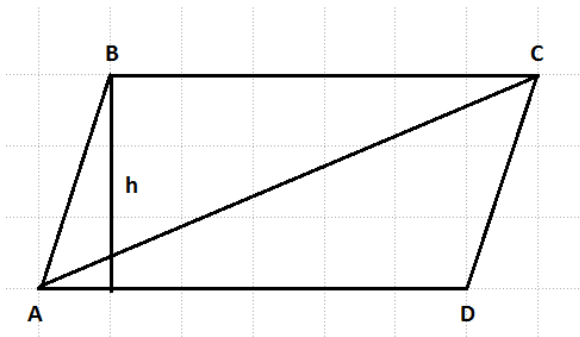


Answer on Question #57004 – Math – Geometry

Question

1. Find the height of a parallelogram with 10 sides and 20 inches long, and an included angle of 35 degrees. Also, calculate the area of the figure.

Solution



Given: $AB = CD = 10$, $AD = BC = 20$, $\angle BAD = 35^\circ$.

Then

$$h = AB \sin \angle BAD = 10 \sin 35^\circ \approx 5.74 \text{ in.}$$

$$S = AD * h = 20 * 5.74 = 114.8 \text{ in}^2$$

Answer: 5.74 in, 114.8 in².

Question

2. A certain city block is in the form of a parallelogram. Two of its sides measures 32 ft and 41 ft. If the area of the land in the block is 656 ft², what is the length of its longer diagonal?

Solution

Given: $AB = CD = 32$, $AD = BC = 41$, $S = 656$.

Then

$$h = AB \sin \angle BAD.$$

Area of parallelogram is

$$S = AD * h = AD * AB * \sin \angle BAD \rightarrow$$

$$\rightarrow \sin \angle BAD = \frac{S}{AD * AB} = \frac{656}{41 * 32} = 0.5 \rightarrow \angle BAD = 30^\circ \rightarrow$$

$$\rightarrow \angle ADC = 180^\circ - 30^\circ = 150^\circ.$$

By law of cosines,

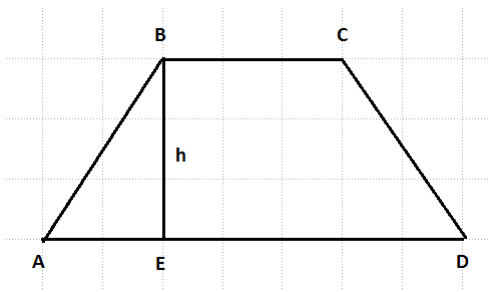
$$\begin{aligned} AC &= \sqrt{AD^2 + CD^2 - 2AD * CD \cos \angle ADC} = \\ &= \sqrt{41^2 + 32^2 - 2 * 32 * 41 \cos 150^\circ} = \sqrt{4977.45} \approx 70.55 \end{aligned}$$

Answer: 70.55 ft.

Question

3. The area of an isosceles trapezoid is 246 m^2 . If the height and the length of one of its congruent sides measures 6 meters and 10 meters, respectively, find the length of the two bases.

Solution



Given: $S = 246$, $BE = h = 6$, $AB = 10$.

By the Pythagorean Theorem,

$$AE = \sqrt{AB^2 - BE^2} = \sqrt{100 - 36} = 8.$$

The area of trapezium is

$$S = \frac{AD+BC}{2} h = \frac{2BC+2AE}{2} h = (BC + 8) * 6 = 246 \rightarrow BC = \frac{246-48}{6} = 33.$$

So the lengths of two bases are $BC = 33$, $AD = 33 + 16 = 49$.

Answer: 33m, 49m.