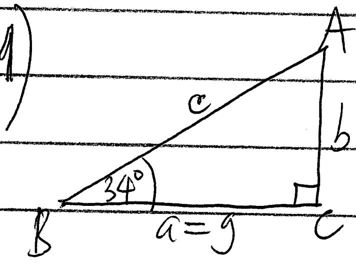
QUIZ 5

1)



- Need to find A, b and c

- Because of the right angle at C, we have $A = 90^\circ - B = 90^\circ - 34^\circ = 56^\circ$

$$\boxed{A = 56^\circ}$$

- We see that $\tan 34^\circ = \dfrac{b}{a}$

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

So $b = a\tan 34^\circ = 9\tan 34^\circ \simeq 6.07$

$$\boxed{b = 6.07}$$

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

- We see that $\cos 34^\circ = \dfrac{a}{c}$

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

So $c = \dfrac{a}{\cos 34^\circ} = \dfrac{9}{\cos 34^\circ} \approx 10.85$

$$\boxed{c = 10.85}$$

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

2) $\dfrac{\sec 54^\circ}{\csc 36^\circ}$

- Convert everything into sine and cosine

$$\frac{\sec 54^\circ}{\csc 36^\circ} = \frac{\frac{1}{\cos 54^\circ}}{\frac{1}{\sin 36^\circ}} = \frac{1}{\cos 54^\circ} \cdot \frac{\sin 36^\circ}{1} = \frac{\sin 36^\circ}{\cos 54^\circ}$$

- We see that $36^\circ + 54^\circ = 90^\circ$. Thus 36° and 54° are complementary angles.
- Thus, $\sin 36^\circ = \cos 54^\circ$
- Thus $\dfrac{\sin 36^\circ}{\cos 54^\circ} = 1$

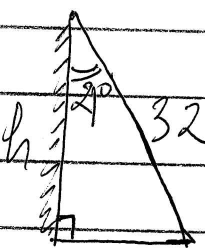
<u>Reminder:</u> if $A + B = 90^\circ$ then

$\left.\begin{array}{l} \sin A = \cos B \\ \cos A = \sin B \end{array}\right\}$ sin, cos pair

$\left.\begin{array}{l} \tan A = \cot B \\ \cot A = \tan B \end{array}\right\}$ tan, cot pair

$\left.\begin{array}{l} \sec A = \csc B \\ \csc A = \sec B \end{array}\right\}$ sec, csc pair

3)



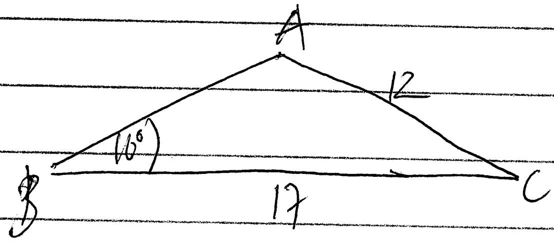
We see that $\cos 21^\circ = \frac{h}{32}$

Thus $h = 32\cos 21^\circ \approx 29.874$

Round the answer to the nearest foot

$\boxed{h \approx 30 \text{ ft}}$

4) $a=17,\ b=12,\ B=10^\circ$



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 law of sine:

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

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

Thus $\sin A = \frac{a \sin B}{b} = \frac{17 \sin 10^\circ}{12} \approx 0.246$

- Remember that there are always <u>two</u> angles A such that $\sin A = 0.246$.

- By using calculator, we get $A = \sin^{-1} 0.246 \approx 14.24^\circ$.

The other angle A is $180^\circ - 14.24^\circ = 165.76^\circ$

- For $A = 14.24^\circ$ ~~ge~~ we get $C = 180^\circ - B - A = 180^\circ - 10^\circ - 14.24^\circ$

$= 155.76^\circ$

$\frac{\sin B}{b} = \frac{\sin C}{c}$ implies $c = \frac{b \sin C}{\sin B} = \frac{12 \sin 155.76^\circ}{\sin 10^\circ}$

≈ 28.37

- For $A = 165.76^\circ$ we get

$C = 180^\circ - B - A = 180^\circ - 10^\circ - 165.76^\circ$

$= 4.24^\circ$

$\frac{\sin B}{b} = \frac{\sin C}{c}$ implies $c = \frac{b \sin C}{\sin B} = \frac{12 \sin 4.24^\circ}{\sin 10^\circ} \approx 5.11$

$\boxed{\text{Two triangles}}$

$\boxed{A = 14.24^\circ,\ C = 155.76^\circ,\ c = 28.37}$

$\boxed{A = 165.76^\circ,\ C = 4.24^\circ,\ c = 5.11}$