# Objective

Students will be able to discover special right triangles.

# Special Right Triangles Activity

Measure the length of the side of your given square. Find the length of the diagonal of your square (NO decimals). Record your findings in your notebook.

Switch squares with someone near you who has a different side length. Repeat process for at least 3 squares and come up with a conclusion about the right triangles formed by the diagonal (what are the angles of the triangles formed and come up with a conclusion about its sides).

# Special Right Triangles Activity

Measure the length of the side of your given equilateral triangle. Find the length of the altitude of your equilateral triangle (NO decimals). Record your findings in your notebook.

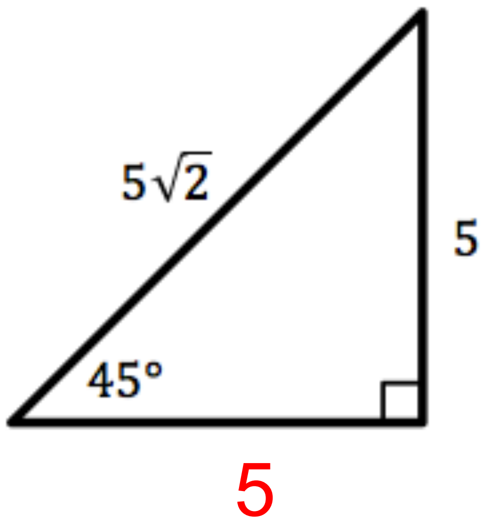
Switch triangles with someone near you who has a different side length. Repeat process for at least 3 triangles and come up with a conclusion about the right triangles formed by the altitude (what are the angles of the triangles formed and come up with a conclusion about its sides).

# Objective

Students will be able to apply special right triangles.

# Use the Pythagorean Theorem to find the missing sides.

1)

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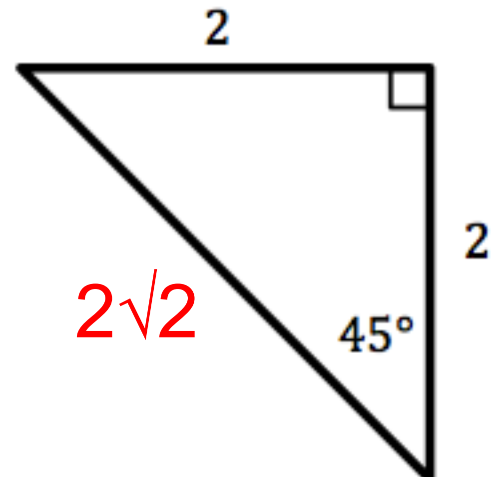


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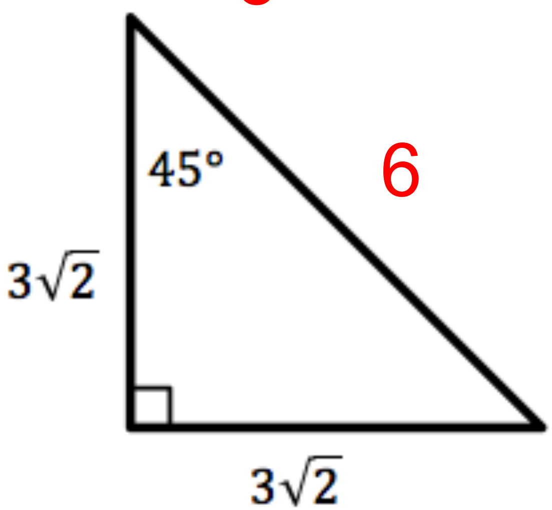


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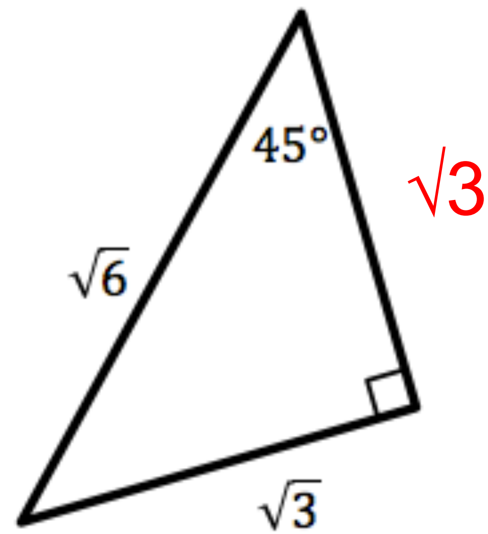


