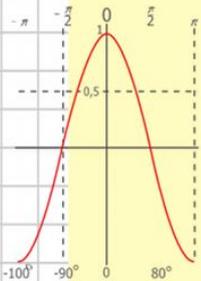
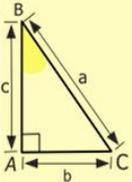
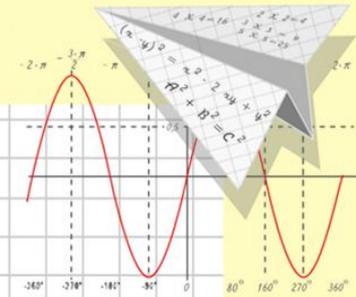
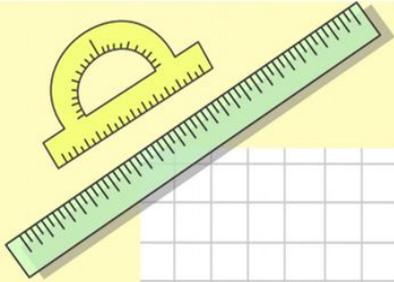


Математик

а

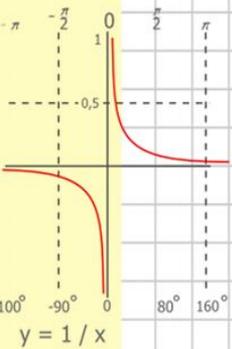
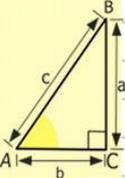
Занятие 115. Объемы многогранников

Решение задач



$$y = \cos x$$

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

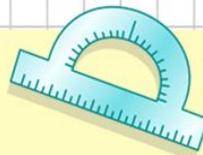


$$\begin{array}{r} 2500 \\ \times 42 \\ \hline 2100 \\ + 8400 \\ \hline 105000 \end{array}$$

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

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

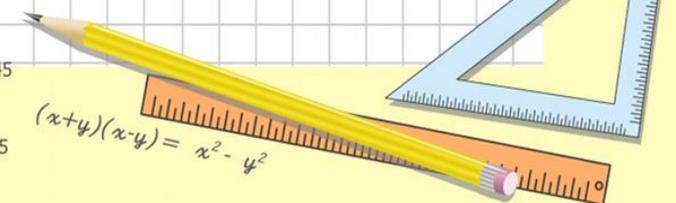
$$\sin 90^\circ = 1$$



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

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

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

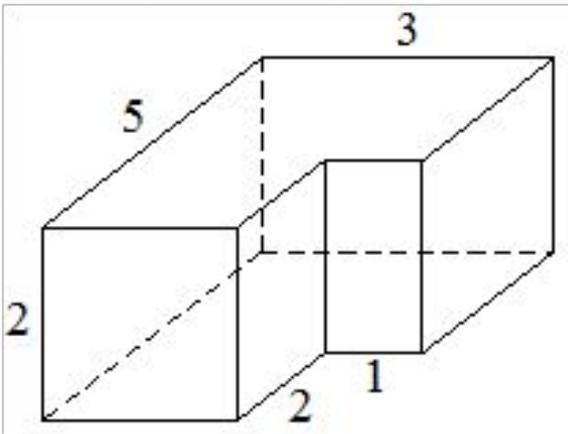


Объемы многогранников

1. Деталь имеет форму изображённого на рисунке многогранника (все двугранные углы прямые). Числа на рисунке обозначают длины рёбер в сантиметрах. Найдите объём этой детали. Ответ дайте в кубических сантиметрах.

