

How to apply Maths in real world

The workshop concerns in area surfaces calculations, estimating costs, describing geometric relations.

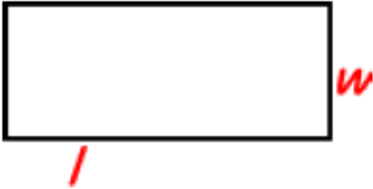
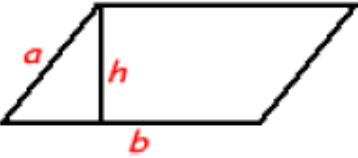
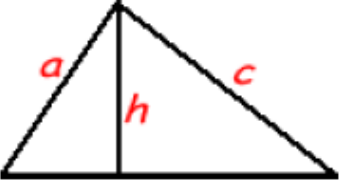
Gardens:



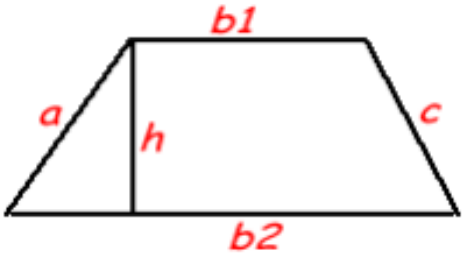
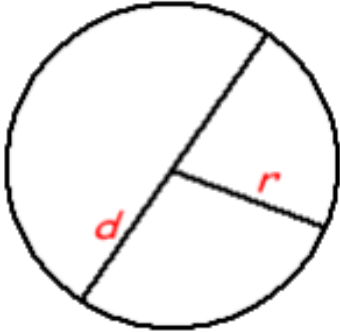




Formula for area surfaces calculations:

Shapes	Formulas
	<p>Rectangle Area = Length X Width $A = lw$</p> <p>Perimeter = 2 X Lengths + 2 X Widths $P = 2l + 2w$</p>
	<p>Parallelogram Area = Base X Height $A = bh$</p> <p>Perimeter = add the length of all sides $P = 2a + 2b$</p>
	<p>Triangle Area = 1/2 of the base X the height $A = \frac{1}{2}bh$</p> <p>Perimeter = $a + b + c$ (add the length of the three sides)</p>

Formula for area surfaces calculations:

 <p>A diagram of a trapezoid with a vertical height line labeled 'h'. The top horizontal base is labeled 'b1' and the bottom horizontal base is labeled 'b2'. The left slanted side is labeled 'a' and the right slanted side is labeled 'c'.</p>	<p>Trapezoid Area = 1/2 of the base X the height $A = \left(\frac{b1+b2}{2}\right)h$</p> <p>Perimeter = add lengths of all sides $P = a + b1 + b2 + c$</p>
 <p>A diagram of a circle with a horizontal diameter line labeled 'd' and a vertical radius line labeled 'r' extending from the center to the top edge.</p>	<p>Circle Radius = the distance from the center to a point on the circle (r).</p> <p>Diameter = the distance between two points on the circle through the center (d = 2r).</p> <p>Circumference = the distance around the circle (C = $\pi d = 2\pi r$). (Assume $\pi \approx 3.14$)</p> <p>Area = πr^2</p>

Area surfaces calculations:

2. A circle has the diameter of 16 m. Calculate circle's surface. Considering that $3,14 < \pi < 3,15$, round the surface to a natural value and calculate how many tulips can be planted on the circle's surface if on 1 m^2 it is recommended to plant 20 tulips.

$$r = D : 2 = 16 : 2 = 8 \text{ m}$$

$$S = \pi \cdot r^2 = \pi \cdot 8^2 = 64\pi \text{ m}^2.$$

$$3,14 < \pi < 3,15 \mid \cdot 64$$

$$200,96 < S < 201,6$$

$$S \cong 201 \text{ m}^2$$

$$\text{Tulips} = 201 \cdot 20 = 4020.$$

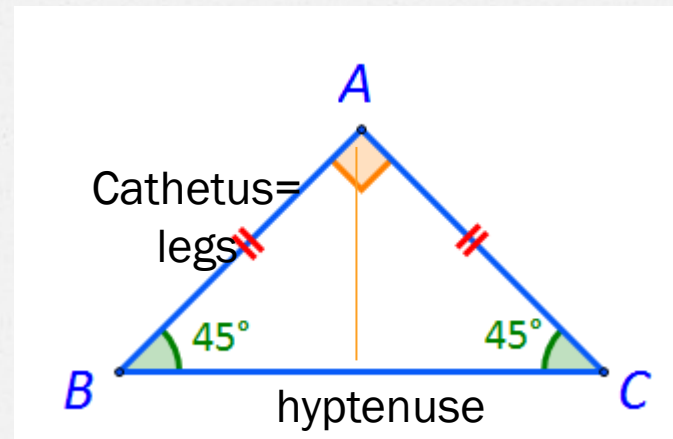
The area surface of an isoscel right triangle

