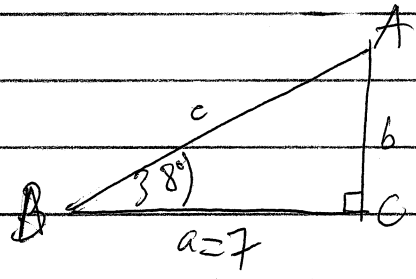
QUIZ 5

1)



\ Need to find A, b and c

\ Because of the right angle at C, we have $A = 90° - B = 52°$

$$\boxed{A = 52°}$$

\ We see that $\tan 38° = \frac{b}{a}$

(remember $\tan = \frac{\text{opp.}}{\text{adj.}}$, or TOA)

So $b = a \tan 38° = 7 \tan 38° \simeq 5.47$

$$\boxed{b = 5.47}$$

*Note: we usually take two decimal digits, unless the problem states otherwise.

\ We see that $\cos 38° = \frac{a}{c}$

(remember cosine $= \frac{\text{adj.}}{\text{hyp.}}$, or CAH)

So $c = \frac{a}{\cos 38°} = \frac{7}{\cos 38°} \simeq 8.88$

$$\boxed{c = 8.88}$$

We can use the Pythagorean identity $c^2 = a^2 + b^2$ to get the same result.

2) $-\dfrac{\csc 40^\circ}{\sec 50^\circ}$

- Convert everything into sine and cosine

$$-\frac{\csc 40^\circ}{\sec 50^\circ} = -\frac{\frac{1}{\sin 40^\circ}}{\frac{1}{\cos 50^\circ}} = -\frac{1}{\sin 40^\circ}\cdot\frac{\cos 50^\circ}{1} = -\frac{\cos 50^\circ}{\sin 40^\circ}$$

- We see that $50^\circ + 40^\circ = 90^\circ$. Thus 50° and 40° are complementary angles.

- Thus, $\cos 50^\circ = \sin 40^\circ$.
- The final answer is $\boxed{-1}$

Note: we should be careful about the sign. Don't forget to put the minus sign in the final answer.

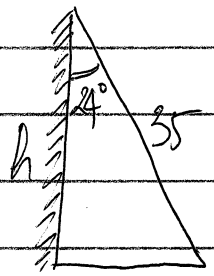
Reminder: if $A + B = 90^\circ$ then

$$\left.\begin{aligned}\sin A &= \cos B\\ \cos A &= \sin B\end{aligned}\right\} \text{ sin, cos pair}$$

$$\left.\begin{aligned}\tan A &= \cot B\\ \cot A &= \tan B\end{aligned}\right\} \text{ tan, cot pair}$$

$$\left.\begin{aligned}\sec A &= \csc B\\ \csc A &= \sec B\end{aligned}\right\} \text{ sec, csc pair}$$

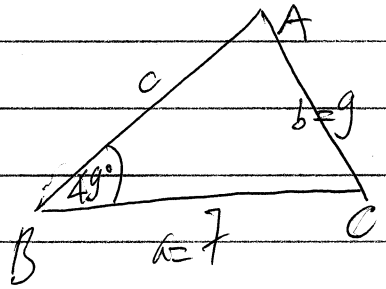
3)



- We see that $\cos 24^\circ = \frac{h}{35}$
- Thus $h = 35\cos 24^\circ \approx 31.974$
- Round the answer to the nearest foot

$$\boxed{h \approx 32 \text{ ft}}$$

4) $a = 7,\ b = 9,\ B = 49^\circ$



- Here we're dealing with an oblique triangle, not a right triangle. Thus we cannot apply the Pythagorean identity $c^2 = a^2 + b^2$ nor any other identity in a right triangle

We need to use the <u>law of sine</u>:

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

- We have $\frac{\sin A}{a} = \frac{\sin B}{b}$

Thus $\sin A = \frac{a \sin B}{b} = \frac{7 \sin 49^\circ}{9} \approx 0.586$

- Remember that there are always <u>two</u> angles A such that $\sin A = 0.586$.
- By using a calculator, we get $A = \sin^{-1} 0.586 \approx 35.94^\circ$.

the other angle A is $180^\circ - 35.94^\circ = 144.06^\circ$

- For $A = 35.94^\circ$, we get $C = 180^\circ - B - A = 180^\circ - 49^\circ - 35.94^\circ$
$= 95.06^\circ$

$\frac{\sin B}{b} = \frac{\sin C}{c}$ implies $c = \frac{b \sin C}{\sin B} = \frac{9 \sin 95.06^\circ}{\sin 49^\circ}$
≈ 11.88

- For $A = 144.06^\circ$ we see that $A + B = 144.06^\circ + 49^\circ > 180^\circ$
Thus this choice doesn't work.

One triangle $\quad A = 35.94^\circ, C = 95.06^\circ, c = 11.88$