Exercises

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Triangle exercise

1. ABC and AMP are two right triangles, right angled at B and M respectively. M lies on AC and AB is extended to meet P. Prove that:
   1.1 $\triangle ABC \sim \triangle AMP$
   1.2 $\frac{CA}{PA} = \frac{BC}{MP}$

Solution:

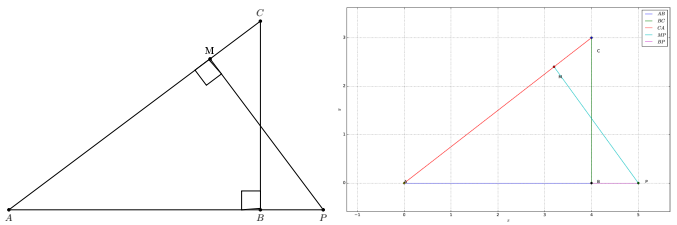

Figure 0-1: right angled triangles

From the above figure

$$\angle CAB = \angle MAP \tag{1}$$
$$\angle ABC = \angle AMP \tag{2}$$

From 1 and 2

$$\triangle ABC \sim \triangle AMP \tag{3}$$

- As correspondinng sides are proportional $\frac{CA}{PA} = \frac{BC}{MP} = \frac{AB}{AM}$

$$\frac{CA}{PA} = \frac{BC}{MP}$$

Triangle construction

2. In $\triangle ABC$,a=8,$\angle B = 45°$ and c-b=3.5. Sketch $\triangle ABC$

Solution:

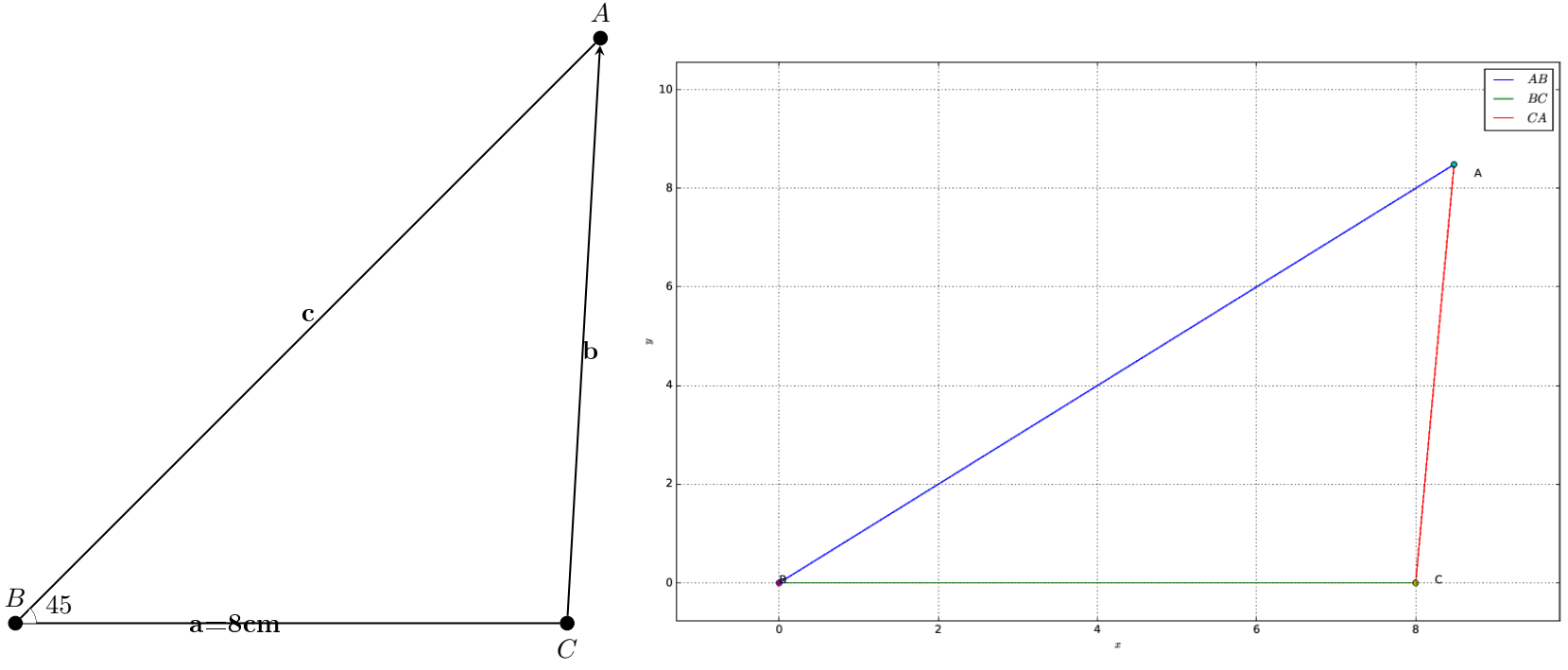

Figure 0-2: Triangle with tikz and python

Given a=8cm, c-b=k (k=3.5cm) Apply cosine rule

$$\cos(B) = \frac{a^2 + c^2 - b^2}{2ac}$$

$$\cos(B) = \frac{a^2 + (b+k)^2 - b^2}{2a(b+k)}$$

$$2ab\cos B + 2ak\cos B = a^2 + k + 2bk$$

$$b = \frac{a^2 + k^2 - 2ak\cos B}{2a\cos B - 2k}$$

b=8.49, c=11.99

- tikz code for above figure: `https://github.com/d-DP/Assignments/blob/master/figs/2.tex`
- Python code for Figure 0-2:`https://github.com/d-DP/Assignments/blob/master/codes/2.py`