

№1 а) данное число $x = ?$

$$1) \left(\frac{a}{4} : 3\right) \cdot x = \frac{3a}{2}$$

$$\frac{a}{12} \cdot x = \frac{3a}{2}$$

$$x = \frac{3a \cdot 12}{2a} = \frac{36}{2} = 18$$

Ответ: 18

№2

~~x~~ x (кол-во книг кроме ут. математики и еще 5)
 a (кол-во ут. математики)

1) $x + a + 5$ все книги вместе

$$\frac{a+x}{7} = 1 \Rightarrow a = \frac{1}{7}x, \quad x = \frac{6}{7}y$$

 $a = y, \quad x = 6y \Rightarrow$

$$7y + 5 \leq 39$$

$$7x \leq 34$$

$$x \leq \frac{37}{9}$$

$$x < 5 \Rightarrow$$

может быть 4 книги по математике

$$4 \cdot 7 + 5 = 33$$

Ответ: 33

№3

$$\sin k + \cos k = ? \quad \sin k \cdot \cos k = \frac{1}{3}$$

$$(\sin k)^2 + (\cos k)^2 = 1$$

$$(\sin k)^2 = \frac{1}{(\cos k)^2} \Rightarrow \sin k = \pm \frac{1}{\cos k}$$

$$\sin k = \frac{1}{3 \cos k}$$

$$\left(\frac{1}{3 \cos k}\right)^2 + (\cos k)^2 = 1$$

$$t = \cos k$$

$$t - 1 - \frac{1}{9t} = 1$$

$$9t^2 - 9t + 1 = 0$$

$$D = 81 - 36 = 45$$

$$t_1 = \frac{3 + \sqrt{5}}{6}$$

$$t_2 = \frac{3 - \sqrt{5}}{6}$$

$$\Rightarrow \sin k = \frac{6}{27 + 9\sqrt{5}}$$

$$\frac{6}{27 - 9\sqrt{5}}$$

1	10
2	1
3	0
4	7
5	1
6	10
7	-
8	-
9	10
10	1

15. $\sum 318$

14/12

$$\sin \alpha + \cos \alpha = \sqrt{\frac{3+\sqrt{5}}{6}} + \sqrt{\frac{2}{9+3\sqrt{5}}}$$

Отв: $\sqrt{\frac{3+\sqrt{5}}{6}} + \sqrt{\frac{2}{9+3\sqrt{5}}}$

№4

$$\frac{1}{\sqrt{2}+\sqrt{1}} + \frac{1}{\sqrt{3}+\sqrt{2}} + \dots + \frac{1}{\sqrt{100}+\sqrt{99}} = \frac{1(\sqrt{2}-\sqrt{1})}{(\sqrt{2}+\sqrt{1})(\sqrt{2}-\sqrt{1})} + \dots + \frac{1(\sqrt{100}-\sqrt{99})}{(\sqrt{100}+\sqrt{99})(\sqrt{100}-\sqrt{99})}$$

1) домножить все слагаемые

$$\frac{\sqrt{2}-\sqrt{1}}{2-1} + \frac{\sqrt{3}-\sqrt{2}}{3-2} + \dots + \frac{\sqrt{100}-\sqrt{99}}{100-99} = \sqrt{2}-\sqrt{1} + \sqrt{3}-\sqrt{2} + \sqrt{4}-\dots + \sqrt{100}-\sqrt{99}$$

$$\frac{-\sqrt{1}-\sqrt{99}}{1} = -\sqrt{1} - \sqrt{99}$$

Отв: $-\sqrt{1} - \sqrt{99}$

№5

$$f(1) = 1$$

$$\frac{f}{N} = N$$

$$f(x+y) = f(x) + f(y) + xy$$

если $x=1$ и $y=1$

$$f(2) = 1 + 1 + 1 = 3$$

$$f(3) = 5$$

$$f(4) = 8$$

15

(N6)

