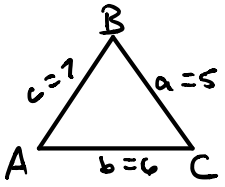
More Trig – Law of Cosines & Sines

Hw Section 10.3 Name_____

Use the given information to find each value. Round the sides to the nearest tenth and the angles to the nearest whole number.

#1) If a = 5, b = 6, and c = 7, find m∠A.



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

$(5)^2 = (6)^2 + (7)^2 - 2(6)(7)\cos(m\angle A)$

$25 = 36 + 49 - 84\cos(m\angle A)$

$25 = 85 - 84\cos(m\angle A)$

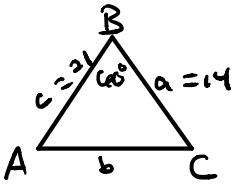
$-60 = -84\cos(m\angle A)$

$\frac{60}{84} = \cos(m\angle A)$

$\cos^{-1}\left(\frac{60}{84}\right) = m\angle A$

$44^\circ \approx m\angle A$

#2) If a = 14, c = 21 and m∠B = 60°, find b.



$b^2 = a^2 + c^2 - 2ac\cdot\cos(m\angle C)$

$b^2 = (14)^2 + (21)^2 - 2(14)(21)\cos(60^\circ)$

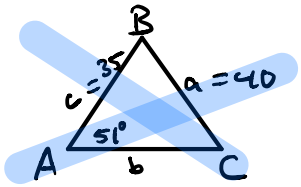
$b^2 = 196 + 441 - 588\cos(60^\circ)$

$b^2 = 637 - 588\cos(60^\circ)$

$b = \pm\sqrt{637 - 588\cos(60^\circ)}$

$b \approx 18.5$

#3) If a = 40, m∠A = 51°, and c = 35, find m∠C.



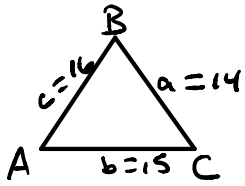
$\frac{\sin(51^\circ)}{40} = \frac{\sin(m\angle C)}{35}$

$\frac{35\sin(51^\circ)}{40} = \sin(m\angle C)$

$\sin^{-1}\left(\frac{35\sin(51^\circ)}{40}\right) = m\angle C$

$43^\circ \approx m\angle C$

#4) If a = 14, b = 15, and c = 16, find m∠C.



$c^2 = a^2 + b^2 - 2ab\cos(m\angle C)$

$(16)^2 = (14)^2 + (15)^2 - 2(14)(15)\cos(m\angle C)$

$256 = 196 + 225 - 420\cos(m\angle C)$

$256 = 421 - 420\cos(m\angle C)$

$-165 = -420\cos(m\angle C)$

$\frac{165}{420} = \cos(m\angle C)$

$\cos^{-1}\left(\frac{165}{420}\right) = m\angle C$

$67^\circ \approx m\angle C$

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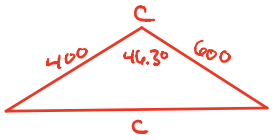
For the following, round the sides to the nearest tenth and the angles to the nearest whole number.

#5) George fenced in a triangular area for Danny Devito, his miniature pet donkey. Two sides of the area are 400 ears of corn long and 600 ears of corn long and they meet at an angle of 46.3°. If a fence is to be built around the area, how many ears of corn will be needed for the fencing?



$c^2 = a^2 + b^2 - 2ab\cos(m\angle C)$

$c^2 = (400)^2 + (600)^2 - 2(400)(600)\cos(46.3°)$

$c^2 = 160{,}000 + 360{,}000 - 480{,}000\cos(46.3°)$

$c^2 = 520{,}000 - 480{,}000\cos(46.3°)$

$c = \pm\sqrt{520{,}000 - 480{,}000\cos(46.3°)}$

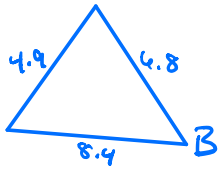
$c \approx 434.0$

$P = 400 + 600 + 434$

$P = 1434$

George needs 1434 ears of corn.

#6) The measure of the sides of George's best friend Rickito, a Ranch flavored Dorito, is 6.8 mm by 8.4 mm by 4.9 mm. Find the measure of the smallest angle of Rickito to the nearest degree?



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

$(4.9)^2 = (6.8)^2 + (8.4)^2 - 2(6.8)(8.4)\cos(m\angle B)$

$24.01 = 46.24 + 70.56 - 114.24\cos(m\angle B)$

$24.01 = 116.8 - 114.24\cos(m\angle B)$

$-92.79 = -114.24\cos(m\angle B)$

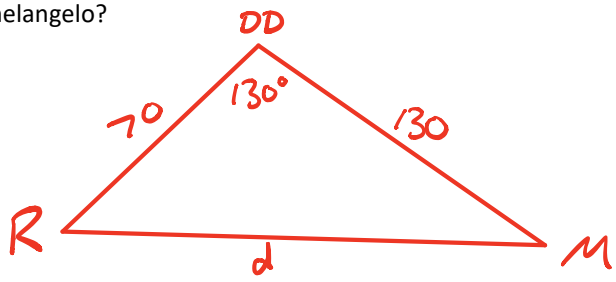
$\frac{92.79}{114.24} = \cos(m\angle B)$

$\cos^{-1}\left(\frac{92.79}{114.24}\right) = m\angle B$

$36° \approx m\angle B$

Rickito's smallest angle is 36°.

#7) Unbeknownst to George, Danny Devito ate through the corn fence and is now terrorizing George's bedroom. After eating George's best friend, Danny Devito takes a nap. From his napping position, Danny Devito is 70 pretzel sticks from Raphael and 130 pretzel sticks from Michelangelo. The angle formed by the two Ninja Turtles and Danny Devito is 130°. How many pretzel sticks apart are Raphael and Michelangelo?



$d^2 = r^2 + m^2 - 2rm\cos(m\angle DD)$

$d^2 = (130)^2 + (70)^2 - 2(130)(70)\cos(130°)$

$d^2 = 16{,}900 + 4{,}900 - 18{,}200\cos(130°)$

$d^2 = 21{,}800 - 18{,}200\cos(130°)$

$d = \pm\sqrt{21{,}800 - 18{,}200\cos(130°)}$

$d = 183.0$

Raphael and Michelangelo are 183 pretzel sticks apart.