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1 2019 · 14 ABC ABC 90 AB 4 BC 3 D

AC BDC 45 BD ____ $\cos$ ABD ________.

1， RT ABC $\sin C$ $\frac{4}{5}$

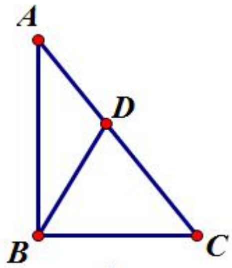

图1

BCD $\frac{BD}{\sin C}$ $\frac{3}{\sin\ \ BDC}$ BD $\frac{12\sqrt{2}}{5}$

CBD 135 C $\sin$ CBD $\sin(135$ $C)$ $\frac{7\sqrt{2}}{10}$

$\cos$ ABD $\cos(90$ $CBD)$ $\sin$ CBD $\frac{7\sqrt{2}}{10}$.

2

2 2011 · 6 2 ABC

D AC AB $AD, 2AB$ $\sqrt{3}BD$

BC $2BD$ $\sin C$

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

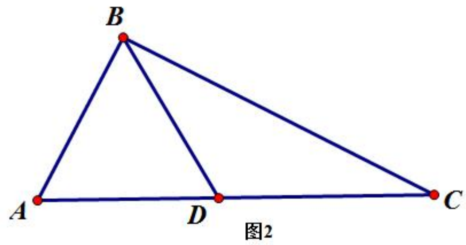

图2

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

ABD $\cos A$ $\frac{c^2\ \ c^2\ \ \frac{4}{3}c^2}{2c^2}$ $\frac{1}{3}$ $\sin A$ $\frac{2\sqrt{2}}{3}$ 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 3 $ABCD$ A $\frac{}{2}$, B $\frac{2}{3}$, AB 6 AB E

BE 1 EC, ED CED $\frac{2}{3}$, CE $\sqrt{7}$.

(1) $\sin$ BCE 2 CD .

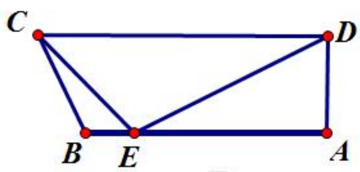

图3

(1) CBE

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

(2) CBE $CE^2 \quad BE^2 \quad CB^2 \quad 2BE \ CB\cos\frac{2}{3}$ $CB \quad 2$.

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

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

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

3

4 ABC D BC AD BAC ABD ADC

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

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

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

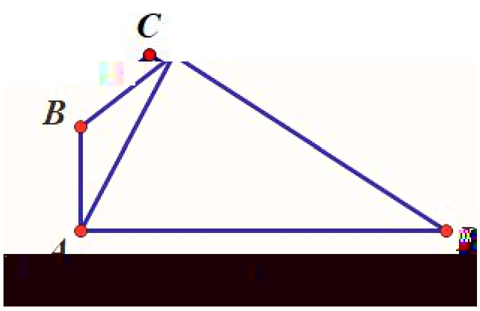
$AB^2 \quad AD^2 \quad BD^2 \quad 2AD \ BD\cos \quad ADB$, ①

$AC^2 \quad AD^2 \quad DC^2 \quad 2AD \ DC\cos \quad ADC$, ② $\cos \quad ADB$ $\cos \quad ADC$

①+2 × ② $AB^2 \quad 2AC^2 \quad 6$ $AB \quad 2AC$ $AC \quad 1$.

5 4 $ABCD$ $AB \quad \sqrt{2} \quad BC \quad \sqrt{3}, AB \quad AD, AC \quad CD$ ·

$AD \quad 3AC$ AC ·



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

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

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

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