

The Cosine Law

Sept 26

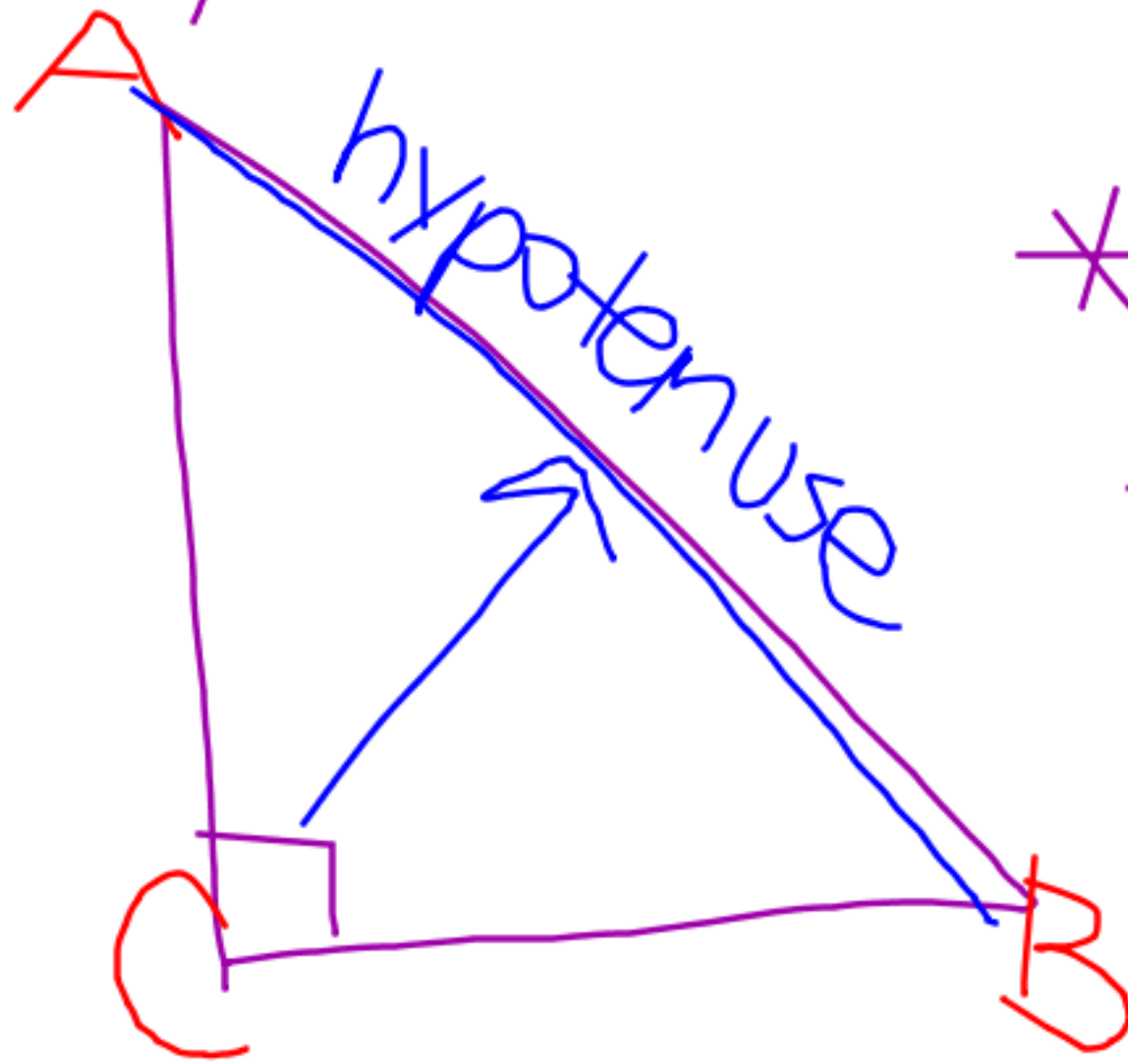
Another formula used to solve sides and angles in oblique triangles.

With cosine, you need 3 pieces of information, and one MUST be a side length.

REVIEW

When do you use **SOHCAHTOA**?

When you have a right angle



* also
remember
Pythagorean
Theorem

When do you use The Sine Law?

