

MEG Mastering Angle chasing

Tom Yan

June 2023

1 Introduction

1. In $\triangle ABC$, $AB = AC$ and $\angle A = 40^\circ$. The bisector from $\angle B$ intersects AC at point D . What is $\angle BDC$?
2. (AIMO 2019/3) Let $ABCD$ be a square with side length 24. Let P be a point on side AB with $AP = 8$, and let AC and DP intersect at Q . Determine the area of triangle CQD .
3. (Angle Bisector theorem) Let ABC be a triangle and D be a point on \overline{BC} so that \overline{AD} is the internal angle bisector of $\angle BAC$. Show that

$$\frac{AB}{AC} = \frac{DB}{DC}.$$

4. (AIME 2016/6) In $\triangle ABC$ let I be the center of the inscribed circle, and let the bisector of $\angle ACB$ intersect AB at L . The line through C and L intersects the circumscribed circle of $\triangle ABC$ at the two points C and D . If $LI = 2$ and $LD = 3$, then find IC .
5. Let ABC be an acute triangle inscribed in circle Ω . Let X be the midpoint of the arc \widehat{BC} not containing A and define Y, Z similarly. Show that the orthocenter of XYZ is the incenter I of ABC .