

Special Triangles Practice

Use the following information to answer the first question.

The following statements were made regarding the special triangle ratios.

Statement 1	None of the special triangle ratios are integers.
Statement 2	The sine of 30° is the same as the cos of 60° .
Statement 3	The tan of 30° is the reciprocal of the tan of 60° .
Statement 4	If the hypotenuse is 40 cm, the side opposite the 30° angle is 80 cm.

1. The two true statements are

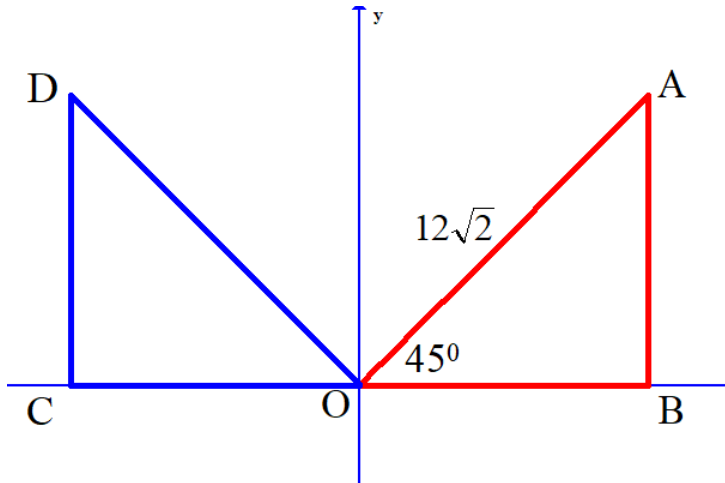
A) 1 and 2

B) 3 and 4

C) 2 and 3

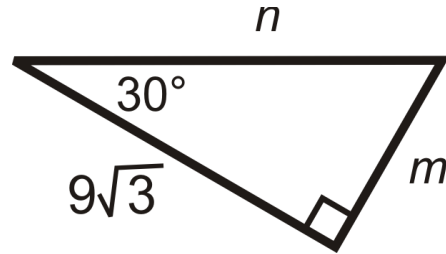
D) 1 and 4

2. Triangle AOB is reflected in the y-axis, as shown below.



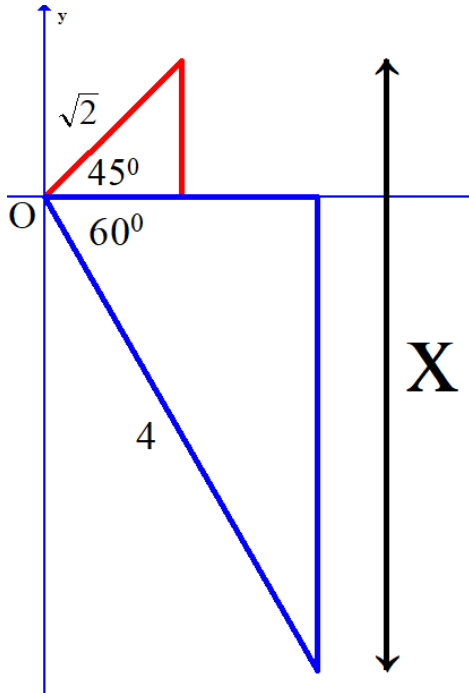
The distance between C and B is ____ units.

Use the following diagram to answer the next question.



3. The length of the hypotenuse is
 A) 4.5 B) 9 C) 18 D) 27

4. As an exact answer, the value of x is _____.



5. A windshield wiper has a length of 60 cm. The wiper rotates from its resting position at 30° , in standard position, to 150° . Determine the exact horizontal distance that the tip of the wiper travels in one swipe.
 A) $60\sqrt{3}$ B) $60\sqrt{2}$ C) $40\sqrt{3}$ D) $40\sqrt{2}$

Special Triangles Practice Solutions

Use the following information to answer the first question.

The following statements were made regarding the special triangle ratios.

Statement 1	None of the special triangle ratios are integers.
Statement 2	The sine of 30° is the same as the cos of 60° .
Statement 3	The tan of 30° is the reciprocal of the tan of 60° .
Statement 4	If the hypotenuse is 40 cm, the side opposite the 30° angle is 80 cm.

1. The two true statements are

A) 1 and 2

B) 3 and 4

C) 2 and 3

D) 1 and 4

Solution

Statement 1 is false. There is one special triangle ratio that is an integer. The tangent of 45° is 1.

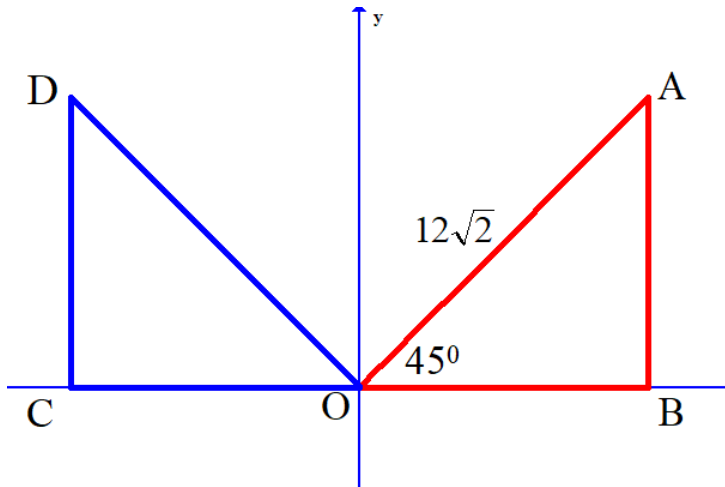
Statement 2 is true. The sine of 30° is $\frac{1}{2}$ and the cos of 60° is $\frac{1}{2}$.