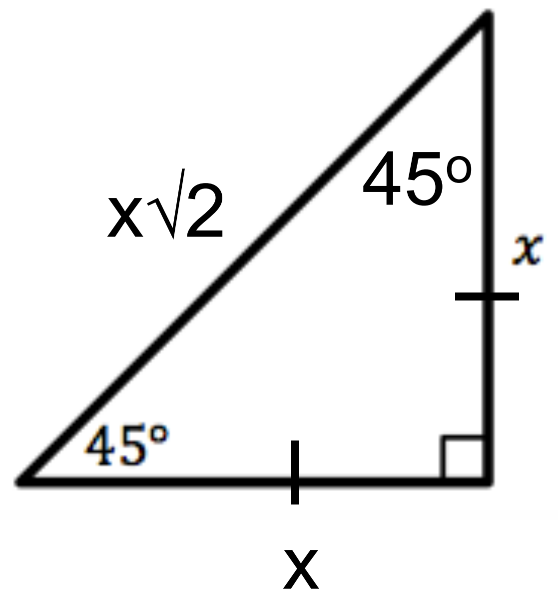
# 45º-45º-90º Triangles

$x^2 + x^2 = c^2$

$2x^2 = c^2$

$\sqrt{(2x^2)} = \sqrt{(c^2)}$

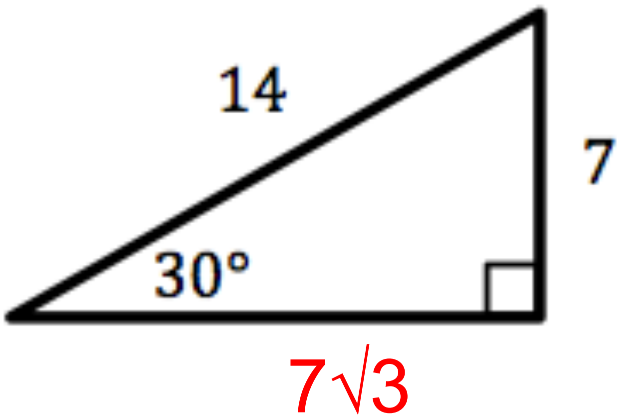
$x\sqrt{2} = c$




<u>45º-45º-90º Triangle Theorem</u>: In a triangle whose angles have the measures 45, 45, and 90, the lengths of the sides opposite these angles can be represented by x, x, and $x\sqrt{2}$, respectively.

# Use the Pythagorean Theorem to find the missing sides.

1)

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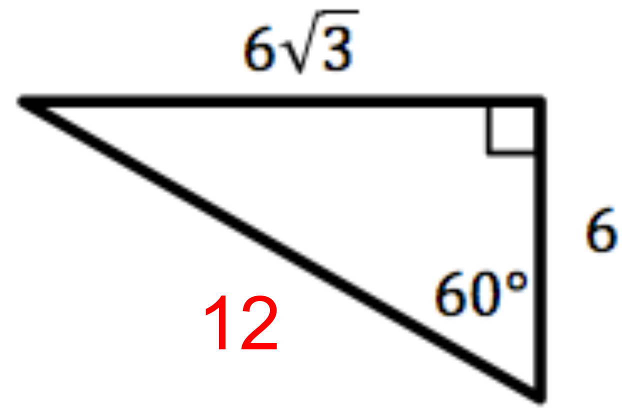


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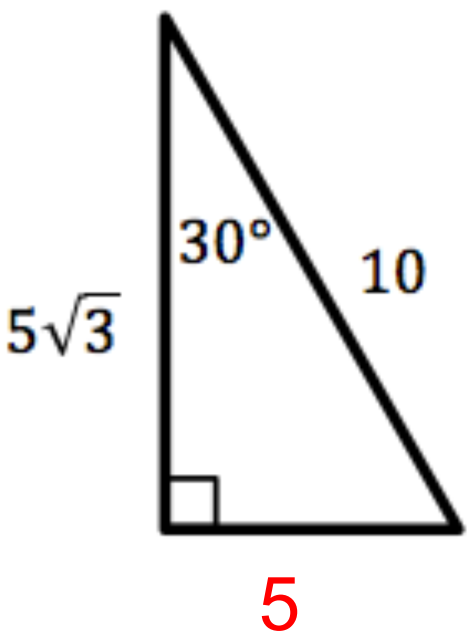


