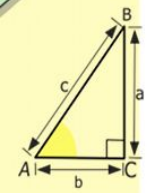


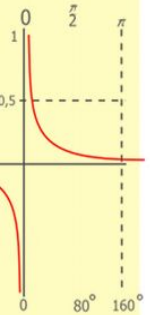
y = co

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



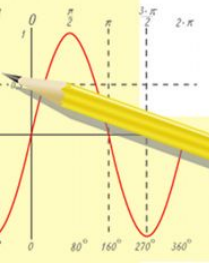
№1645 (а)





y = 1 / x

$$\begin{array}{r} {\scriptstyle 1\ \ 1} \\ 2\,5\,00 \\ \times\ 4\,2 \\ \hline 21\,0 \\ +\ 84 \\ \hline 105\,0\,00 \end{array}$$



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

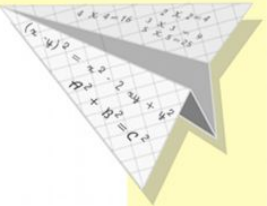
$$\frac{a}{c}+\frac{b}{c}=\frac{a+b}{c}$$

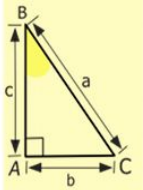
$\sin 90^\circ = 1$

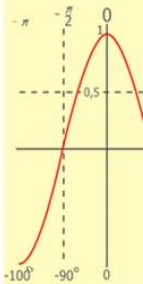
$$\begin{cases} x = 25y + 45 \\ y = 1 \\ x = 25 + 45 \end{cases}$$

$x = 70$

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

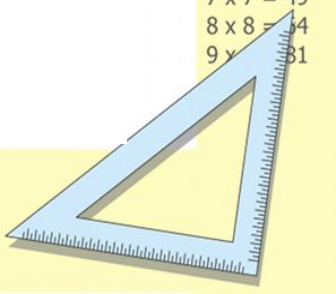




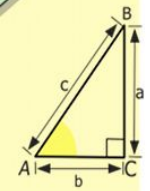


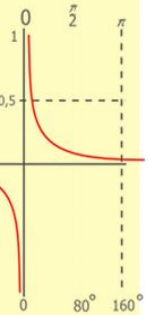
y = co

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



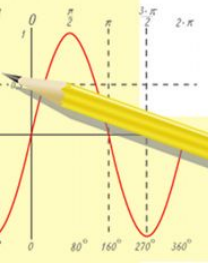
№1645(б)





y = 1 / x

$$\begin{array}{r} {\scriptstyle 1}\\ 2\,5\,00 \\ \times\ 4\,2 \\ \hline 2\,1\,0 \\ +\ 8\,4 \\ \hline 1\,0\,5\,0\,0 \end{array}$$



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

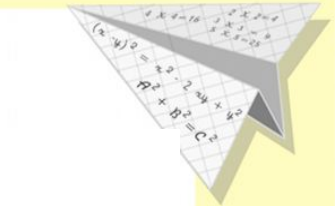
$$\frac{a}{c}+\frac{b}{c}=\frac{a+b}{c}$$

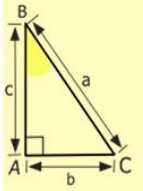
$$\sin 90^\circ = 1$$

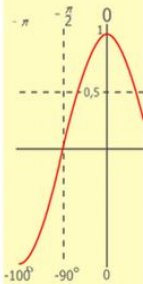
$$\begin{cases} x = 25y + 45 \\ y = 1 \\ x = 25 + 45 \end{cases}$$

$$x = 70$$

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







y = co

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

Задание на каникулы:

Создать справочник по формулам (лучше напечатать, чтобы можно было размножить), презентация, видеоролик и т.п.

1. **Тригонометрические формулы**
2. **Тригонометрические уравнения (общий вид, частные случаи, методы решения)**
3. **Производная**
4. **Применение производной к исследованию функций**
5. **Функции, свойства, графики, преобразования**
6. **Первообразная и интеграл**
7. **Показательные уравнения и неравенства**
8. **Логарифмические уравнения и неравенства**
9. **Степени и корни**
10. **Системы уравнений**
11. **Основные типы задач**

12. РЕШАТЬ ВАРИАНТЫ ЕГЭ