

(районная математическая олимпиада 2016 г.)

11 класс

1.

$$(2 - 3x)^{2016} + (3 - 2x)^{2017}.$$

$P(x)$

x

= 1.

$$P(1) = (2 - 3 \cdot 1)^{2016} + (3 - 2 \cdot 1)^{2017} = (-1)^{2016} + 1^{2017} = 1 + 1 = 2.$$

: 2.

2.

2016
7?

: 1, 11, 111, 1111, ..., 11 ... 1.

,

:

7.

: 336

3.

$$AB + CD \geq 2\sqrt{S}, \quad S -$$

$D,$

$D \parallel$

,

$D.$

$$S = \frac{AD + BC}{2} h.$$

$$h \leq \frac{AB + CD}{2}.$$

D

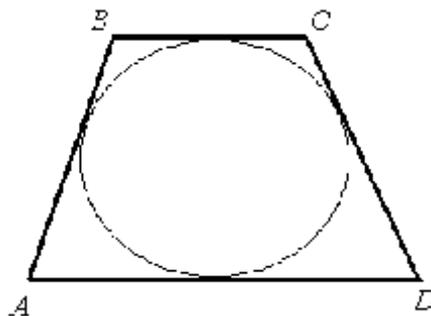
$$D + + = + D.$$

$$, S = \frac{AD + BC}{2} h \leq \frac{AB + CD}{2} \cdot \frac{AB + CD}{2} + D$$

$+ D$

$$\geq 2\sqrt{S}.$$

$D -$



4.

$$: (2016!)^2 \quad 2016^{2016?}$$

$$(1 \cdot 2016) (2 \cdot 2015) \dots (2015 \cdot 2) \cdot 2016.$$

(2016 1).

2016.

$$2016^{2016} -$$

2016

,

2016,

$$, (2016!)^2.$$

$$: (2016!)^2 > 2016^{2016}.$$

5.

:',

1			
			6
		6	
	9		

$a_1, a_2, a_3, a_4 -$

1	$1+a_1$	$1+2a_1$	$1+3a_1$
$6-3a_2$	$6-2a_2$	$6-a_2$	6
$6-2a_3$	$6-a_3$	6	$6+a_3$
$9-a_4$	9	$9+a_4$	$9+2a_4$

$$\begin{cases} 2(6-3a_2) = 6-2a_3+1, \\ 2(6-2a_3) = 6-3a_2+9-a_4, \\ 12 = 6-a_2+9+a_4, \\ 12 = 6+a_3+1+3a_1; \end{cases} \Rightarrow \begin{cases} 12-6a_2 = 7-2a_3, \\ 12-4a_3 = 15-3a_2-a_4, \\ a_2-a_4 = 3, \\ a_3+3a_1 = 5; \end{cases} \Rightarrow$$

$$\begin{cases} 6a_2 - 2a_3 = 5, \\ 3a_2 - 4a_3 + a_4 = 3, \\ a_2 - a_4 = 3, \\ a_3 + 3a_1 = 5. \end{cases}$$

$$a_4 = a_2 - 3$$

$$\begin{cases} 6a_2 - 2a_3 = 5, \\ 4a_2 - 4a_3 = 6, \\ 3a_1 + a_3 = 5; \end{cases} \Rightarrow \begin{cases} 6a_2 - 2a_3 = 5, \\ 2a_2 - 2a_3 = 3, \\ 3a_1 + a_3 = 5. \end{cases}$$

$$= 1 - 3 = -2 \quad a_3 = -1; \quad a_4 = a_2 - 3 = 0,5 - 3 = -2,5 \quad a_4 = -2,5. \quad 4a_2 = 2; \quad a_2 = 0,5. \quad 2a_3 = 2a_2 - 3, \quad 3a_1 - 1 = 5$$

1	3	5	7
4,5	5	5,5	6
8	7	6	5
11,5	9	6,5	4