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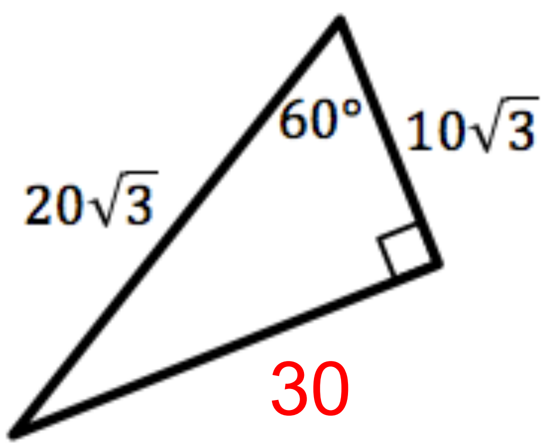


# 30º-60º-90º Triangles

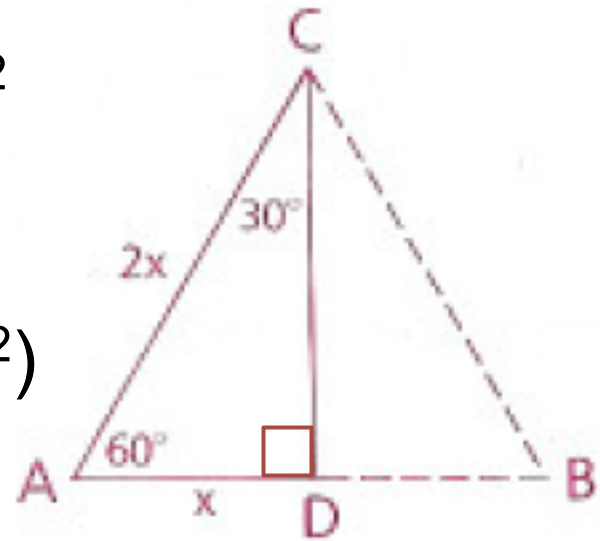
$x^2 + b^2 = (2x)^2$

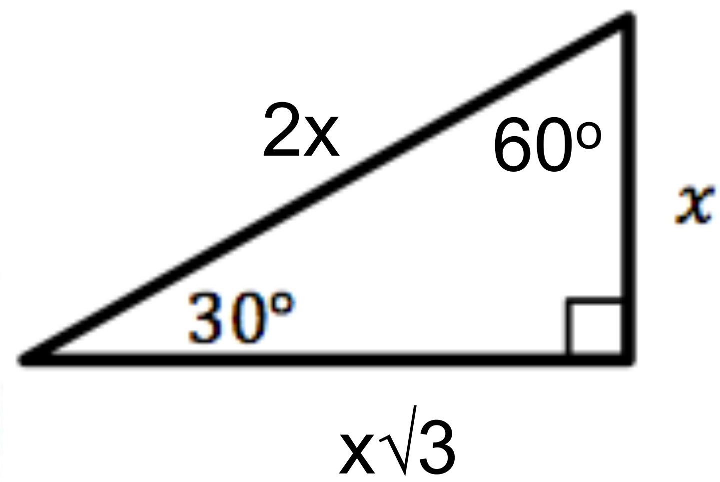
$x^2 + b^2 = 4x^2$

$b^2 = 3x^2$

$\sqrt{(b^2)} = \sqrt{(3x^2)}$

$b = x\sqrt{3}$




30º-60º-90º Triangle Theorem: In a triangle whose angles have the measures 30, 60, and 90, the lengths of the sides opposite these angles can be represented by x, x√3, and 2x, respectively.

