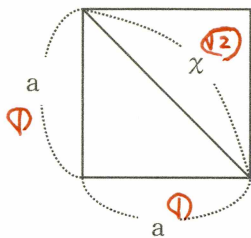


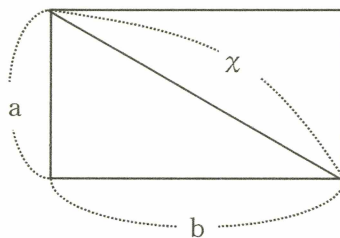
## (2) 三平方の定理と平面図形

## ①正方形



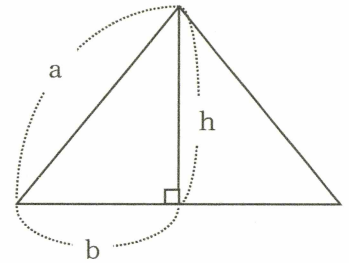
$$x = \sqrt{2} a$$

## ②長方形



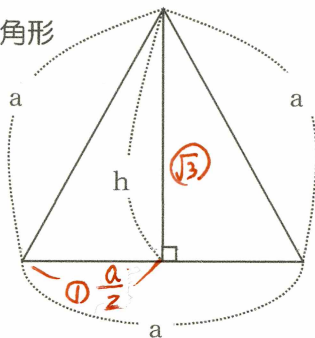
$$x = \sqrt{a^2 + b^2}$$

## ③二等辺三角形



$$h = \sqrt{a^2 - \frac{b^2}{4}}$$

## ④正三角形

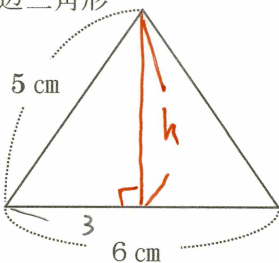


高さ  $h = \frac{\sqrt{3}}{2} a$

面積  $S = a \times \frac{\sqrt{3}}{2} a \times \frac{1}{2} = \frac{\sqrt{3}}{4} a^2$

(例3) 次の図形の面積を求めよ。

## (1) 二等辺三角形

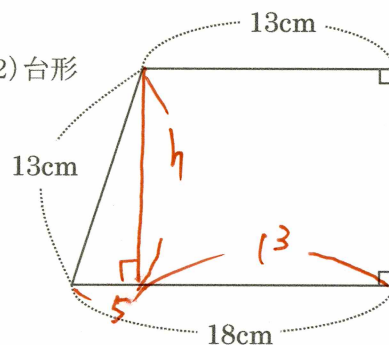


$$\begin{aligned} h &= \sqrt{5^2 - 3^2} \\ &= \sqrt{25 - 9} \\ &= \sqrt{16} \\ &= 4 \text{ cm} \end{aligned}$$

$$\begin{aligned} S &= 6 \times 4 \times \frac{1}{2} \\ &= 12 \text{ cm}^2 \end{aligned}$$

④ 垂線を  
ひく

## (2) 台形



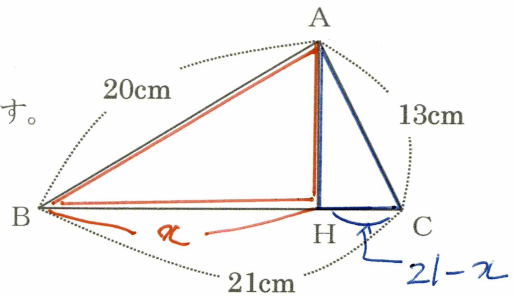
$$\begin{aligned} h &= \sqrt{13^2 - 5^2} \\ &= \sqrt{169 - 25} \\ &= \sqrt{144} \\ &= 12 \text{ cm} \end{aligned}$$

$$\begin{aligned} S &= (13 + 18) \times 12 \times \frac{1}{2} \\ &= 31 \times 6 \\ &= 186 \text{ cm}^2 \end{aligned}$$

(例4) 三角形の面積

右の図は△ABCの頂点Aから垂線AHをひいたものです。

BH, AHの長さを求め、面積Sを求めよ。



BHを $x$ cmとする,  $CH = 21 - x$

AH<sup>2</sup>を2通りの式で表す

$$\frac{20^2 - x^2}{\triangle ABH} = \frac{13^2 - (21 - x)^2}{\triangle ACH}$$

$$400 - x^2 = 169 - (441 - 42x + x^2)$$

$$400 - x^2 = 169 - 441 + 42x - x^2$$

$$42x - 272 = 400$$

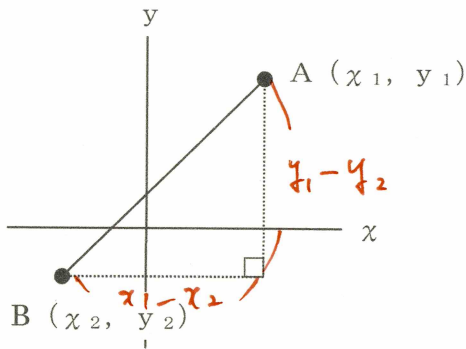
$$42x = 672$$

$$x = 16 \text{ cm}$$

$$\begin{aligned} \text{高さ} \\ AH &= \sqrt{20^2 - 16^2} \leftarrow \begin{pmatrix} CH = 21 - 16 \\ = 5 \\ AH = \sqrt{13^2 - 5^2} \\ = 12 \end{pmatrix} \\ &= \sqrt{400 - 256} \\ &= \sqrt{144} \\ &= 12 \text{ cm} \end{aligned}$$

$$\begin{aligned} S &= 21 \times 12 \times \frac{1}{2} \\ &= 126 \text{ cm}^2 \end{aligned}$$

(3) 2点間の距離



$$AB = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

←(図の三角形で三平方の定理を使うだけ。)

(例5) A(-3, -5)とB(5, 7)の2点間の距離を求めよ。

$$\begin{aligned} \text{右-左} \\ x &= 5 - (-3) = 8 \end{aligned}$$

$$\begin{aligned} \text{上-下} \\ y &= 7 - (-5) = 12 \end{aligned}$$

$$\begin{aligned} AB &= \sqrt{8^2 + 12^2} \\ &= \sqrt{64 + 144} \\ &= \sqrt{208} \\ &= 4\sqrt{13} \end{aligned}$$