Решение:

$$V = abc$$

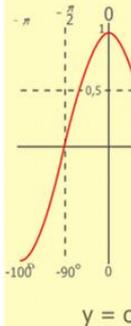
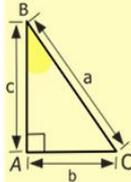


$$V_1 =$$

$$V_2 =$$

$$V = V_1 - V_2 =$$

Ответ:



- 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

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

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

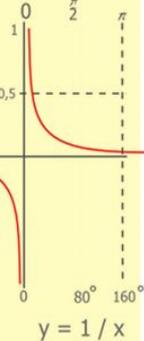
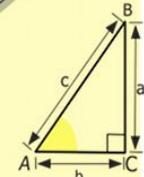
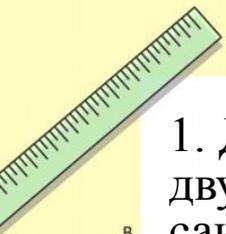
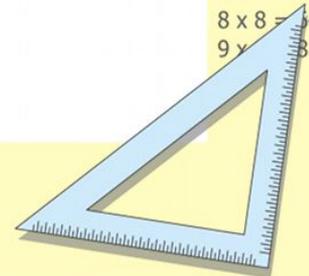
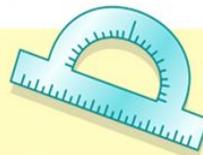
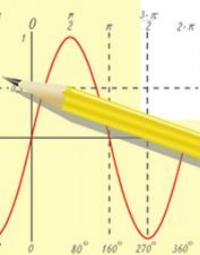
$$\sin 90^\circ = 1$$

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

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

$$x = 70$$

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

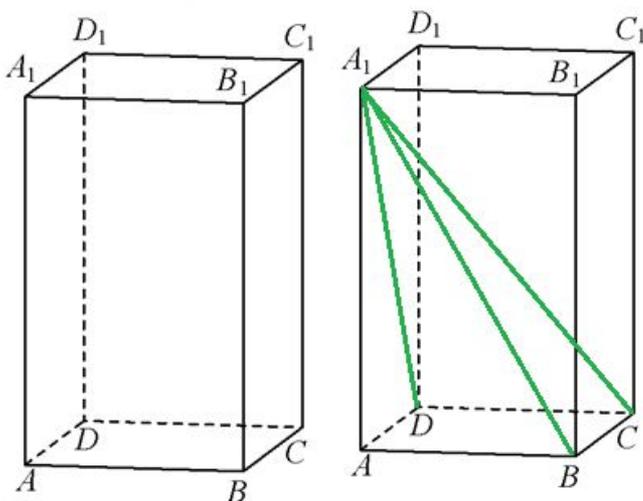


$$\begin{array}{r} 2500 \\ \times 42 \\ \hline 2100 \\ + 840 \\ \hline 105000 \end{array}$$

Объемы многогранников

2. Найдите объём многогранника, вершинами которого являются точки A, B, A_1, C, D прямоугольного параллелепипеда $ABCD A_1 B_1 C_1 D_1$, у которого $AB = 6, BC = 8, AA_1 = 10$.

Решение:



$$V(\text{парал} - \text{д}) = S(\text{осн}) \cdot h$$

$$V(\text{пирамида}) = \frac{1}{3} S(\text{осн}) \cdot h$$

$$V(\text{пирамида}) =$$

Ответ:

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

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

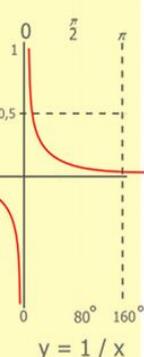
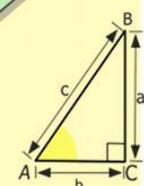
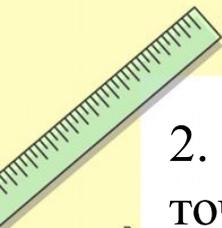
$$\sin 90^\circ = 1$$