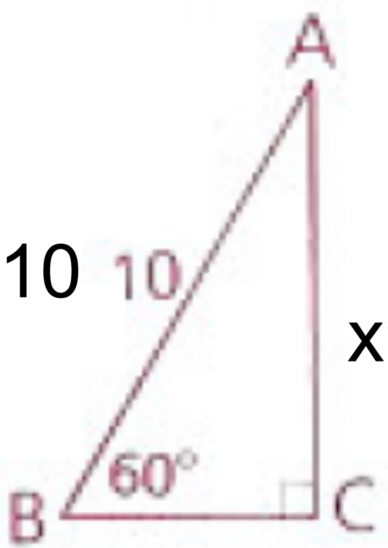
# Solve for the missing sides of the triangles.

**Hint:  Use what you know about the special right triangles to help you solve

**Rationalize denominator

1)

2x = 10



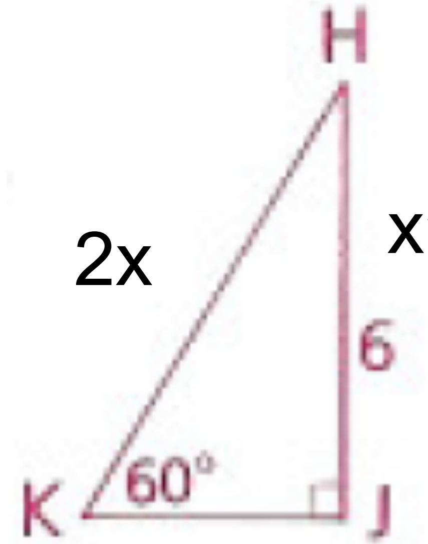

$x\sqrt{3}$

x

$x = 5$ so $BC = 5$
and $AC = 5\sqrt{3}$

2)

2x




$x\sqrt{3} = 6$

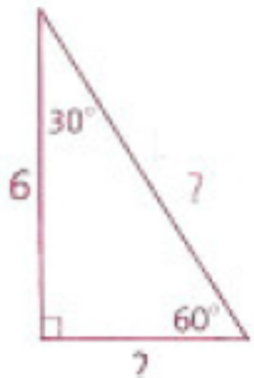
x

$x = 2\sqrt{3}$ so $KJ = 2\sqrt{3}$
and $HK = 4\sqrt{3}$

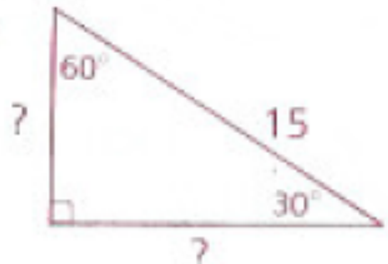
# Homework p. 408: 2, 4, 8, 19, 22

**2** Find the two missing sides of each triangle. (Hint: These are a bit harder, and you may want to put x, $x\sqrt{3}$, and 2x on the proper sides as shown in the sample problems.)

