# ҰБТ есептерін шығарудың тиімді тәсілдері

1. Радикалдар
2. Өрнектер
3. Тригонометрия
4. Жазық фигура

# Мақсаты:

ҰБТ есептерін шығаруда тиімді әдістерін үйрету

# Радикалы бар сандық өрнектерді түрлендіру

$$\sqrt{a+\sqrt{в}} = \sqrt{\frac{a+\sqrt{a^2-в}}{2}} + \sqrt{\frac{a-\sqrt{a^2-в}}{2}}$$

$$\sqrt{a-\sqrt{в}} = \sqrt{\frac{a+\sqrt{a^2-в}}{2}} - \sqrt{\frac{a-\sqrt{a^2-в}}{2}}$$

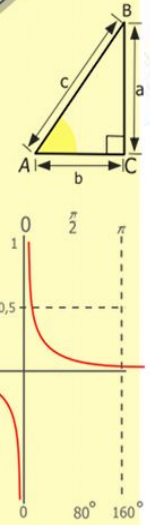
$$\sqrt{25+4\sqrt{6}}=\sqrt{25+\sqrt{96}}=\sqrt{\frac{25+\sqrt{625-96}}{2}}+\sqrt{\frac{25-\sqrt{625-96}}{2}}=\sqrt{\frac{25+23}{2}}+\sqrt{\frac{25-23}{2}}=2\sqrt{6}+1;$$

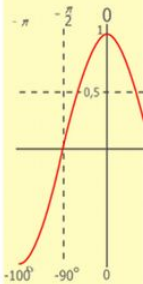
$$\sqrt{5+2\sqrt{6}}=\sqrt{5+\sqrt{24}}$$

$$=\sqrt{\frac{5+\sqrt{25-24}}{2}}+\sqrt{\frac{5-\sqrt{25-24}}{2}}$$

$$=\sqrt{\frac{5+1}{2}}+\sqrt{\frac{5-1}{2}}$$

$$=\sqrt{3}+\sqrt{2}$$




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

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

$$x=70$$

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

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

# Тиімді тәсілі:

1. $\sqrt{25+4\sqrt{6}}$

$2\sqrt{6}$ 2-ге бөлеміз

$(2+\sqrt{6})=10$

$(1+2\sqrt{6})=25$

$(2\sqrt{3}+\sqrt{2})=14$

$(2\sqrt{2}+\sqrt{3})=11$

1. Жіктейміз
2. Квадраттап қосқанда берілген есептегі 25 шығу керек

2. $\sqrt{5+2\sqrt{6}}$

$\sqrt{6}$

$(1+\sqrt{6})=7$

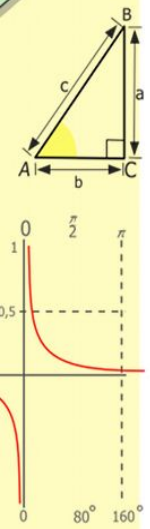
$(\sqrt{2}+\sqrt{3})=5$

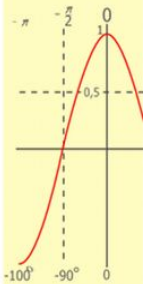
# Алгебралық өрнектерді ықшамдау

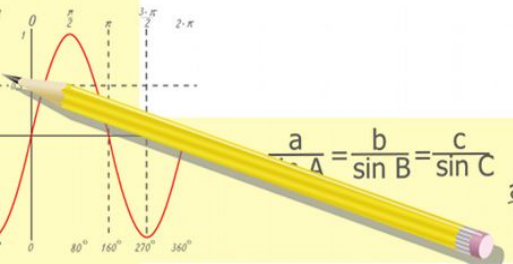
$$\frac{a-b+1}{a^2-ab}+\frac{a+b}{2ab}\left(\frac{a}{b^2-ab}+\frac{a}{b^2+ab}\right).$$

A) $\frac{b+1}{ab}$ B) $\frac{b-1}{2ab}$ C) $\frac{b-1}{ab}$

D) $\frac{1}{a}$ E) $\frac{1-a}{ab}$



# шығару жолы:

$$\frac{a-b+1}{a^2-ab}+\frac{a+b}{2ab}\left(\frac{a}{b^2-ab}+\frac{a}{b^2+ab}\right)=$$

$$=\frac{a-b+1}{a(a-b)}+\frac{a+b}{2ab}\cdot\frac{a}{b}\cdot\left(\frac{1}{b-a}+\frac{1}{b+a}\right)=$$