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

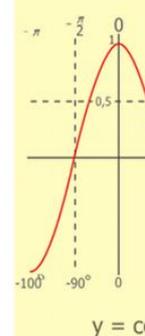
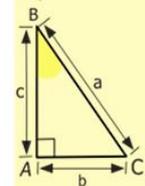
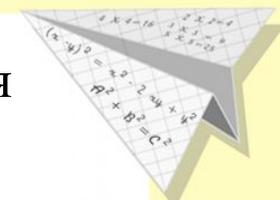
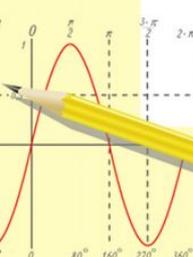
$$\begin{cases} y = 1 \\ x = 25 + 45 \end{cases}$$

$$x = 70$$

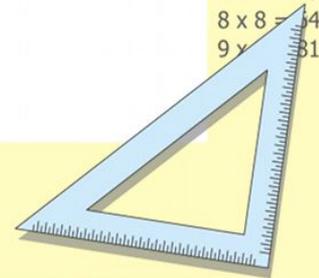
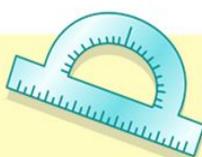
$$(x+y)(x-y) = x^2 - y^2$$



$$\begin{array}{r} 2500 \\ \times 42 \\ \hline 2100 \\ + 840 \\ \hline 10500 \end{array}$$



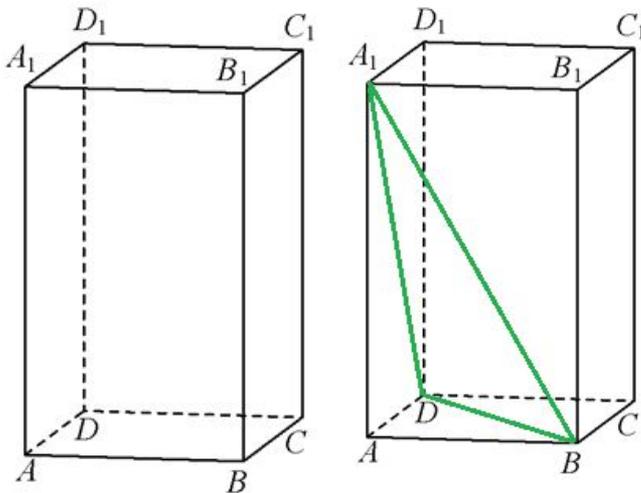
- 2 x 2 = 4
- 3 x 3 = 9
- 4 x 4 = 16
- 5 x 5 = 25
- 6 x 6 = 36
- 7 x 7 = 49
- 8 x 8 = 64
- 9 x 9 = 81



Объемы многогранников

3. Найдите объём многогранника, вершинами которого являются точки A, B, A_1, D прямоугольного параллелепипеда $ABCD A_1 B_1 C_1 D_1$, у которого $AB = 6, BC = 8, AA_1 = 10$.

Решение:



$$V(\text{парал} - \text{д}) = S(\text{осн}) \cdot h$$

$$V(\text{пирамида}) = \frac{1}{3} \cdot \frac{1}{2} S(\text{осн}) \cdot h =$$

$$= \dots \cdot S(\text{осн}) \cdot h$$

$$V(\text{пирамида}) =$$

Ответ:

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

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

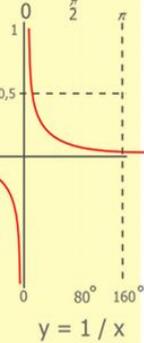
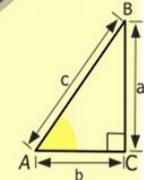
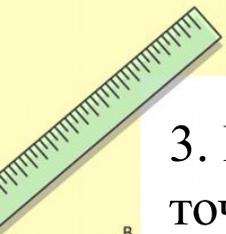
$$\sin 90^\circ = 1$$

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

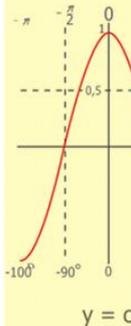
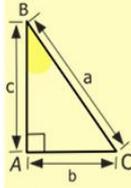
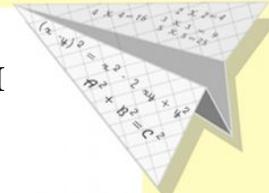
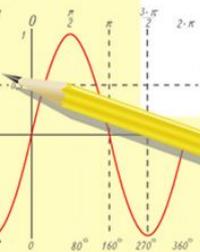
$$\begin{cases} y = 1 \\ x = 25 + 45 \end{cases}$$

