

HW 5-1

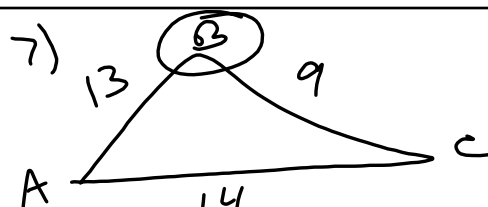
GHW#9 Due Next Wed, 12/18

Mini Quizzes Wed & Fri this week

Do the warmup at the top of today's notes.

1. $a^2 = b^2 + c^2 - 2bccosA$
2. 3
3. 3
4. $\sqrt{63}$
5. 7
6. 14
7. $76^\circ 39'$

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7) 

$m\angle B$ to the nearest min

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

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

$\cos(\text{angle}) = \text{trig value}$

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

$$\cos B = \frac{(14^2 - 9^2 - 13^2)}{(-2)(9)(13)} = \frac{3}{13}$$

2nd-cos
2nd-apps-4

$m\angle B = \cos^{-1}\left(\frac{3}{13}\right) = 76.657632$

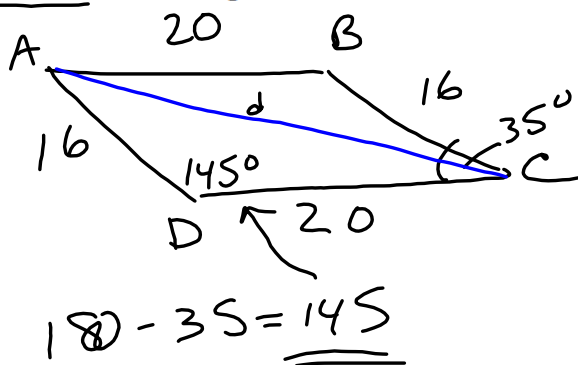
Doms = $76^\circ 39' 27.49''$

$= 76^\circ 39'$

The Law of Cosines (SSS)

PreCalc Ch 5 Day 2

Warm-up: The lengths of 2 adjacent sides of a parallelogram ABCD are 16 cm and 20 cm. Find the length of the longer diagonal to the nearest cm, if the angle between the two sides is 35° . Draw a diagram and solve.



$$d^2 = a^2 + c^2 - 2ac \cos D$$

$$d^2 = 20^2 + 16^2 - 2(20)(16) \cos 145^\circ$$

$$d^2 = 1180.25$$

$$d \approx \underline{34 \text{ cm}}$$

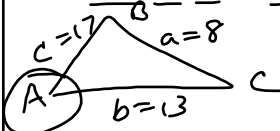
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To find an angle of a triangle that does not contain a right angle:

$c^2 = a^2 + b^2 - 2ab \cos C$ where C is the angle opposite the side that you need.

For each problem, draw a diagram and solve.

1. In $\triangle ABC$, $a = 8$, $b = 13$, and $c = 17$. Find $m\angle A$ to the nearest 10 minutes.



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

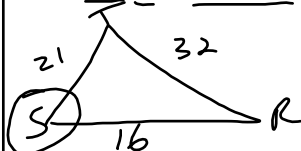
$$8^2 = 13^2 + 17^2 - 2(13)(17) \cos A$$

$$8^2 - 13^2 - 17^2 = -2(13)(17) \cos A$$

$$\cos A = \frac{8^2 - 13^2 - 17^2}{-2(13)(17)} = .8914..$$

$$A = \cos^{-1}(.8914..) = 26.94..$$

2. In $\triangle RST$, $r = 21$, $s = 32$, and $t = 16$. Find the measure of $\angle S$ to the nearest minute.



$$32^2 = 21^2 + 16^2 - 2(21)(16) \cos S$$

$$\cos S = \frac{32^2 - 21^2 - 16^2}{-2(21)(16)}$$

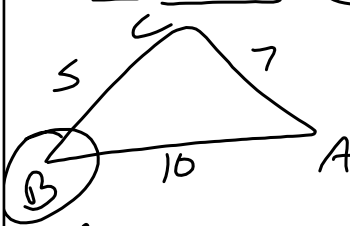
$$\cos S = -.486607..$$

$$S = \cos^{-1}(-.486607..) = 119.117$$

$$\triangle Dms = \underline{119^\circ 7'}$$

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3. In $\triangle ABC$, $a = 5$, $b = 7$, $c = 10$, find $\cos B$ as a fraction in lowest terms. SSS