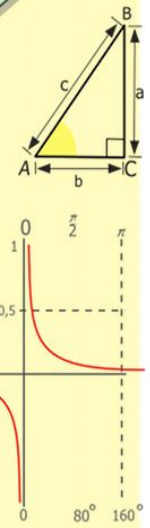
$$=\frac{a-b+1}{a(a-b)}+\frac{a+b}{2b^2}\cdot\left(\frac{a+b+b-a}{(b-a)(b+a)}\right)=$$

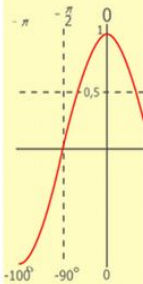
$$=\frac{a-b+1}{a(a-b)}+\frac{(a+b)\cdot 2b}{2b^2(b-a)(b+a)}=$$

$$= \frac{a-b+1}{a(a-b)} - \frac{1}{b(a-b)} = \frac{(a-b+1)b-a}{ab(a-b)} =$$

$$= \frac{ab-b^2+b-a}{ab(a-b)} = \frac{b(a-b)-(a-b)}{ab(a-b)} =$$

$$= \frac{(a-b)(b-1)}{ab(a-b)} = \frac{b-1}{ab}$$




2 x 2 = 4
3 x 3 = 9
4 x 4 = 16
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$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

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

$\sin 90° = 1$

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

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$x = 70$

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

# Тиімді тәсілі:

Өзіміз кез келген мәнді аламыз.

Мысалға: $a = 3, b = 2$

Берілген есепке орнына қоямыз

$$\frac{2}{3} + \frac{5}{12} * \left(\frac{3}{-2} + \frac{3}{10}\right) = \frac{2}{3} + \frac{5}{12} * -\frac{12}{10} = \frac{1}{6}$$

Жауаптарына өзіміз тандаган мәндерді қоямыз.

A) $\frac{3}{6}$ $B)$ $\frac{1}{12}$ $C)$ $\frac{1}{6}$

# Мәтінді есептерді шығару жолдары

Құрамында никельдің мөлшері 5 % және 40 % болатын екі түрлі сорты бар. Құрамындағы никельдің мөлшері 30 % болатын 140 тонна болат алу үшін екі сорттың әрқайсысынан неше тоннадан алу керек?

$x_т$ ---- 5 %----0,05

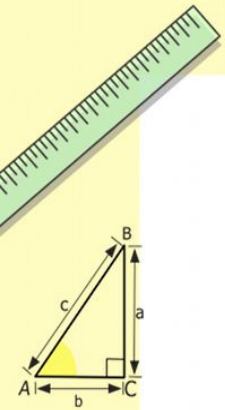
$y_т$ ---- 40 %----0,4

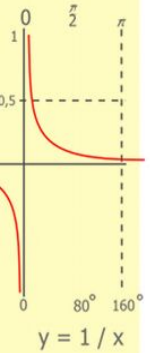
140 т ----30 %----0,3

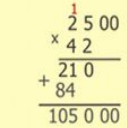
$$\begin{cases} x + y = 140 \\ 0{,}05x + 0{,}4y = 140 * 0{,}3 \end{cases}$$

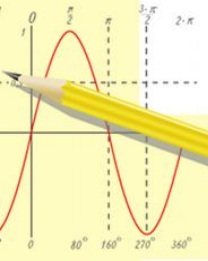
Жауабы: 100 т, 40 т

# Тиімді тәсілі:





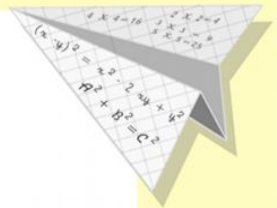
5% 40%

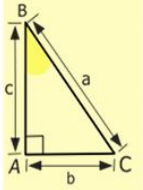
30%

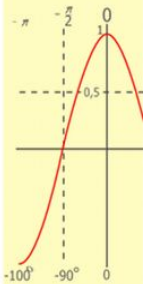
10% + 25% = 35

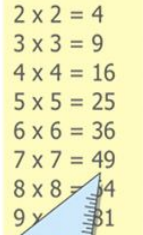
40 100 140

Үлкен саннан кішісін азайтамыз (орта),





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# Мәтінді есептерді шығару жолдары