$$x = 70$$

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

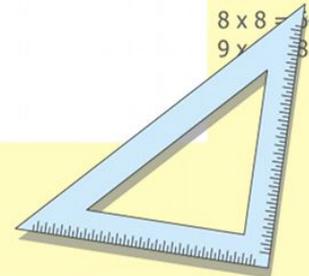
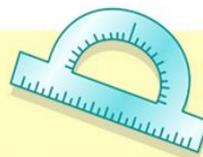


$$\begin{array}{r} 1 \\ \times 2500 \\ \hline 2500 \\ + 210 \\ \hline 105000 \end{array}$$



$$y = \cos$$

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

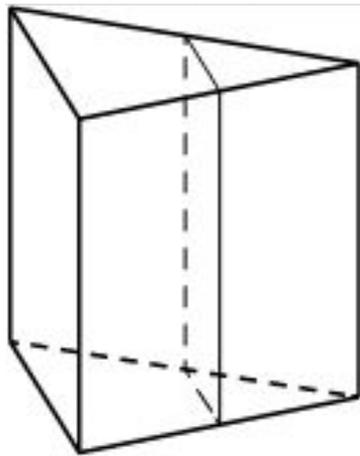


Объемы многогранников

4. Через среднюю линию основания треугольной призмы проведена плоскость, параллельная боковому ребру. Объем отсечённой треугольной призмы равен 60. Найдите объем исходной призмы.

Решение:

$$V(\text{призма}) = S(\text{осн}) \cdot h$$



$$V(\text{отсеченная}) = S(\text{осн}) \cdot h = 60$$

Отношение площадей подобных фигур равно квадрату коэффициента подобия. Т.к. стороны основания исходной призмы в 2 раза больше, чем у отсеченной, то ее площадь будет в ___ раза больше.

$$V(\text{исходная}) = \dots \cdot S(\text{осн}) \cdot h$$

$$V(\text{исходная}) =$$

Ответ:

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

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

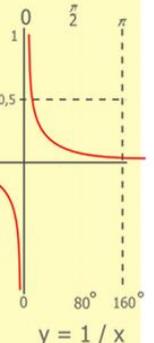
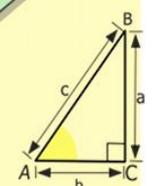
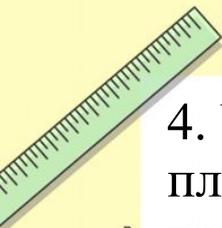
$$\sin 90^\circ = 1$$

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

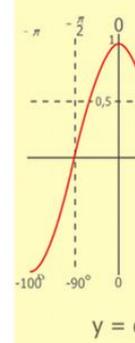
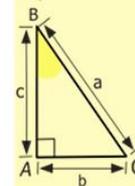
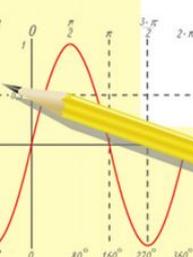
$$\begin{cases} y = 1 \\ x = 25 + 45 \end{cases}$$

$$x = 70$$

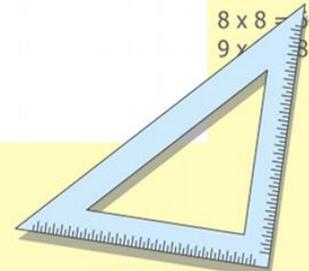
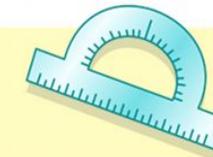
$$(x+y)(x-y) = x^2 - y^2$$



