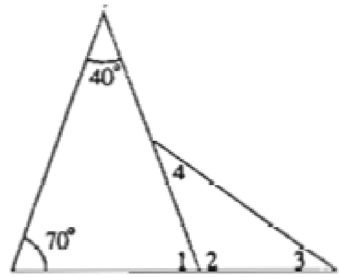
1997 Q12

12. $\angle 1 + \angle 2 = 180°$
$\angle 3 = \angle 4$
Find $\angle 4$

(A) 20° **(B)** 25° **(C)** 30° **(D)** 35° **(E)** 40°



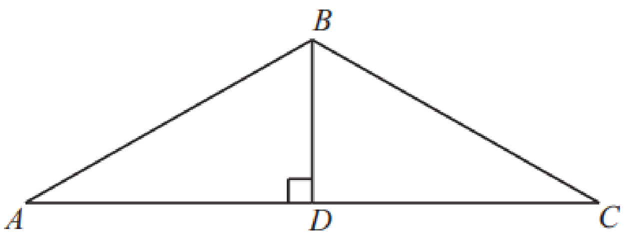
12. **(D)** Since the sum of the angles of a triangle is 180°, $40° + 70° + \angle 1 = 180°$ and $\angle 1 = 70°$. This means that $\angle 2 = 110°$. Then $110° + \angle 3 + \angle 4 = 180°$, so $\angle 3 + \angle 4 = 70°$ and $\angle 3 = \angle 4 = 35°$.

2007 Q14

14. The base of isosceles $\triangle ABC$ is 24 and its area is 60. What is the length of one of the congruent sides?

(A) 5 **(B)** 8 **(C)** 13 **(D)** 14 **(E)** 18

14. **(C)** Let $\overline{BD}$ be the altitude from B to $\overline{AC}$ in $\triangle ABC$.



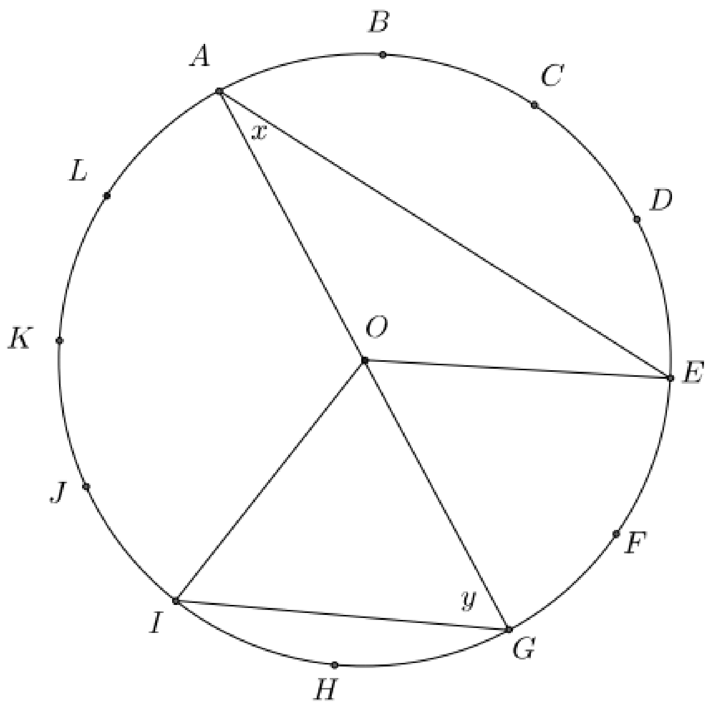
Then $60 =$ the area of $\triangle ABC = \frac{1}{2} \cdot 24 \cdot BD$, so $BD = 5$. Because $\triangle ABC$ is isosceles, $\triangle ABD$ and $\triangle CBD$ are congruent right triangles. This means that $AD = DC = \dfrac{24}{2} = 12$. Applying the Pythagorean Theorem to $\triangle ABD$ gives

$$AB^2 = 5^2 + 12^2 = 169 = 13^2, \text{ so } AB = 13.$$

2014 Q15

15. The circumference of the circle with center O is divided into 12 equal arcs, marked the letters A through L as seen below. What is the number of degrees in the sum of angles x and y?

(A) 75 **(B)** 80 **(C)** 90 **(D)** 120 **(E)** 150



15. **Answer (C):** Angle AOE is $\frac{4}{12}$ of $360°$ or $120°$ degrees, while $\angle GOI$ is $\frac{2}{12}$ of $360°$ or $60°$. Both triangles are isosceles, so the equal base angles are $\frac{60°}{2}$ and $\frac{120°}{2}$ respectively. The sum of angles x and y then is $(60° + 120°)/2 = 90°$.

2005 Q15

15. How many different isosceles triangles have integer side lengths and perimeter 23?

(A) 2 **(B)** 4 **(C)** 6 **(D)** 9 **(E)** 11

15. **(C)** Because the perimeter of such a triangle is 23, and the sum of the two equal side lengths is even, the length of the base is odd. Also, the length of the base is less than the sum of the other two side lengths, so it is less than half of 23. Thus the six possible triangles have side lengths 1, 11, 11; 3, 10, 10; 5, 9, 9; 7, 8, 8; 9, 7, 7 and 11, 6, 6.