40 литр 5 %-дық тұз ерітіндісіне қанша су қосып 4 %-дық тұз ерітіндісін алуға болады?

$$40 \text{ л} \text{ ----} 5\ \% = 0{,}05$$

$$x_{\text{л}} \text{ ----} 0\ \%$$

$$y_{\text{л}} \text{ ----} 4\ \% = 0{,}04$$

$$\begin{cases} 40 + x = y \\ 40 * 0{,}05 + x * 0 = y * 0{,}04 \end{cases} \Rightarrow \begin{cases} y = 40 + x \\ 2 = 0{,}04y \end{cases} \Rightarrow$$

$$0{,}04(40 + x) = 2$$

$$1{,}6 + 0{,}04x = 2$$

$$0{,}04x = 0{,}4$$

$$x = 10 \text{ л}$$

Жауабы: 10 литр

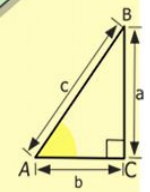
# Тиімді тәсілі:

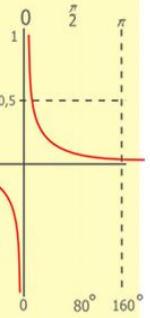
5% 0%

4%

4% + 1%

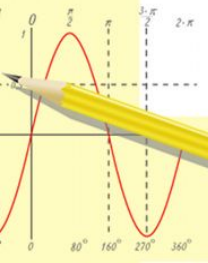
40 10




y = 1 / x

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

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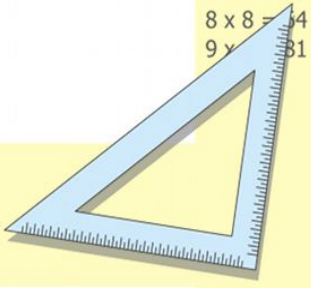

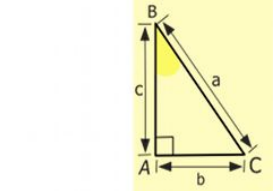


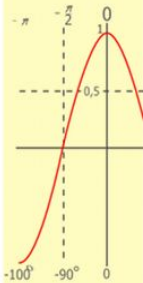


y = co

2 x 2 = 4
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6 x 6 = 36
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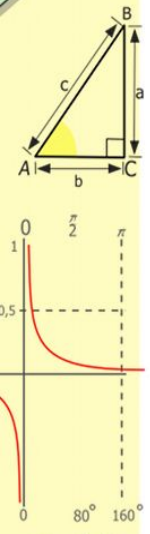
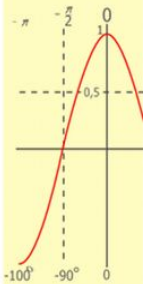
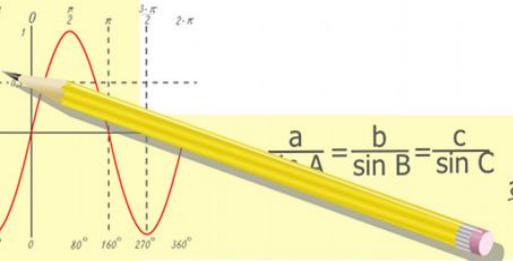
9 x 9 = 81

# Геометриялық прогрессия

Кемімелі геометриялық прогрессияның екінші мүшесі $\frac{1}{3}$-ге, ал бірінші мен үшінші мүшелерінің қосындысы $\frac{10}{9}$-ға тең. Төртінші мен екінші мүшелерінің көбейтіндісін табыңыз.



# шығару жолы:

$$\begin{cases} b_1 q = \frac{1}{3} \\ b_1 + b_1 q^2 = \frac{10}{9} \end{cases} \Rightarrow \begin{cases} b_1 q = \frac{1}{3} \\ b_1 (1 + q^2) = \frac{10}{9} \end{cases} \Rightarrow$$

$$\frac{1+q^2}{q} = \frac{10}{9} \cdot 3 \Rightarrow 3(1+q^2) = 10q \Rightarrow 3q^2 - 10q + 3 = 0$$

$$D_1 = 25 - 9 = 16$$

$$q = \frac{5 \pm 4}{3};$$

$$q = \frac{1}{3};\ q = 3$$

$$b_1 = \frac{1}{3} : \frac{1}{3} = 1$$

$$b_4 = b_1 \cdot q^3 = 1 \cdot \frac{1}{27} = \frac{1}{27}$$

$$b_4 \cdot b_2 = \frac{1}{27} \cdot \frac{1}{3} = \frac{1}{81}$$

# Тиімді тәсілі:

$1, \frac{1}{3}, \frac{1}{9}, \frac{1}{27}, \frac{1}{81}, \ldots\ldots\ldots$ кемімелі

