$\sin A = \frac{opp}{hyp}$ $\cos A = \frac{adj}{hyp}$ $\tan A = \frac{opp}{adj}$

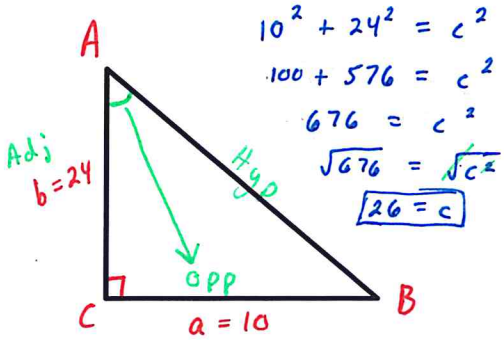
$\csc A = \frac{hyp}{opp}$ $\sec A = \frac{hyp}{adj}$ $\cot A = \frac{adj}{opp}$

Trigonometry

Emphasis on SOH – CAH – TOA

Evaluate the six trigonometric functions for the regular right triangle for ∠ A.

1. a = 10 & b = 24



$10^2 + 24^2 = c^2$

$100 + 576 = c^2$

$676 = c^2$

$\sqrt{676} = \sqrt{c^2}$

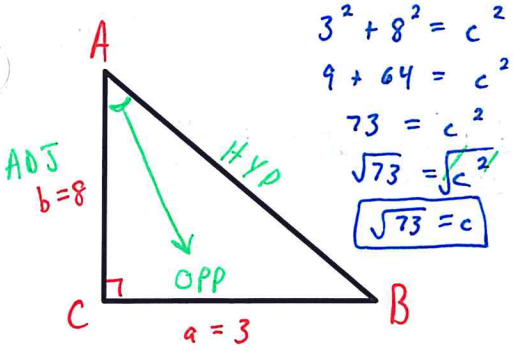
$26 = c$

$\sin A = \frac{10}{26} = \frac{5}{13}$ $\csc A = \frac{13}{5}$

$\cos A = \frac{24}{26} = \frac{12}{13}$ $\sec A = \frac{13}{12}$

$\tan A = \frac{10}{24} = \frac{5}{12}$ $\cot A = \frac{12}{5}$

2. a = 3 & b = 8



$3^2 + 8^2 = c^2$

$9 + 64 = c^2$

$73 = c^2$

$\sqrt{73} = \sqrt{c^2}$

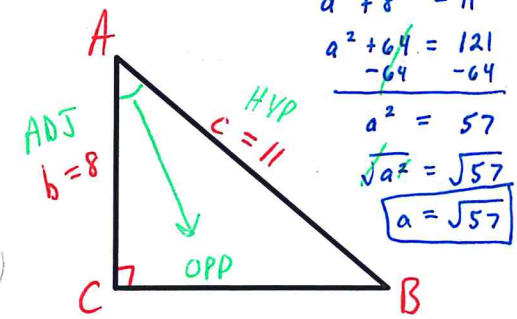
$\sqrt{73} = c$

$\sin A = \frac{3}{\sqrt{73}} \cdot \frac{\sqrt{73}}{\sqrt{73}} = \frac{3\sqrt{73}}{73}$ $\csc A = \frac{\sqrt{73}}{3}$

$\cos A = \frac{8}{\sqrt{73}} \cdot \frac{\sqrt{73}}{\sqrt{73}} = \frac{8\sqrt{73}}{73}$ $\sec A = \frac{\sqrt{73}}{8}$

$\tan A = \frac{3}{8}$ $\cot A = \frac{8}{3}$

3. b = 8 & c = 11



$a^2 + 8^2 = 11^2$

$a^2 + 64 = 121$

$-64 \quad -64$

$a^2 = 57$

$\sqrt{a^2} = \sqrt{57}$

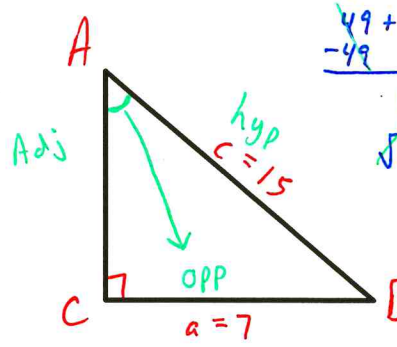
$a = \sqrt{57}$

$\sin A = \frac{\sqrt{57}}{11}$ $\csc A = \frac{11}{\sqrt{57}} \cdot \frac{\sqrt{57}}{\sqrt{57}} = \frac{11\sqrt{57}}{57}$

