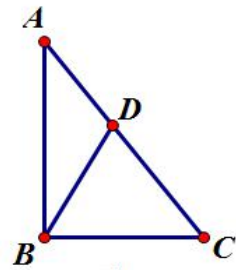


1

1 2019 · 14 $\triangle ABC$ $\angle C = 90^\circ$, $AB = 4$, $BC = 3$, D 在 AC 上, $\angle BDC = 45^\circ$, 则 $\cos \angle ABD =$ _____.

1, $\triangle ABC$ 为 $RT \triangle$, $\sin C = \frac{4}{5}$
 $\triangle BCD$ 中, $\frac{BD}{\sin C} = \frac{BC}{\sin \angle BDC}$, $BD = \frac{12\sqrt{2}}{5}$
 $\angle CBD = 135^\circ - C$, $\sin \angle CBD = \sin(135^\circ - C) = \frac{7\sqrt{2}}{10}$
 $\cos \angle ABD = \cos(90^\circ - \angle CBD) = \sin \angle CBD = \frac{7\sqrt{2}}{10}$.



2

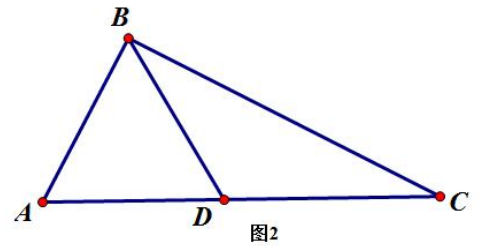
2 2011 · 6 $\triangle ABC$ 中, $AB = AD = 2AB = \sqrt{3}BD$, $\angle C = 2\angle D$, 则 $\sin C =$ _____.

A. $\frac{\sqrt{3}}{3}$ B. $\frac{\sqrt{3}}{6}$ C. $\frac{\sqrt{6}}{3}$ D. $\frac{\sqrt{6}}{6}$

$AB = c$, $AD = c$, $BD = \frac{2c}{\sqrt{3}}$, $BC = \frac{4c}{\sqrt{3}}$

$\triangle ABD$ 中, $\cos A = \frac{c^2 + c^2 - \frac{4}{3}c^2}{2c^2} = \frac{1}{3}$, $\sin A = \frac{2\sqrt{2}}{3}$, $\triangle ABC$

$\frac{c}{\sin C} = \frac{BC}{\sin A} = \frac{\frac{4c}{\sqrt{3}}}{\frac{2\sqrt{2}}{3}}$, $\sin C = \frac{\sqrt{6}}{6}$



3 $\triangle ABCD$ 中, $\angle A = \frac{\pi}{2}$, $\angle B = \frac{2\pi}{3}$, $AB = 6$, AB 的中点为 E

$BE = 1$, EC, ED 为 $\triangle CED$ 的边, $\angle CED = \frac{2\pi}{3}$, $CE = \sqrt{7}$.

(1) $\sin \angle BCE =$ _____, $CD =$ _____.

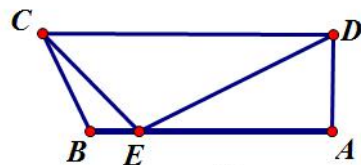


图3

$$(1) \frac{CE}{\sin B} = \frac{BE}{\sin BCE}, \quad \sin BCE = \frac{\sqrt{21}}{14}.$$

$$(2) \frac{CE^2 + BE^2 - CB^2}{2BE \cdot CB \cos \frac{2}{3}} = CB \cdot 2.$$

$$\cos BEC = \frac{2\sqrt{7}}{7}, \quad \sin BEC = \frac{\sqrt{21}}{7}$$

$$\sin AED = \sin\left(\frac{2}{3} - BEC\right) = \frac{\sqrt{21}}{14}, \quad \cos AED = \frac{5\sqrt{7}}{14}$$

$$\text{RT } ADE \quad \frac{DE}{\cos AED} = \frac{AE}{2\sqrt{7}} \quad CED \quad CD = 7.$$

3

4 $\triangle ABC \sim \triangle DBC \sim \triangle AD \sim \triangle BAC \sim \triangle ABD \sim \triangle ADC$
2 .

$$(1) \frac{\sin B}{\sin C} = (2) \frac{AD}{1} = \frac{DC}{\frac{\sqrt{2}}{2}} = \frac{BD}{AC}.$$

$$1 \frac{\sin B}{\sin C} = \frac{AC}{AB} = \frac{S_{ACD}}{S_{ABD}} = \frac{1}{2}.$$

$$(2) \frac{BD}{DC} = \frac{S_{ABD}}{S_{ACD}} = 2 \quad BD = \sqrt{2}. \quad \triangle ABD \sim \triangle ADC$$

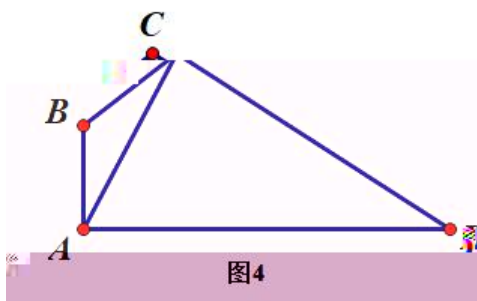
$$AB^2 = AD^2 + BD^2 - 2AD \cdot BD \cos \angle ADB, \textcircled{1}$$

$$AC^2 = AD^2 + DC^2 - 2AD \cdot DC \cos \angle ADC, \textcircled{2} \quad \cos \angle ADB = \cos \angle ADC$$

$$\textcircled{1} + 2 \times \textcircled{2} \quad AB^2 = 2AC^2 - 6 \quad AB = 2AC \quad AC = 1.$$

5 $\triangle ABC \sim \triangle DBC \sim \triangle AD \sim \triangle BAC \sim \triangle ABD \sim \triangle ADC$

$AD = 3AC = AC$.



$$AC = x, AD = 3x \quad \text{RT } \triangle ACD \quad CD = 2\sqrt{2}x \quad \sin \angle CAD = \frac{2\sqrt{2}}{3}.$$

$$\triangle ABC \quad \cos \angle BAC = \frac{x^2 - 1}{2\sqrt{2}x} \quad \angle BAC = \angle CAD = 90^\circ$$

$$\cos \angle BAC = \sin \angle CAD, \frac{x^2 - 1}{2\sqrt{2}x} = \frac{2\sqrt{2}}{3} \quad x = 3 \quad AC = 3.$$

" "

1

2