$|\sin x + \cos x| = 5 - 4[x]$, $[x]$ целая часть

$\sin x + \cos x = 5 - 4[x]$

$-1 \leq x \leq 1$

$-(\sin x + \cos x) = 5 - 4[x]$

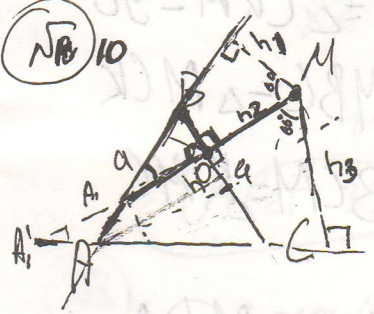
$[x] \in \{-1, 0, 1\}$

1) $\sin x + \cos x = 5 + 4$ | $\sin x + \cos x = 1$ | $\sin x + \cos x = 5$

2) $-\sin x + \cos x = -9$

$\sin x + \cos x = -1$ | $\sin x - \cos x = -5$

(N8) 10



Дано: $\triangle ABC$ равносторонний
г.М

Доказать:

$h_1 + h_2 - h_3$
не зависит от М

1) $\angle BA_1M = 30^\circ$ ($A_1M \perp BC$ угол \Rightarrow уг. = 30°)

$h_3 = h_1 \cdot k$

$\sum_{k=1}^3 h_k = h_1 + h_2 - h_3 = 0$

$h_1 + h_1(k-1) - h_1 \cdot k = 0$

\Rightarrow константа не зависит на значение

$k = \frac{h_3}{h_1} = \frac{OB}{OC}$ (k угол. подобия где $\triangle A_1BO$ и $\triangle A_1M H_3$)

M19

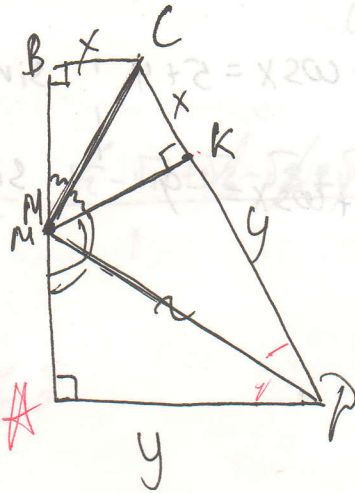
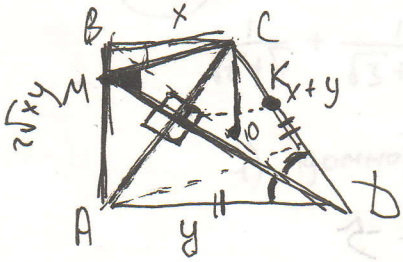
Дано: трапец. трапец.

$$CD = AD + BC$$

$$BC = x$$

$$AD = y$$

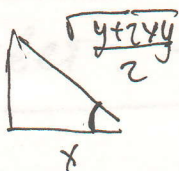
Найти: $\angle CMD$



$$y^2 + 4xy = BD^2$$

$$BD = \sqrt{y + 2xy}$$

$$BO = \frac{\sqrt{y + 2xy}}{2}$$



$$\frac{\sqrt{y + 2xy} - 4x^2}{2}$$

$$\frac{2x}{\sqrt{y + 2xy}}$$

$$\sin \angle CMD = \frac{2x}{\sqrt{y + 2xy}}$$

$$\cos \angle CMD = \frac{y + 2xy - 4x^2}{2\sqrt{y + 2xy}}$$

$$KD = AD$$

1) $BC = CK$

MC общ

$$\angle CBM = \angle CKM = 90^\circ$$

$$\Rightarrow \triangle MBL = \triangle MCK$$

$$\Rightarrow \angle BCM = \angle KMC$$

2) $\triangle KMD = \triangle MDA$

(MP общ, $\angle MAD = \angle DKM$)

$$AD = DK = y$$

$$\Rightarrow \angle KMD = \angle AMD$$

3) $\angle BML + \angle CMK + \angle KMD + \angle DMA = 180^\circ$

т.к. $\angle BCM = \angle KMC$ и $\angle KMD = \angle AMD$

$$\Rightarrow \angle BCM + \angle KMD = \angle CMD = 90^\circ$$

Отв. 90°

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