When you have an angle
and a CORRESPONDING
SIDE

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

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

The unknown is always on the TOP RIGHT

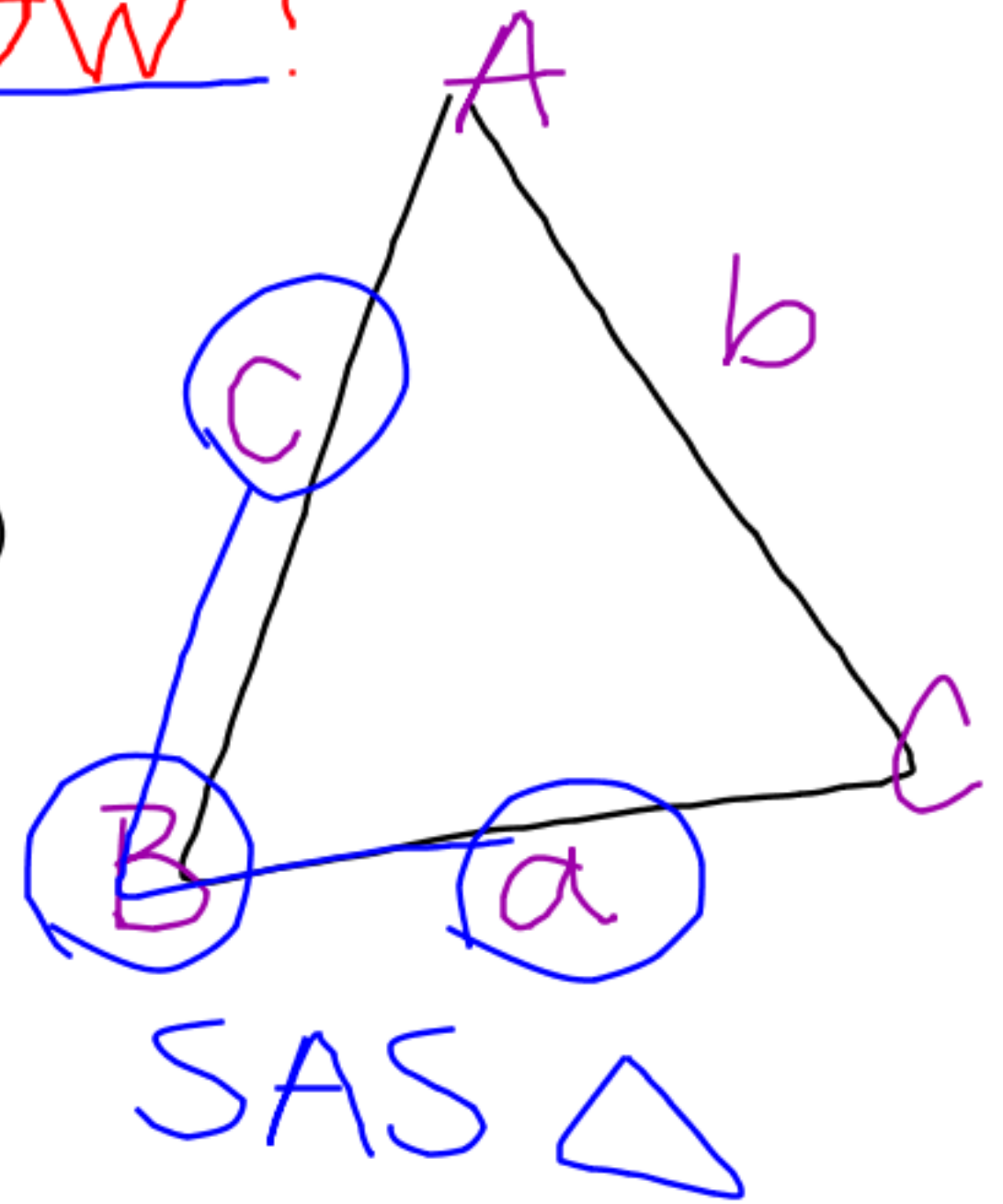
Lets talk about Cosine Law!

