Turn in Graded HW with work stapled to the back

QUIZ

You need your calculator for notes.

Nov 28-9:17 PM

The Law of Cosines (SAS)

No right ∡ necessary

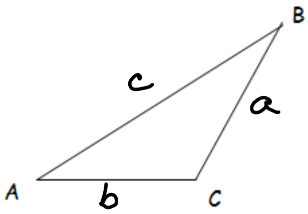
Calc → Degree Mode

The Law of Cosines is commonly used to solve oblique triangles and forms the basis for important trigonometric applications. When two sides of a triangle and the included angle are known, the law of cosines can be used to find the third side. SAS

Law of Cosines: $a^2 = b^2 + c^2 - 2bc\cos A$

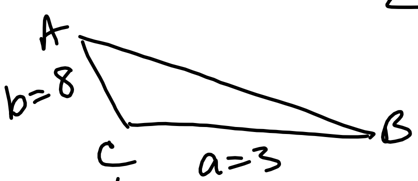
$b^2 = a^2 + c^2 - 2ac\cos B$

$c^2 = a^2 + b^2 - 2ab\cos C$



For each problem, draw a diagram and solve:

1. In ΔABC, $a = 3$, $b = 8$, and $\cos C = \frac{1}{4}$. Find c to the nearest integer.



$\cos C = \frac{1}{4}$

$c^2 = a^2 + b^2 - 2ab\cos C$

$c^2 = 3^2 + 8^2 - 2(3)(8)(\frac{1}{4})$

$\sqrt{c^2} = \sqrt{61}$

$c = \sqrt{61} = 7.8 \approx 8$

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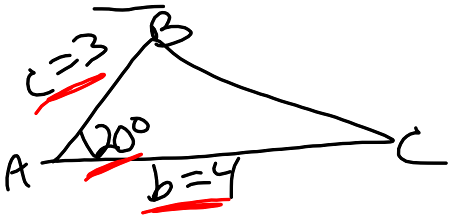
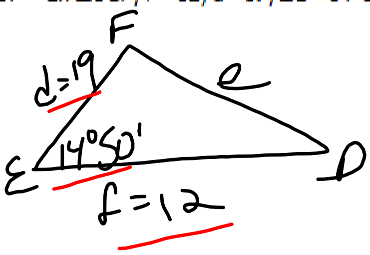
2. In $\triangle ABC$, $b = 4$, $c = 3$, $\angle A = 120°$. Find a to the nearest integer.



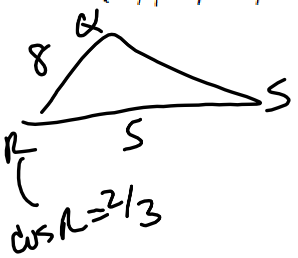
$$a^2 = b^2 + c^2 - 2bc\cos A$$
$$a^2 = 4^2 + 3^2 - 2(4)(3)\cos(120°)$$
$$\sqrt{a^2} = \sqrt{37}$$
$$a \approx 6.08 \approx 6$$

3. In $\triangle DEF$, $f = 12$, $d = 19$, $\angle E = 14°50'$. Find e to the nearest integer.



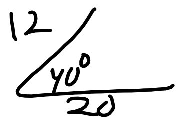
$$e^2 = d^2 + f^2 - 2df\cos E$$
$$e^2 = 19^2 + 12^2 - 2(19)(12)\cos 14°50'$$
$$\sqrt{e^2} = \sqrt{64.19\ldots}$$
$$e \approx 8.012 \approx 8$$

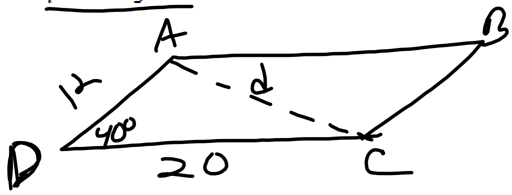
4. In $\triangle QRS$, $q = 5$, $s = 8$, and $\cos R = \frac{2}{3}$. Find r to the nearest integer.



$$r^2 = 8^2 + 5^2 - 2(8)(5)(2/3)$$
$$r^2 = 35.6$$
$$r = 5.96 \approx 6$$

5. In a parallelogram, two sides that are 20 cm and 12 cm long include an angle of 40°. Find the length (to the nearest centimeter) of the shorter diagonal of the parallelogram.





$$d^2 = 12^2 + 20^2 - 2(12)(20)\cos 40°$$
$$\sqrt{d^2} = \sqrt{176.2986}$$
$$d \approx 13.277 \approx 13 \text{ cm}$$

The Law of Cosines (SSS)

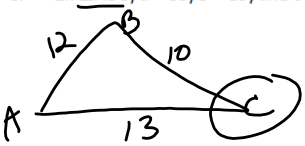
$c^2 = a^2 + b^2 - 2ab\cos C$

To find an angle of a triangle that does not contain a right angle where *C* is the angle opposite the side that you're looking for.

slide-slide -divide

Draw a diagram and solve. SSS

1. In ΔABC, a = 10, b = 13, and c = 12. Find m∠C to the nearest minute.



$c^2 = a^2 + b^2 - 2ab\cos C$

$12^2 = 10^2 + 13^2 - 2(10)(13)\cos C$

$12^2 - 10^2 - 13^2 = -2(10)(13)\cos C$

$\cos C = \dfrac{(12^2 - 10^2 - 13^2)}{(-2(10)(13))}$

$\cos C = \dfrac{25}{52}$ (.48076...)

(2nd cos)

$m\angle C = \cos^{-1}\left(\dfrac{25}{52}\right) = 61.26$

2nd-Apps-4 → ▶DMS = 61°15'51.647"

degrees, minutes, seconds

51" (seconds is more than ½ a min)

$m\angle C \approx 61°16'$

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