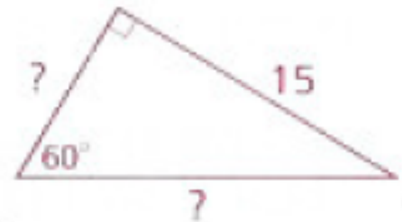
**a**




**b**



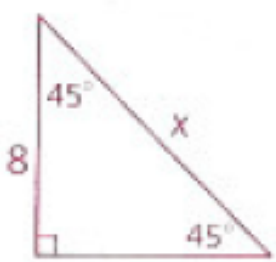

**c**



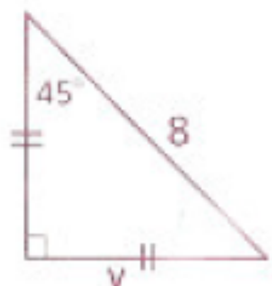

**d**


**4** Solve for the variable in each of these 45°-45°-90° triangles.

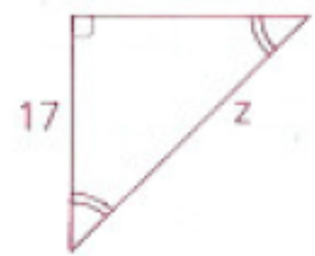
**a**




**b**



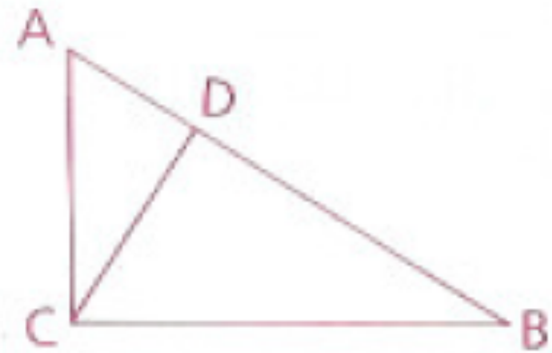

**c**



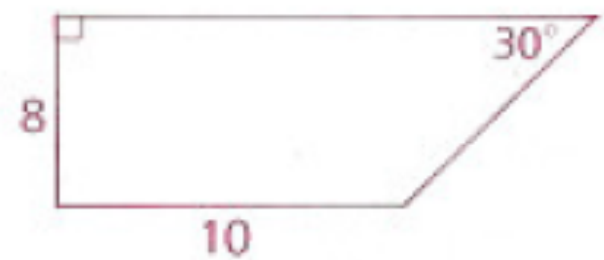

**d**

**8** Given: $\overline{AC} \perp \overline{BC}$, $\overline{CD} \perp \overline{AB}$, $\angle B = 30°$, $BC = 8\sqrt{3}$

Find: CD




**19** Find, to the nearest tenth, the perimeter of the trapezoid.




**22** Find the altitude to the base of the isosceles triangle shown.

# Objective

Students will be able to understand the three basic trigonometric relationships.

Make sure you have a calculator tomorrow!

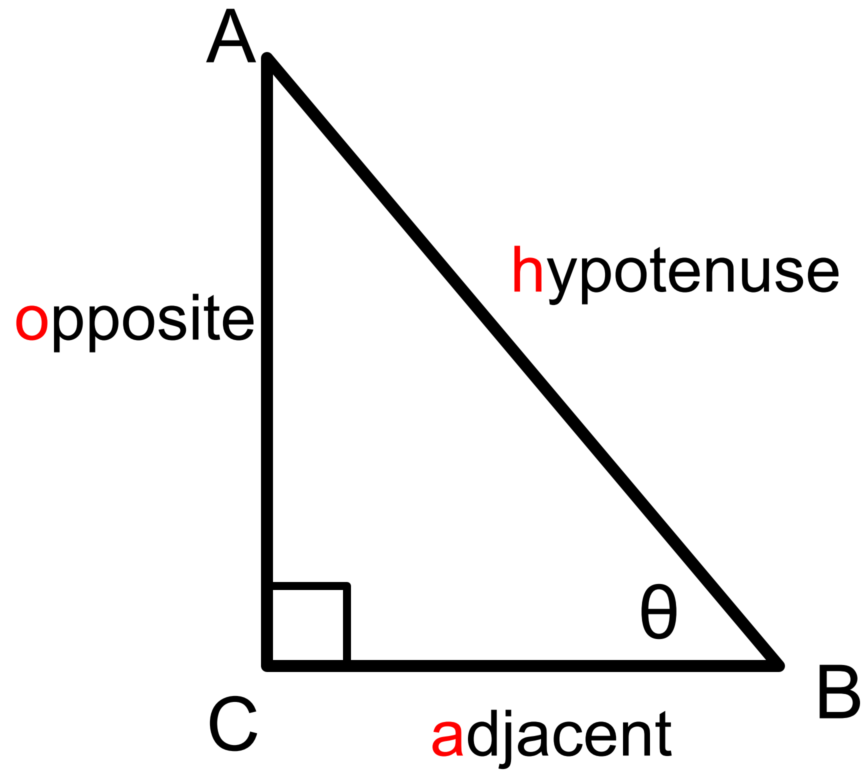
**Similarity and Trigonometric Ratios Test on Monday, 3/13**