$\frac{1}{9}, \frac{1}{3}, 1, 3, 9, 27, \ldots\ldots$ өспелі

$$b_2 * b_4 = \frac{1}{3} * \frac{1}{27} = \frac{1}{81}$$

# Тригонометриялық өрнектер

$$\frac{2\sin\alpha+3\cos\alpha}{5\sin\alpha-\cos\alpha}, \text{ егер } ctg\alpha = -2.$$

$$\frac{(2\sin\alpha+3\cos\alpha):\sin\alpha}{(5\sin\alpha-\cos\alpha):\sin\alpha} = \frac{2+3ctg\alpha}{5-ctg\alpha} =$$

$$= \frac{2+3\cdot(-2)}{5-(-2)} = \frac{2-6}{5+2} = -\frac{4}{7}.$$

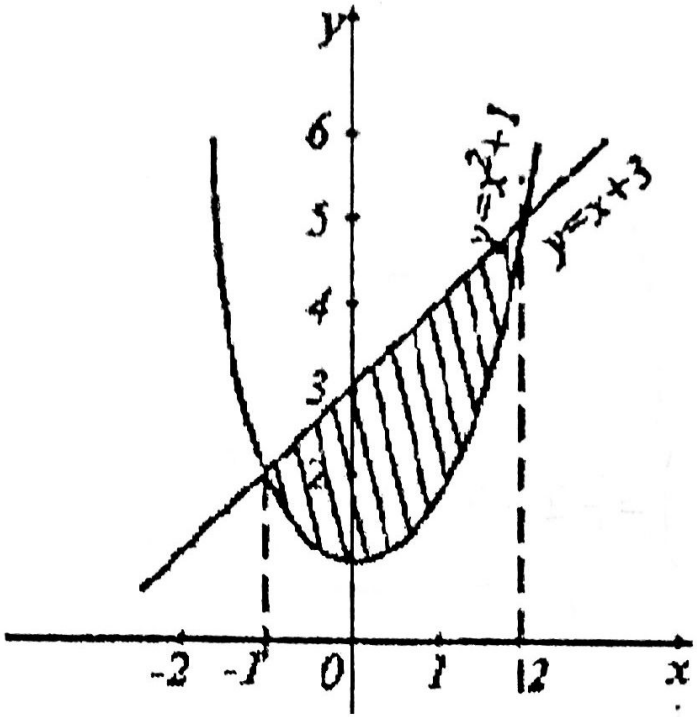
# Тиімді тәсілі:

$$\cot\alpha = \frac{\cos\alpha}{\sin\alpha} = -2 = \frac{-2}{1}$$

$$\frac{2\sin\alpha + 3\cos\alpha}{5\sin\alpha - \cos\alpha} = \frac{2 * 1 + 3 * (-2)}{5 * 1 - (-2)} = \frac{-4}{7}$$

# Жазық фигуралардың ауданын есептеу

$$S = \int_a^b (f(x) - g(x))dx.$$




$y = x^2 + 1$ және $y = x + 3$

$$x^2 + 1 = x + 3$$

$$x^2 - x - 2 = 0$$

$$x_1 = -1; x_2 = 2$$

$$y = x^2 + 1 \text{ және } y = x + 3$$

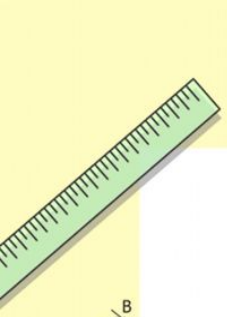
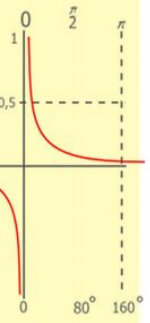
$$x^2 + 1 = x + 3$$