$\cos A = \frac{8}{11}$ $\sec A = \frac{11}{8}$

$\tan A = \frac{\sqrt{57}}{8}$ $\cot A = \frac{8}{\sqrt{57}} \cdot \frac{\sqrt{57}}{\sqrt{57}} = \frac{8\sqrt{57}}{57}$

4. a = 7 & c = 15



$7^2 + b^2 = 15^2$

$49 + b^2 = 225$

$-49 \quad -49$

$b^2 = 176$

$\sqrt{b^2} = \sqrt{176}$

$b = \sqrt{16 \cdot 11}$

$b = \sqrt{16} \cdot \sqrt{11}$

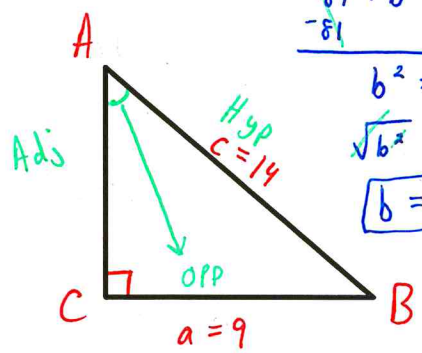
$\boxed{b = 4\sqrt{11}}$

$\sin A = \boxed{\frac{7}{15}}$ $\quad \csc A = \boxed{\frac{15}{7}}$

$\cos A = \boxed{\frac{4\sqrt{11}}{15}}$ $\quad \sec A = \frac{15 \cdot \sqrt{11}}{4\sqrt{11} \cdot \sqrt{11}} = \frac{15\sqrt{11}}{4 \cdot 11} = \boxed{\frac{15\sqrt{11}}{44}}$

$\tan A = \frac{7 \cdot \sqrt{11}}{4\sqrt{11} \cdot \sqrt{11}} = \frac{7\sqrt{11}}{4 \cdot 11} = \boxed{\frac{7\sqrt{11}}{44}}$

5. a = 9 & c = 14



$9^2 + b^2 = 14^2$

$81 + b^2 = 196$

$-81 \quad -81$

$b^2 = 115$

$\sqrt{b^2} = \sqrt{115}$

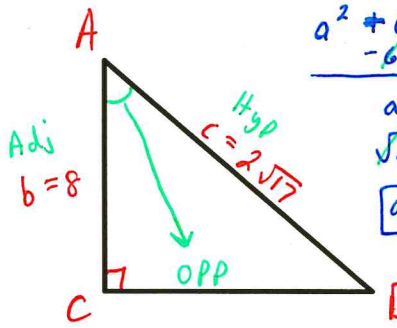
$\boxed{b = \sqrt{115}}$

$\sin A = \boxed{\frac{9}{14}}$ $\quad \csc A = \boxed{\frac{14}{9}}$

$\cos A = \boxed{\frac{\sqrt{115}}{14}}$ $\quad \sec A = \frac{14 \cdot \sqrt{115}}{\sqrt{115} \cdot \sqrt{115}} = \boxed{\frac{14\sqrt{115}}{115}}$

$\tan A = \frac{9 \cdot \sqrt{115}}{\sqrt{115} \cdot \sqrt{115}} = \boxed{\frac{9\sqrt{115}}{115}}$ $\quad \cot A = \boxed{\frac{\sqrt{115}}{9}}$

6. b = 8 & c = $2\sqrt{17}$



$a^2 + 8^2 = (2\sqrt{17})^2$

$a^2 + 64 = 68$

$-64 \quad -64$

$a^2 = 4$

$\sqrt{a^2} = \sqrt{4}$

$\boxed{a = 2}$

$\sin A = \frac{2}{2\sqrt{17}} = \frac{1 \cdot \sqrt{17}}{\sqrt{17} \cdot \sqrt{17}} = \boxed{\frac{\sqrt{17}}{17}}$ $\quad \csc A = \frac{\sqrt{17}}{1} = \boxed{\sqrt{17}}$

$\cos A = \frac{8}{2\sqrt{17}} = \frac{4 \cdot \sqrt{17}}{\sqrt{17} \cdot \sqrt{17}} = \boxed{\frac{4\sqrt{17}}{17}}$ $\quad \sec A = \boxed{\frac{\sqrt{17}}{4}}$

$\tan A = \frac{2}{8} = \boxed{\frac{1}{4}}$ $\quad \cot A = \frac{4}{1} = \boxed{4}$