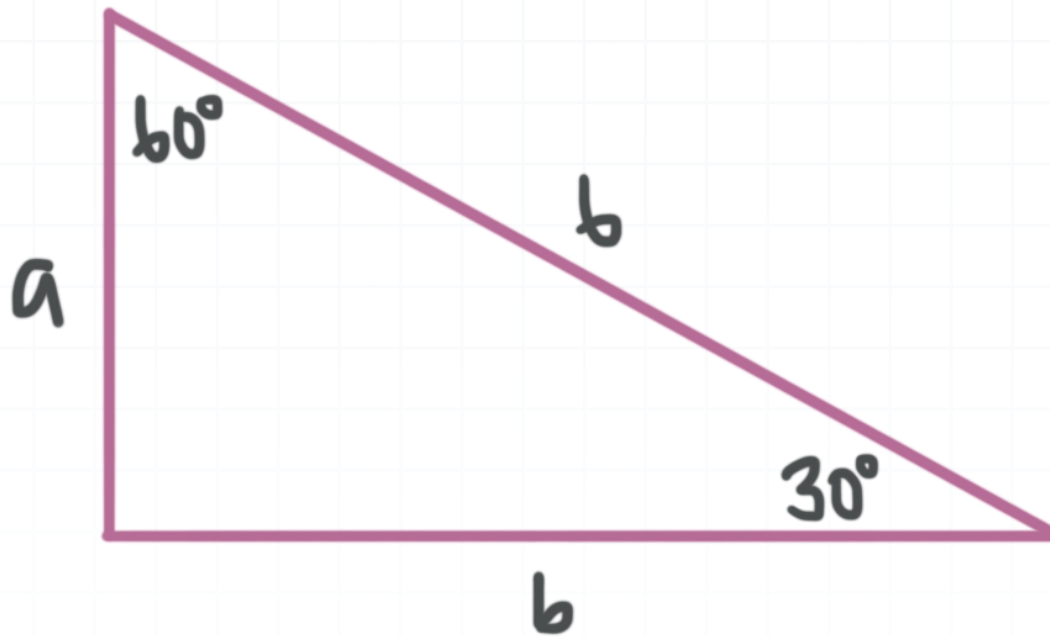


**Topic:** 30-60-90 triangles**Question:** What are the values of  $a$  and  $b$ ?**Answer choices:**

- A  $a = 3\sqrt{3}$  and  $b = 3$
- B  $a = 3$  and  $b = 3\sqrt{3}$
- C  $a = 3$  and  $b = 4$
- D  $a = 3$  and  $b = 3$



**Solution: B**

The pattern for the lengths of the sides of a 30-60-90 triangle is  $x$  for the short leg,  $x\sqrt{3}$  for the long leg, and  $2x$  for the hypotenuse. In this case, we know that 6 is the length of the hypotenuse, which is represented by  $2x$ .

Write  $2x = 6$  and solve for  $x$ .

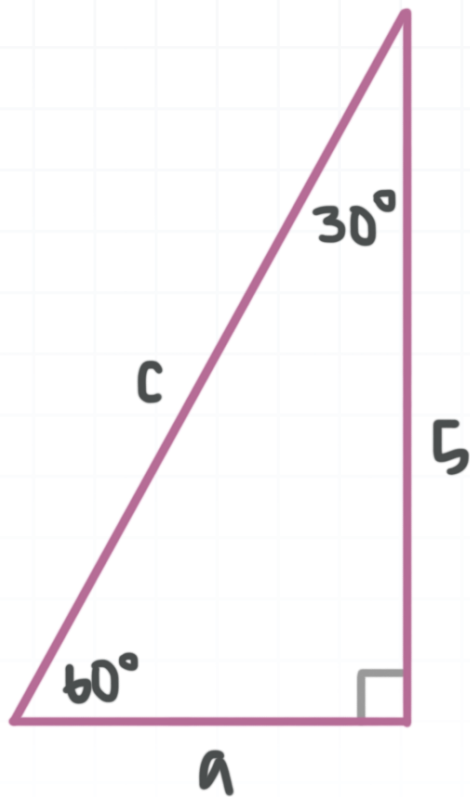
$$2x = 6$$

$$x = 3$$

$a$  is the length of the short leg, so  $a = x = 3$ .

$b$  is the length of the long leg, so  $b = x\sqrt{3} = 3\sqrt{3}$ .



**Topic:** 30-60-90 triangles**Question:** What are the values of  $a$  and  $c$ ?**Answer choices:**

- A  $a = \frac{10\sqrt{3}}{3}$  and  $c = \frac{5\sqrt{3}}{3}$
- B  $a = \frac{5\sqrt{3}}{3}$  and  $c = \frac{10\sqrt{3}}{3}$
- C  $a = 5\sqrt{3}$  and  $c = 10$
- D  $a = 5\sqrt{3}$  and  $c = 5$



**Solution: B**

The pattern for the lengths of the sides of a 30-60-90 triangle is  $x$  for the short leg,  $x\sqrt{3}$  for the long leg, and  $2x$  for the hypotenuse. In this case, we know that 5 is the length of the long leg, which is represented by  $x\sqrt{3}$ .

Write  $x\sqrt{3} = 5$  and solve for  $x$ .

$$x\sqrt{3} = 5$$

$$x = \frac{5}{\sqrt{3}}$$

Rationalizing the denominator, we get

$$x = \frac{5}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{5\sqrt{3}}{3}$$

$a$  is the length of the short leg, so

$$c = 2x = 2\left(\frac{5\sqrt{3}}{3}\right) = \frac{10\sqrt{3}}{3}$$

$c$  is the length of the hypotenuse, so

$$c = 2x = 2\left(\frac{5\sqrt{3}}{3}\right) = \frac{10\sqrt{3}}{3}$$



**Topic:** 30-60-90 triangles

**Question:**  $\triangle SAM$  is a 30-60-90 triangle, with  $S$  at  $(0,0)$ ,  $A$  at  $(4\sqrt{3},4)$ , and  $M$  at  $(4\sqrt{3},0)$  in the Cartesian coordinate system. Which angle is the  $60^\circ$  angle?

**Answer choices:**

- A  $S$
- B  $A$
- C  $M$
- D None of these



## Solution: B

In a 30-60-90 triangle the angle opposite the long leg is the  $60^\circ$  angle, which in this case would be  $\angle A$ .