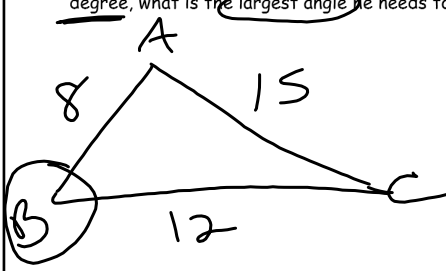


$$b^2 = a^2 + c^2 - 2ac \cos B$$

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

$$\cos B = \frac{7^2 - 5^2 - 10^2}{-2(5)(10)} = \frac{19}{25}$$

4. Jed is working on a stained glass project and needs to form a triangle with sides of 8, 12, and 15 inches out of lead cane to enclose the glass. To the nearest tenth of a degree, what is the largest angle he needs to create using the lead caning? SSS



$$15^2 = 8^2 + 12^2 - 2(8)(12) \cos B$$

$$\cos B = \frac{15^2 - 8^2 - 12^2}{-2(8)(12)}$$

$$\cos B = -\frac{17}{192}$$

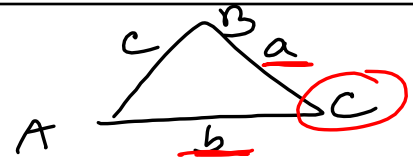
$$m\angle B = \cos^{-1}\left(-\frac{17}{192}\right) = 95.0797$$

$$\approx 95.1^\circ$$

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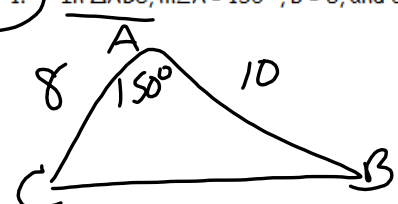
Finding the Area of a Triangle (SAS)

Area of a Triangle = $k = \frac{1}{2} ab \sin C$



For each problem, draw a diagram and solve:

1. In $\triangle ABC$, $m\angle A = 150^\circ$, $b = 8$, and $c = 10$. Find the area of $\triangle ABC$.

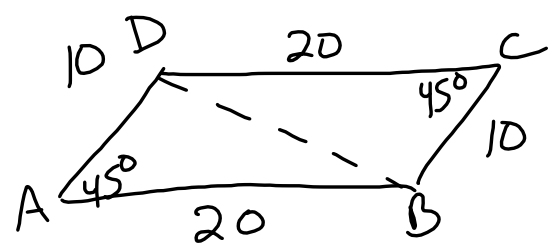


$$k = \frac{1}{2} bc \sin A$$

$$k = \frac{1}{2} (8)(10) \sin 150^\circ$$

$$k = 20 \text{ units}^2$$

2. In parallelogram $ABCD$, $AB = 20$, $AD = 10$, and $m\angle A = 45^\circ$. Find the area of the parallelogram rounded to the nearest tenth.



$$2k = 2 \left(\frac{1}{2} \right) (10)(20) \sin 45^\circ$$

Area = parallelogram

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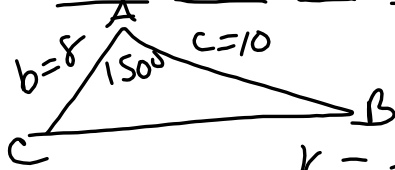
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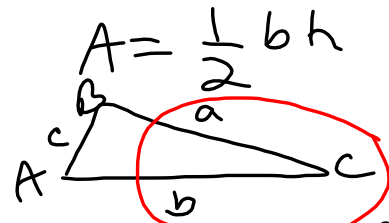
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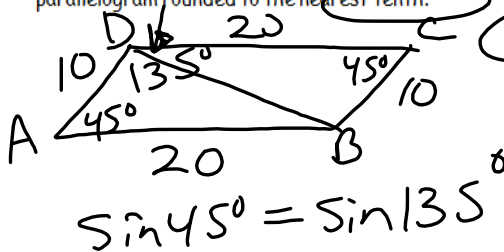


$$K = \frac{1}{2} ac \sin B$$

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2. In parallelogram ABCD, $AB = 20$, $AD = 10$, and $m\angle A = 45^\circ$. Find the area of the parallelogram rounded to the nearest tenth.



$$\sin 45^\circ = \sin 135^\circ$$

$$K = \frac{1}{2} ab \sin C$$

$$2K = 2\left(\frac{1}{2}\right) ab \sin C$$

$$\begin{aligned} 2K &= ab \sin C \\ &= (10)(20) \sin 45^\circ \\ &= 141.4 \text{ u}^2 \end{aligned}$$

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