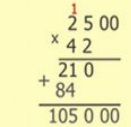
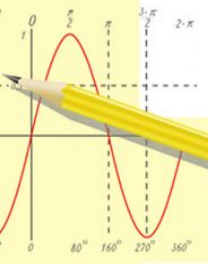
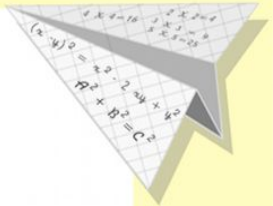
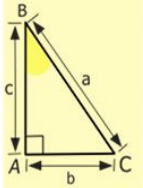
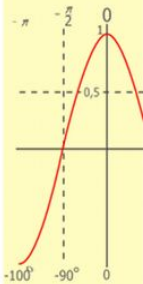
$$x^2 - x - 2 = 0$$

$$x_1 = -1; x_2 = 2$$

$$S = \int_{-1}^{2} \left( (x+3) - (x^2+1) \right) dx = \int_{-1}^{2} (x + 2 - x^2) dx =$$

$$= \left( \frac{x^2}{2} + 2x - \frac{x^3}{3} \right) \Big|_{-1}^{2} = (2 + 4 - \frac{8}{3}) - (\frac{1}{2} - 2 + \frac{1}{3}) = 4\frac{1}{2}.$$

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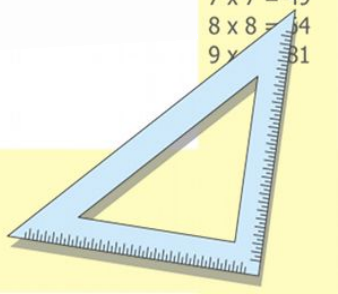

$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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

$\sin 90^\circ = 1$

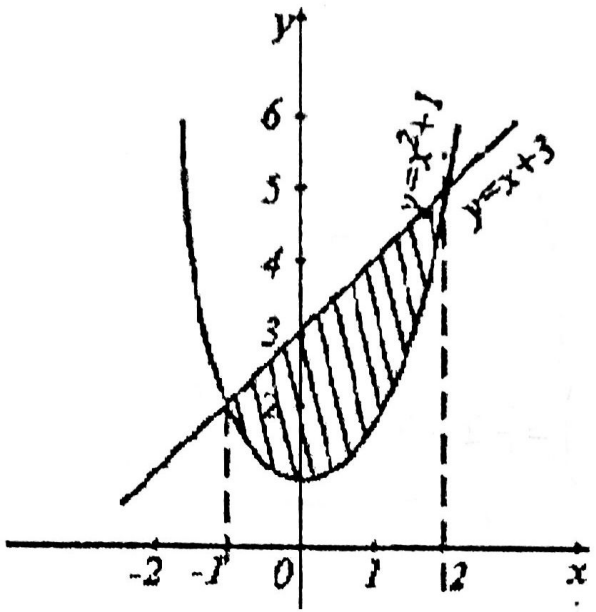
$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

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

$x = 70$

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

# Тиімді тәсілі:




$x_1 = -1 \qquad x_2 = 2$

$$S = \left|\frac{a(x_2 - x_1)}{6}\right|$$

$$s = \left|\frac{1 * (2 - (-1))^3}{6}\right| = \frac{27}{6} = 4\frac{3}{6} = 4\frac{1}{2}$$

$$S = \frac{ab}{3} \text{ (боялған)}$$

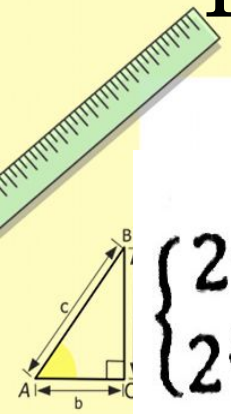
$$S = \frac{2ab}{3} \text{ (боялмаған)}$$

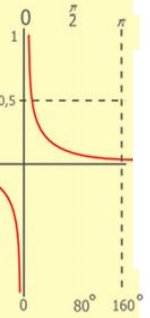
# Көрсеткіштік теңдеулер жүйесін шешу

$$\begin{cases} 2^x - 3^y = 23, \\ 2^{x-1} + 3^{y+1} = 43; \end{cases} \Rightarrow \begin{cases} 2^x = 3^y + 23, \\ \frac{2^x}{2} + 3 \cdot 3^y = 43 \mid \cdot 2 \end{cases} \Rightarrow$$