Statement 3 is true. The tan of 30° is $\frac{1}{\sqrt{3}}$ and the tan of 60° is $\sqrt{3}$.

Statement 4 is false. If the hypotenuse is 40 cm, the opposite side must be half of it, or 20 cm.

The correct answer is C.

2. Triangle AOB is reflected in the y-axis, as shown below.



The distance between C and B is 24 units.

Solution

In a $45^\circ - 45^\circ - 90^\circ$ triangle, the ratio is $1:1:\sqrt{2}$.

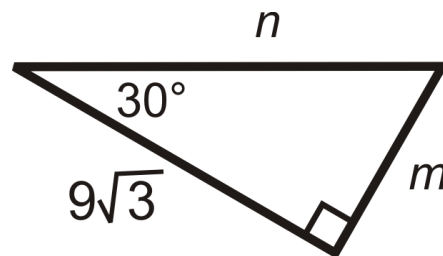
Since the hypotenuse is $12\sqrt{2}$, the two equal sides must be 12 units.

Therefore AB and OB are equal to 12.

Because of the reflection, $OB = OC$. Therefore, $OC = 12$.

The distance between C and B is 24 units.

Use the following diagram to answer the next question.



3. The length of the hypotenuse is

A) 4.5

B) 9

C) 18

D) 27

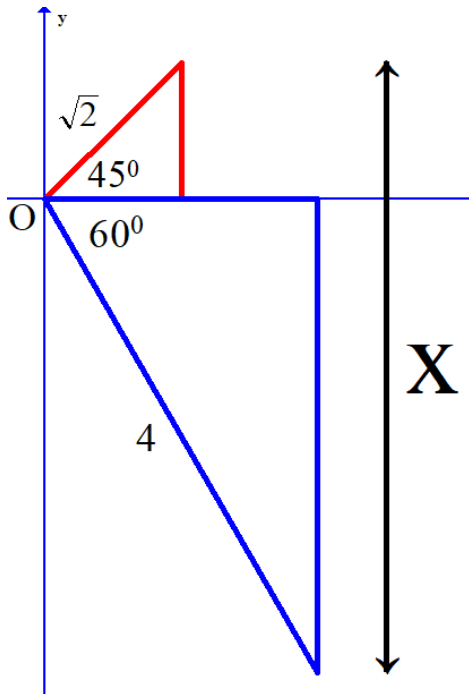
Solution

In a $30^\circ - 60^\circ - 90^\circ$ triangle, the ratio is $1:2:\sqrt{3}$.

Since the longest leg is $9\sqrt{3}$, the shortest leg must be 9, which would mean that the hypotenuse, or the longest side in the triangle, is double this, or 18.

The correct answer is C.

4. As an exact answer, the value of x is $1 + 2\sqrt{3}$.



For the smaller triangle in red, since the hypotenuse is $\sqrt{2}$ each of the sides lengths is 1.

For the larger triangle in blue, since the hypotenuse is 4, the smaller base side on the x-axis must be 2, which means the larger leg (vertical blue line) must be $2\sqrt{3}$

As an exact answer, the value of x is $1 + 2\sqrt{3}$

5. A windshield wiper has a length of 60 cm. The wiper rotates from its resting position at 30° , in standard position, to 150° . Determine the exact horizontal distance that the tip of the wiper travels in one swipe.

A) $60\sqrt{3}$

B) $60\sqrt{2}$

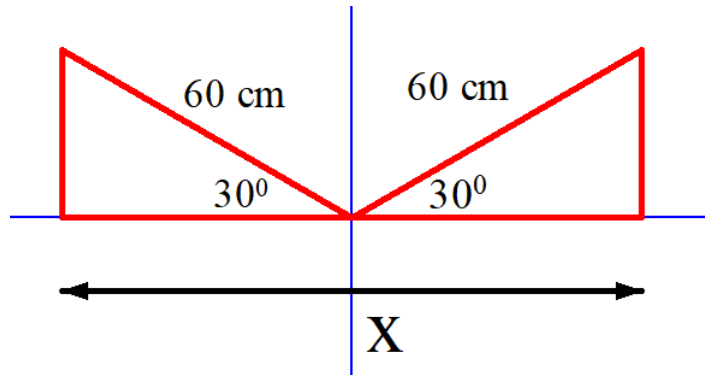
C) $40\sqrt{3}$

D) $40\sqrt{2}$

Ans.

Solution

Our goal is to determine the value of x .



The side opposite the 30° is half of 60 or 30 cm. Therefore, the third side in the triangle is $30\sqrt{3}$.

The length of x is $30\sqrt{3} + 30\sqrt{3}$ or $60\sqrt{3}$.

The correct answer is A.