# Three Trigonometric Ratios- sine, cosine, and tangent

$$\sin\theta = \frac{opposite}{hypotenuse}$$ SOH

$$\cos\theta = \frac{adjacent}{hypotenuse}$$ CAH

$$\tan\theta = \frac{opposite}{adjacent}$$ TOA




**SOH-CAH-TOA**

**only for right triangles

# Find the Three Trig Functions of θ and ∠B

$\sin\theta$

7/25

$\sin\angle B$

24/25

$\cos\theta$

24/25

$\cos\angle B$

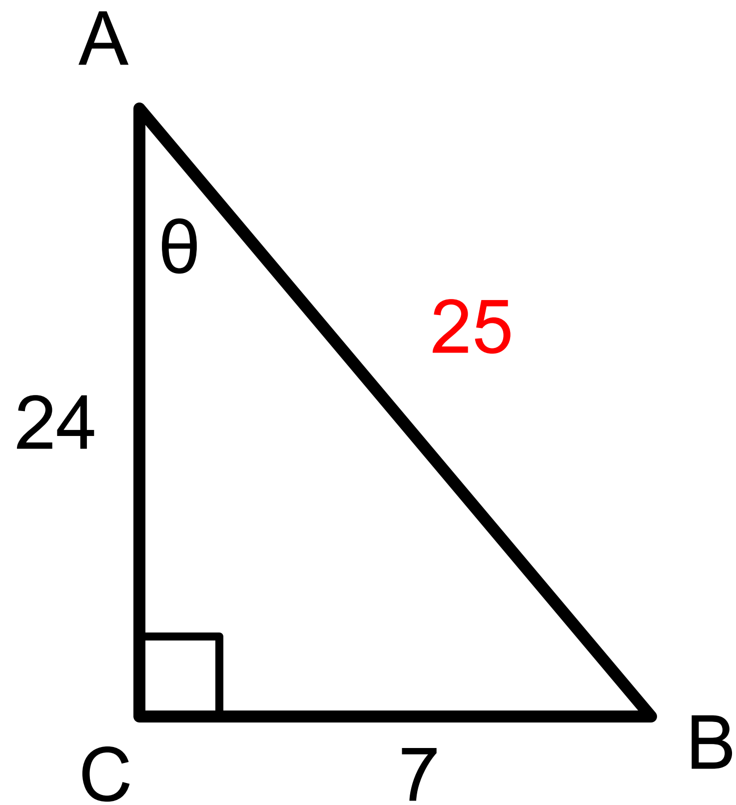
7/25

$\tan\theta$

7/24

$\tan\angle B$

24/7



# Find the Three Trig Functions of $\angle A$ and $\angle B$

$$\sin\angle A$$
$$=\frac{4}{8}=\frac{1}{2}$$

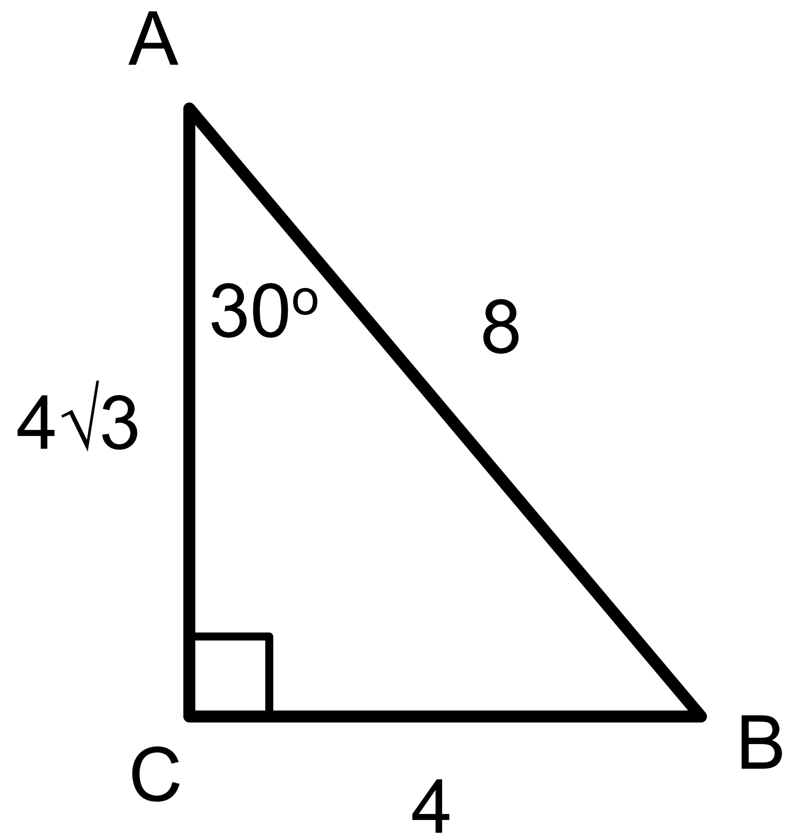
$$\sin\angle B$$
$$=\frac{4\sqrt{3}}{8}=\frac{\sqrt{3}}{2}$$

