

**Topic:** Area from the law of sines

**Question:** What is the area of a triangle with side lengths 17 and 53, and an included angle of  $81^\circ$ ?

**Answer choices:**

- A      560
- B      468
- C      371
- D      445



**Solution: D**

Let  $a = 17$  and  $b = 53$ . Then the included angle is  $C = 81^\circ$ . Plugging what we know into the law of sines for the area of a triangle, we get

$$\text{Area} = \frac{1}{2}ab \sin C$$

$$\text{Area} = \frac{1}{2}(17)(53)\sin 81^\circ$$

$$\text{Area} \approx \frac{901}{2}(0.988)$$

$$\text{Area} \approx 445$$



**Topic:** Area from the law of sines

**Question:** Find the area of a triangle with interior angles  $77^\circ$  and  $56^\circ$ , if the included side has length 39.

**Answer choices:**

- A      841
- B      492
- C      571
- D      708



**Solution: A**

The third angle in the triangle has measure

$$180^\circ - 77^\circ - 56^\circ$$

$$47^\circ$$

Then, plugging everything we know into the law of sines, we get

$$\frac{a}{\sin 77^\circ} = \frac{b}{\sin 56^\circ} = \frac{39}{\sin 47^\circ}$$

Find  $a$  using the first and third parts of this three-part equation.

$$\frac{a}{\sin 77^\circ} = \frac{39}{\sin 47^\circ}$$

$$a = \frac{39 \sin 77^\circ}{\sin 47^\circ} \approx \frac{39(0.974)}{0.731} \approx 52.0$$

Use the law of sines for the area of a triangle.

$$\text{Area} = \frac{1}{2}ac \sin B$$

$$\text{Area} \approx \frac{1}{2}(52.0)(39)\sin 56^\circ$$

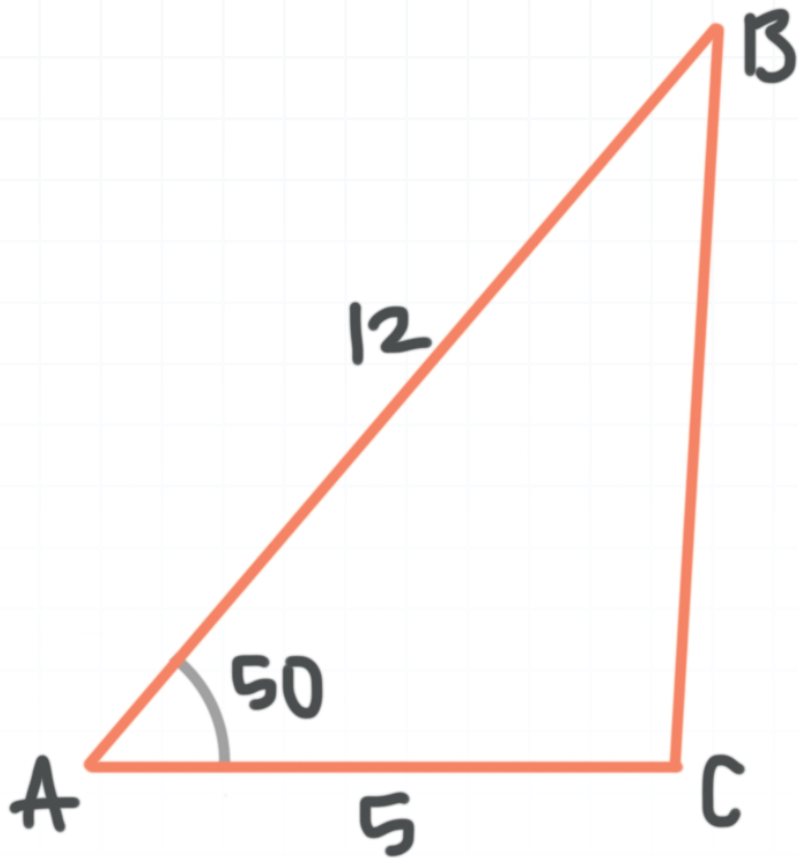
$$\text{Area} \approx \frac{2,028}{2}(0.829)$$

$$\text{Area} \approx 841$$



**Topic:** Area from the law of sines

**Question:** Find the area of the triangle to the nearest tenth.

**Answer choices:**

- A 46
- B 39
- C 23
- D 12



**Solution: C**

Plugging what we know into the law of sines for the area of a triangle, we get

$$\text{Area} = \frac{1}{2}bc \sin A$$

$$\text{Area} = \frac{1}{2}(5)(12)\sin 50^\circ$$

$$\text{Area} \approx 30(0.766)$$

$$\text{Area} \approx 23$$