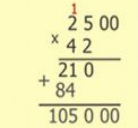
$$\begin{cases} 2^x = 3^y + 23 \\ 3^y + 23 + 6 \cdot 3^y = 86; \end{cases} \Rightarrow \begin{cases} 7 \cdot 3^y = 63, \\ 2^x = 3^y + 23; \end{cases} \Rightarrow$$

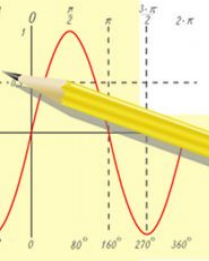
$$\begin{cases} 3^y = 9, \\ 2^x = 3^y + 23 \end{cases} \Rightarrow \begin{cases} y = 2, \\ 2^x = 32 \end{cases} \Rightarrow \begin{cases} y = 2, \\ x = 5. \end{cases}$$




y = 1 / x






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

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

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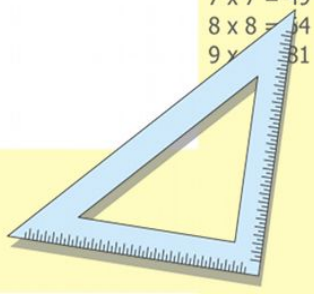
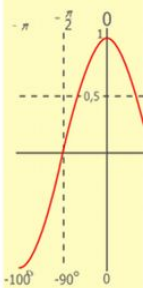





y = co

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

# Тиімді тәсілі:

$$\begin{cases} 2^x - 3^y = 23, \\ 2^{x-1} + 3^{y+1} = 43; \end{cases}$$

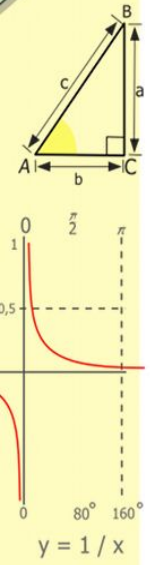
$$\begin{array}{cccc} 2 & & 3 & \\ 4 & - & 9 & = 23 \\ 8 & & 27 & \\ 16 & & 81 & \\ 32 & & 243 & \end{array}$$

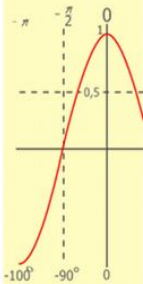
$x = 5 \qquad y = 2$

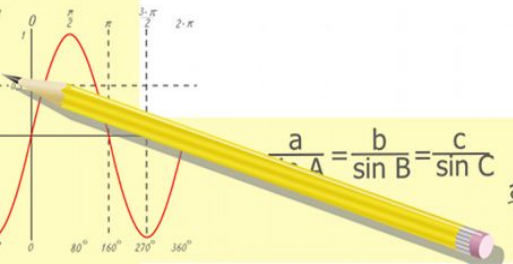
# Көрсеткіштік теңсіздіктерді шешу

$$4 * 3^{x+2} - 2 * 5^{x+2} \leq 5^{x+3} - 3^{x+3}$$

A) $[-1; +\infty)$
B) $[0; +\infty)$
C) $(-\infty; 0]$
D) $[-2; +\infty)$
E) $(3; +\infty)$



# Тиімді тәсілі

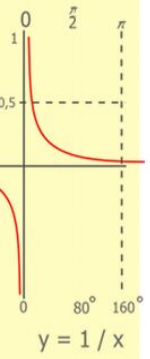
$$4 * 3^{x+2} - 2 * 5^{x+2} \leq 5^{x+3} - 3^{x+3}$$

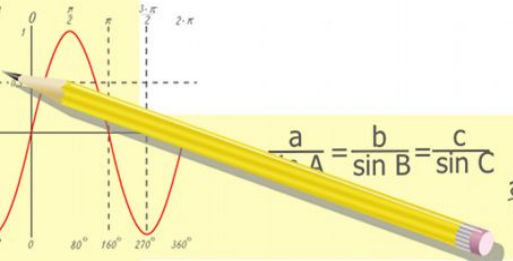
$x = -1$ $\quad 4 * 3 - 2 * 5 \leq 25 - 9 \quad 2 \leq 16$

-1 деген мән шығу ушін тең болу керек

$x = 0$ $\quad 4 * 9 - 2 * 25 \leq 125 - 27 \quad -14 \leq 98$

$x = -2$ $\quad 4 * 1 - 2 * 1 \leq 5 - 3 \quad 2 \leq 2$



# Назарларыңызға рахмет!!!!