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



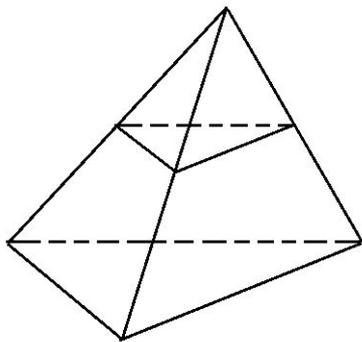
$$\begin{array}{l} 2 \times 2 = 4 \\ 3 \times 3 = 9 \\ 4 \times 4 = 16 \\ 5 \times 5 = 25 \\ 6 \times 6 = 36 \\ 7 \times 7 = 49 \\ 8 \times 8 = 64 \\ 9 \times 9 = 81 \end{array}$$



Объемы многогранников

5. Через середину бокового ребра треугольной пирамиды проведена плоскость, параллельная основанию. Объем отсеченной треугольной пирамиды равен 60. Найдите объем исходной пирамиды.

Решение:



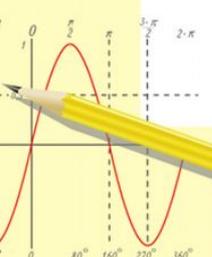
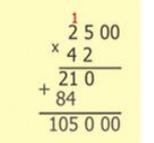
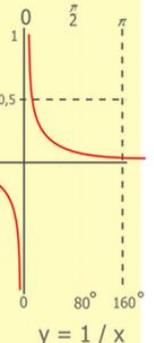
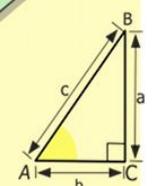
$$V(\text{отсеченная}) = 60$$

Отношение объемов подобных тел равно кубу коэффициента подобия. Т.к. стороны основания исходной пирамиды в 2 раза больше, чем у отсеченной, то ее объем будет в ___ раз больше.

$$V(\text{исходная}) = \dots \cdot V(\text{отсеченная})$$

$$V(\text{исходная}) =$$

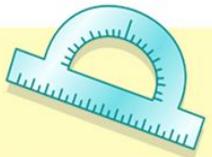
Ответ:



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

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

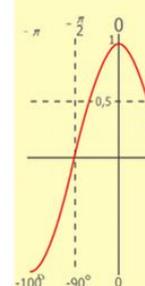
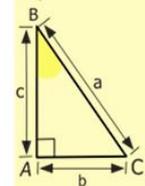
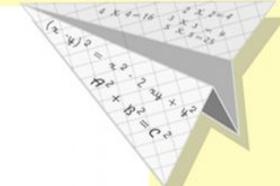
$$\sin 90^\circ = 1$$



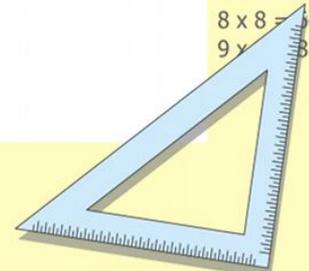
$$\begin{cases} y = \sin 90 \\ x = 25y + 45 \end{cases}$$

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

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



- y = cos
- 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



Объемы многогранников

6. Объём правильной четырёхугольной пирамиды SABCD равен 60. Точка E – середина ребра SB. Найдите объем пирамиды EABC

Решение:

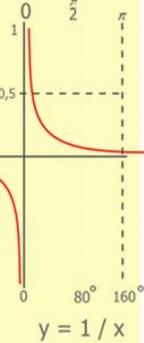
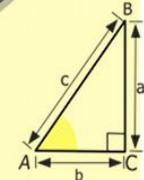
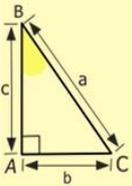
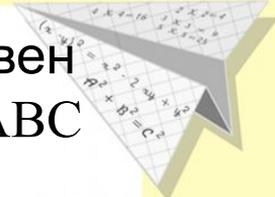
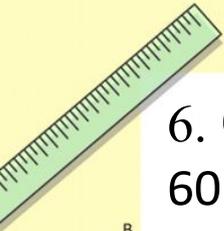
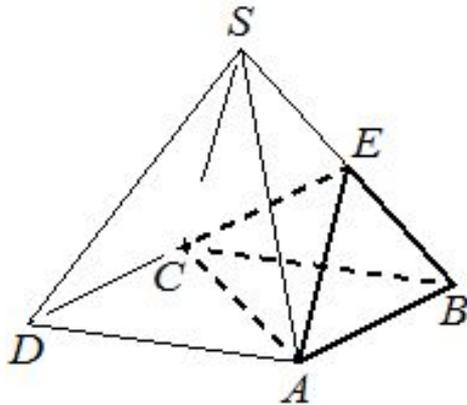
$$V(SABCD) = 60$$