Solving Sides

$$\underline{a^2} = b^2 + c^2 - 2bc(\cos A)$$

$$\underline{b^2} = a^2 + c^2 - 2ac(\cos B)$$

$$\underline{c^2} = a^2 + b^2 - 2ab(\cos C)$$

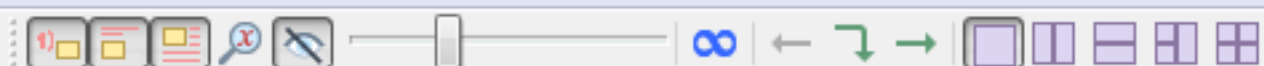


Solving Angles

$$\underline{\cos A} = \frac{b^2 + c^2 - a^2}{2bc}$$

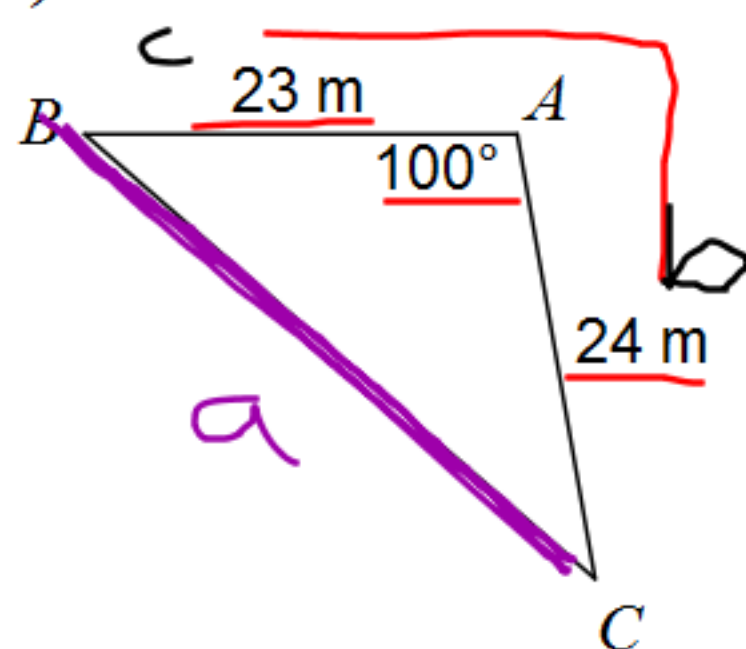
$$\underline{\cos B} = \frac{a^2 + c^2 - b^2}{2ac}$$

$$\underline{\cos C} = \frac{a^2 + b^2 - c^2}{2ab}$$



Find each measurement indicated. Round your answers to the nearest tenth.

1) Find BC



$$a^2 = b^2 + c^2 - 2bc(\cos A)$$

$$a^2 = 24^2 + 23^2 - (2 \times 24 \times 23)$$

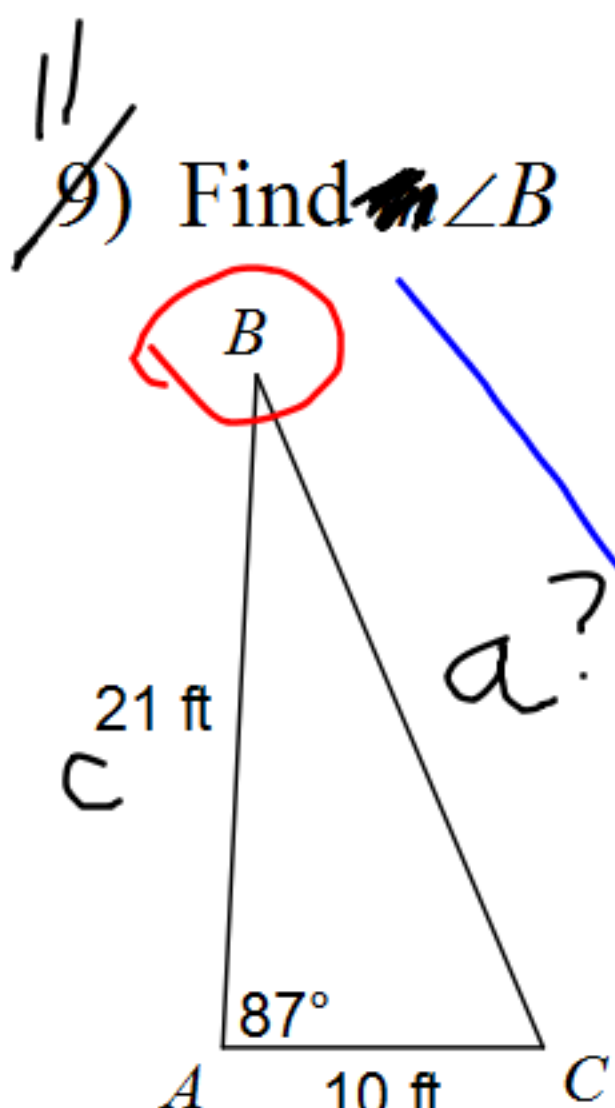
$$a^2 = 24^2 + 23^2 - (1104)(\cos 100^\circ)$$

$$a^2 = 24^2 + 23^2 - (-191.7075)$$

$$a^2 = 1296.7075$$

$$a = 36m$$

Find each measurement indicated. Round your answers to the nearest tenth.



