

# Exercises

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22 December 2019

# Triangle exercise

1.  $\triangle ABC$  and  $\triangle AMP$  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:**

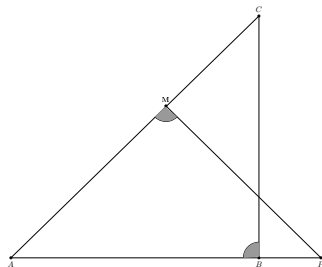


Figure 0-1: right angled triangles

From the above figure

$$\angle CAB = \angle MAP \quad (1)$$

$$\angle ABC = \angle AMP \quad (2)$$

From 1 and 2

$$\triangle ABC \sim \triangle AMP \quad (3)$$

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

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

# Triangle construction

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

**Solution:**

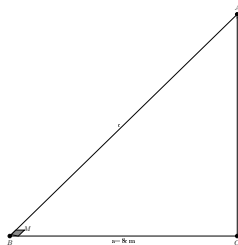


Figure 0-2: Triangle

Apply cosine rule

$$\cos 45^\circ = \frac{8}{3.5 + c} \implies c = 7.813, b = 4.313$$

Python code for Figure 0-2: <https://github.com/d-DP/Codes>

## Circle exercises

3. Two circles intersect at two points B and C. Through B, two line segments ABD and PBQ are drawn to intersect the circles at A, D and P, Q respectively. Prove that  $\angle ACP = \angle QCD$

**Solution:**

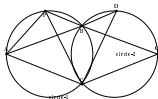


Figure 0-3: Circle

**Solution:**

From the above figure

$$\angle PBA = \angle ACP \quad (4)$$

$$\angle DBQ = \angle QCD \quad (5)$$

$$\angle PBA = \angle DBQ \quad (6)$$

## circle constructions

4. Draw a circle with centre B and radius 6. If C be a point 10 units away from its centre, construct the pair of tangents AC and CD to the circle.

**Solution:**

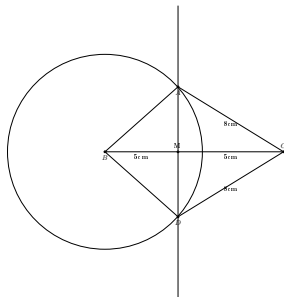


Figure 0-4: Circle

python code : <https://github.com/d-DP/Codes>

## Miscellaneous

5. The lengths of two parallel chords of a circle are 6 cm and 8 cm. If the smaller chord is at distance 4 cm from the centre, what is the distance of the other chord from the centre?

**Solution:**

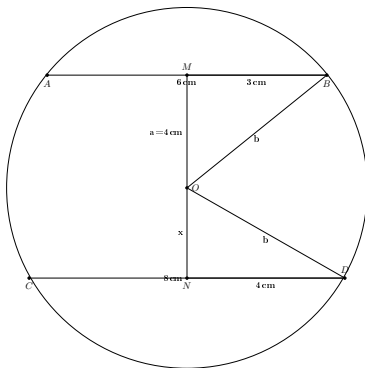


Figure 0-5: Circle

Apply Baudhayana theorem for  $\triangle MOB$  and  $\triangle NOD$

$$a^2 + b^2 = (3)^2$$

$$x^2 + b^2 = (4)^2$$