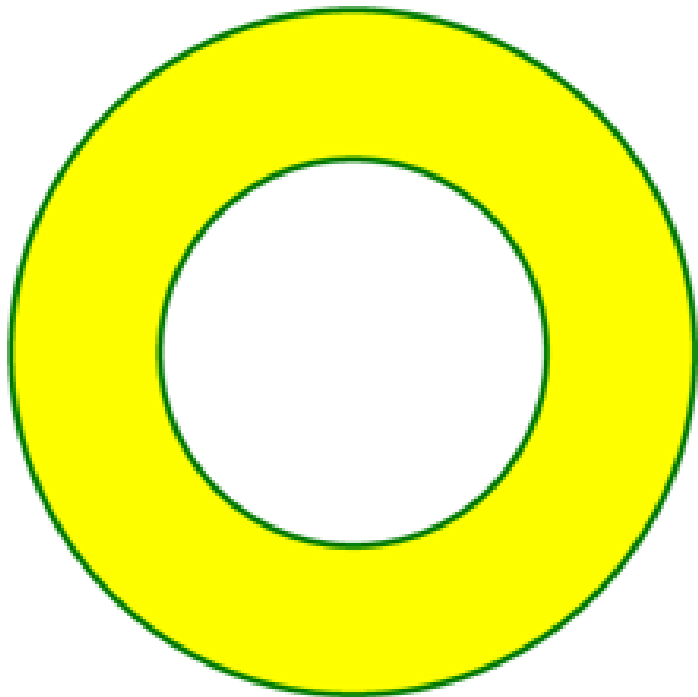
- o The sides that form the right angle are equal.
The height from the right angle is also a median

$$h = \frac{ip}{2}$$

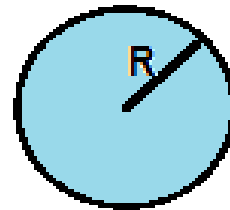
$$S = \frac{b \cdot h}{2} = \frac{BC \cdot \frac{BC}{2}}{2} = \frac{BC^2}{4}$$

Or in other situations: $S = \frac{c^2}{2}$





An *annulus* is the region between two concentric circles (the yellow area in the diagram to the left)



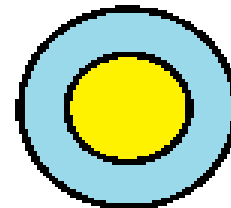
Area of
Big Circle =
 πR^2

—



Area of
Small Circle =
 πr^2

=



Area of Annulus =
 $\pi R^2 - \pi r^2$

Task 1:

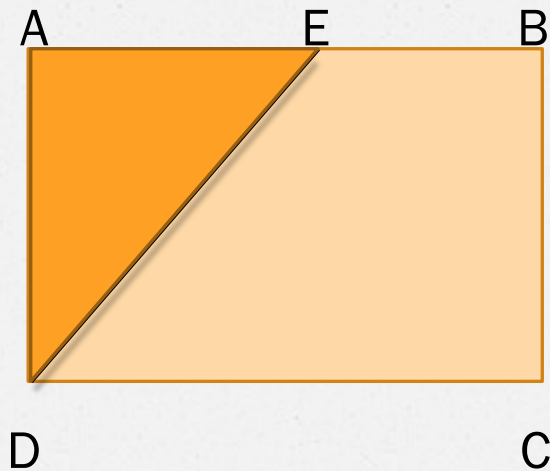
- o Landscaping a garden, we need to use tulips of 3 colors. The garden shape is an rectangle with the lenght of 20 m and the width of 16 m. Inside the garden we will plant diferent color tulips under the shape of: a circle with the radius of 5 m, and a isosceles right triangle with the leg of 6 m. The geometric shapes can be arranged as you want.
- o a) Please indicate the position ef each geometric shape using relations as: distances, paralel sides etc.
- o b) Calculate how many tulips on anny diferent colors are needed for landscaping if on a square metter we can plant 10 tulips.

Task 2:

Describe concentric 3 circles of tulips on different colors. The biggest radius is 10m. Every circle has the radius 2 m smaller than the previous one. On 1 m^2 it is recommended to plant 25 tulips. Estimate $\pi = 3,14$. How many tulips should we buy at any different color?

Task 3:

A rectangle ABCD has the length of 8 m and the width of 6 m. On the length AB we put a point E, so that the angle ADE has 45° . Calculate how many tulips will fit on the surface of CDEB, if on 1 m^2 it will be planted 30 tulips.



Task 4:

A parallelogram has the sides of 20 m and of 16 m. One angle of the parallelogram has 150° . Calculate the area surface of the parallelogram. If the surface is covered by flowers on parallel stripes with the longer side, 4 m wide, in different colors. How many flowers will be necessaries if on 1 m^2 it will be planted 28 flowers on every paralell stipe?

Task 5:

- o In a square with sides of 12 m, we will form a model of a circle with the radius of 5 m. The surface of the circle will be covered with yellow tulips and the rest of the square will be covered with purple tulips. On 1 m^2 we will plant 25 tulips. How many yellow and purple tulips do we need? Estimate $\pi = 3,14$.