9) Find $\angle B$

$$\cos B = \frac{a^2 + c^2 - b^2}{2ac}$$

$$\cos B = \frac{22.8^2 + 21^2 - 10^2}{(2 \times 22.8 \times 21)}$$

$$\cos B = \frac{860.84}{957.6}$$

$$\cos^{-1} \cos B = 0.8989$$

$$B = 25.9861$$

$$B = 26^\circ$$

$$a^2 = b^2 + c^2 - 2bc(\cos A)$$

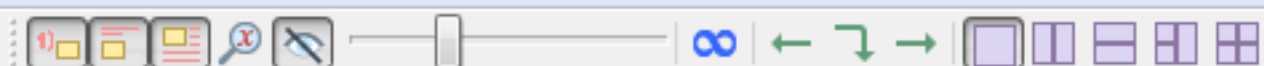
$$a^2 = 10^2 + 21^2 - (2 \times 10 \times 21)(\cos 87)$$

$$a^2 = 10^2 + 21^2 - (420)(\cos 87)$$

$$a^2 = 10^2 + 21^2 - (21.9811)$$

$$a^2 = 59.0189$$

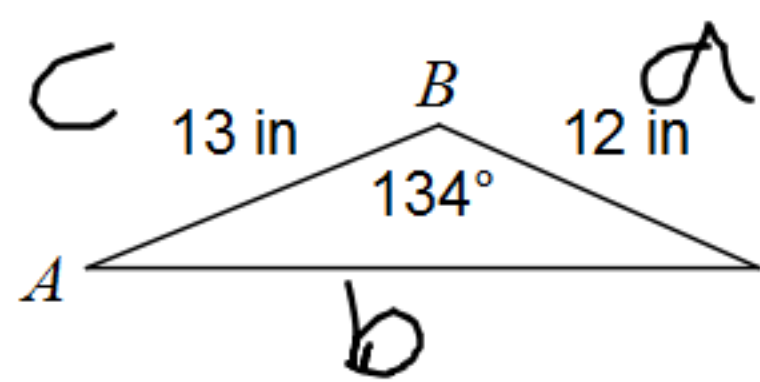
$$a = 22.7819 \quad a = 22.8$$



Find each measurement indicated. Round your answers to the nearest tenth.

3

2) Find AC



$$b^2 = a^2 + c^2 - 2ac (\cos B)$$

$$b^2 = 12^2 + 13^2 - (2 \times 12 \times 13) (\cos 134)$$

$$b^2 = 12^2 + 13^2 - (312) (\cos 134)$$

$$b^2 = 12^2 + 13^2 - (-216.7334)$$

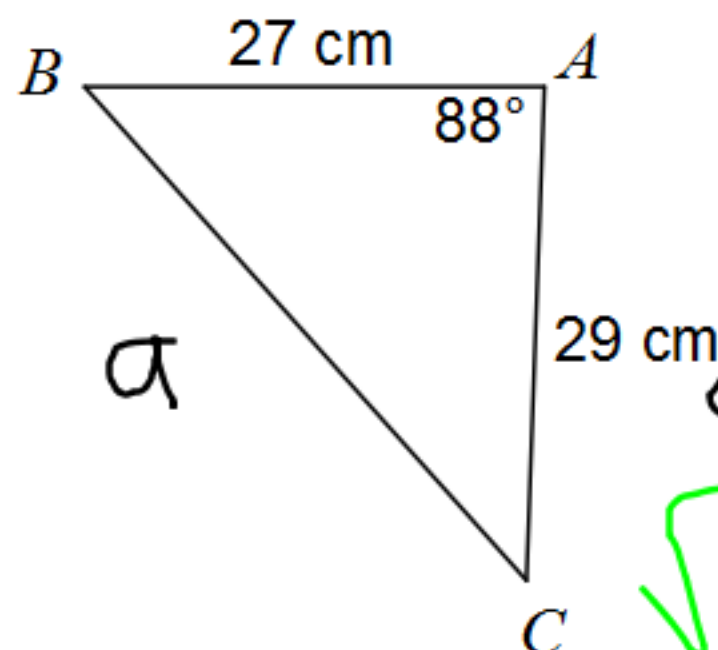
$$\sqrt{b^2} = \sqrt{529.7334}$$

$$b = 23.0159$$

$$b = 23 \text{ in}$$

Find each measurement indicated. Round your answers to the nearest tenth.

10) Find $\angle B$



$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$a^2 = 29^2 + 27^2 - (2 \times 29 \times 27) (\cos 88^\circ)$$

$$a^2 = 29^2 + 27^2 - (1566) (\cos 88^\circ)$$

$$a^2 = 29^2 + 27^2 - (54.6526)$$

$$a^2 = 1515.3474$$

$$a = 38.9$$

$$\cos B = \frac{a^2 + c^2 - b^2}{2ac}$$

$$\cos B = \frac{38.9^2 + 27^2 - 29^2}{2 \times 38.9 \times 27}$$

$$\cos B = \frac{1401.21}{2100.6}$$

$$\cos^{-1} \cos B = 0.6670$$

$$B = 48.1640$$

$$B = 48^\circ$$