$$\cos\angle A$$
$$=\frac{4\sqrt{3}}{8}=\frac{\sqrt{3}}{2}$$

$$\cos\angle B$$
$$=\frac{4}{8}=\frac{1}{2}$$

$$\tan\angle A$$
$$=\frac{4}{4\sqrt{3}}=\frac{1}{\sqrt{3}}\cdot\frac{\sqrt{3}}{\sqrt{3}}=\frac{\sqrt{3}}{3}$$

$$\tan\angle B$$
$$=\frac{4\sqrt{3}}{4}=\sqrt{3}$$



# Unit Circle

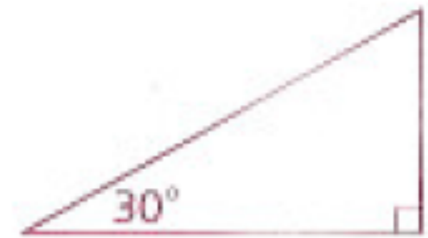
Looking back at your unit circle and thinking about trigonometry, how are the points written?

$$(x, y) = (\cos\theta, \sin\theta)$$

# Homework p. 420: 2, 6, 7, 9, 13

**2** Find each ratio.

**a** sin 30°
**b** cos 30°
**c** tan 30°
**d** sin 60°
**e** cos 60°
**f** tan 60°



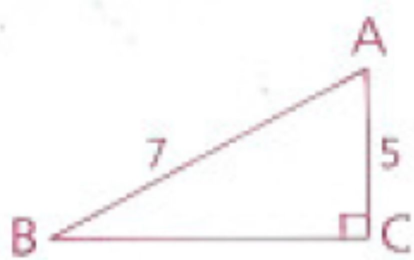

**6** Using the figure as marked, name each missing angle.


**a** $\frac{5}{12} = \tan \angle \underline{\quad ? \quad}$

**b** $\frac{12}{13} = \cos \angle \underline{\quad ? \quad}$

**c** $\frac{5}{13} = \sin \angle \underline{\quad ? \quad}$

**7** Find each quantity.




**a** BC

**b** sin ∠A

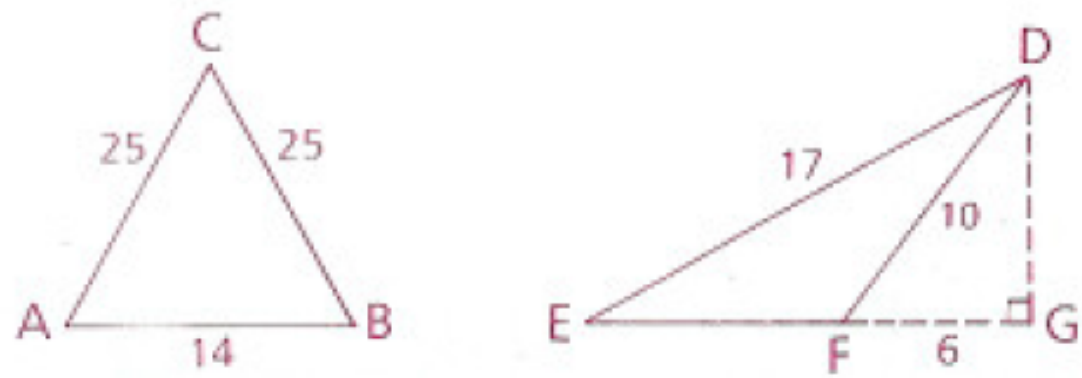
**c** tan ∠B

9 Using the given figures, find

a $\cos \angle A$

b $\sin \angle E$

c $\sin \angle DFG$




13 Using the figure, find

a $\tan \angle ACD$

b $\sin \angle A$