Высота исходной пирамиды в 2 раза больше, чем у отсеченной, а также площадь основания в 2 раза больше, то ее объем будет в ___ раза больше.

$$V(\text{отсеченная}) = \dots \cdot V(\text{исходная})$$

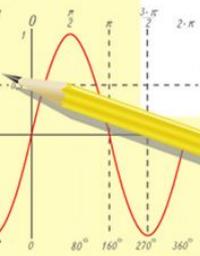
$$V(\text{отсеченная}) = \dots$$

Ответ:



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

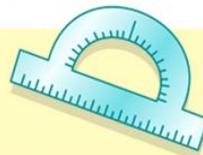
$$\begin{array}{l} 2 \times 2 = 4 \\ 3 \times 3 = 9 \\ 4 \times 4 = 16 \\ 5 \times 5 = 25 \\ 6 \times 6 = 36 \\ 7 \times 7 = 49 \\ 8 \times 8 = 64 \\ 9 \times 9 = 81 \end{array}$$



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

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

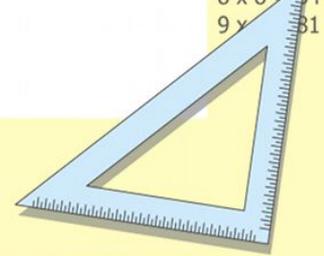
$$\sin 90^\circ = 1$$



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

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

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



Решения

№ 1

$$V_1 = 2 * 5 * 3 = 30 \quad V_2 = 1 * 2 * 2 = 4 \quad V = V_1 - V_2 = 30 - 4 = 26$$

Ответ: 26

№ 2 $V(\text{пирамида}) = \frac{1}{3} * 6 * 8 * 10 = 160$

Ответ: 160

№ 3 $V(\text{пирамида}) = \frac{1}{6} * 6 * 8 * 10 = 80$

Ответ: 80

№ 4 $V(\text{исходная}) = 4 * S(\text{осн}) * h = 4 * 60 = 240$

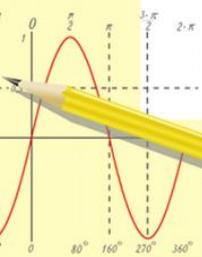
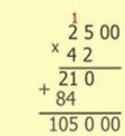
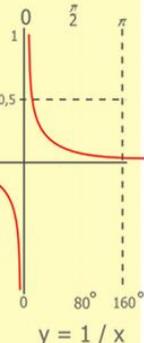
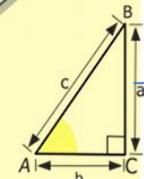
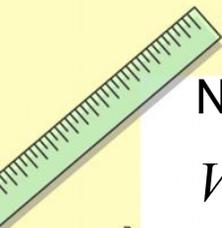
Ответ: 240

№ 5 $V(\text{исходная}) = 8 * 60 = 480$

Ответ: 480

№ 6 $V(\text{отсеченная}) = \frac{1}{4} * 60 = 15$

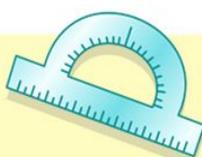
Ответ: 15



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

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

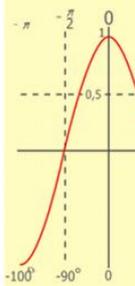
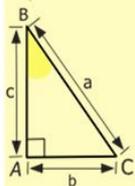
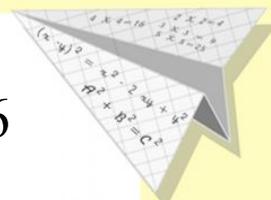
$$\sin 90^\circ = 1$$



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

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

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



- y = cos
- 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

