

Law of Cosines 5.6

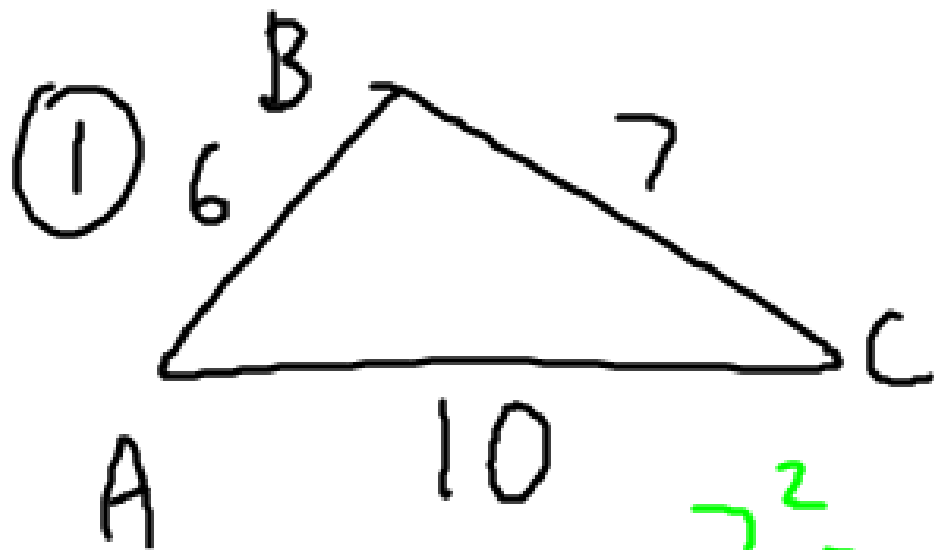
SSS



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

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

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



$$7^2 = 10^2 + 6^2 - 2(10)(6)\cos A$$
$$49 = 136 - 120\cos A$$

-136 -136

$$\frac{-87}{-120} = \frac{-120\cos A}{-120}$$

$$0.725 = \cos A$$

$$\cos^{-1}(0.725) = A$$

$$43.5^\circ = A$$

$$10^2 = (6^2 + 7^2) - 2(6)(7)\cos B$$

$$100 = 85 - 84\cos B$$

- 85 - 85

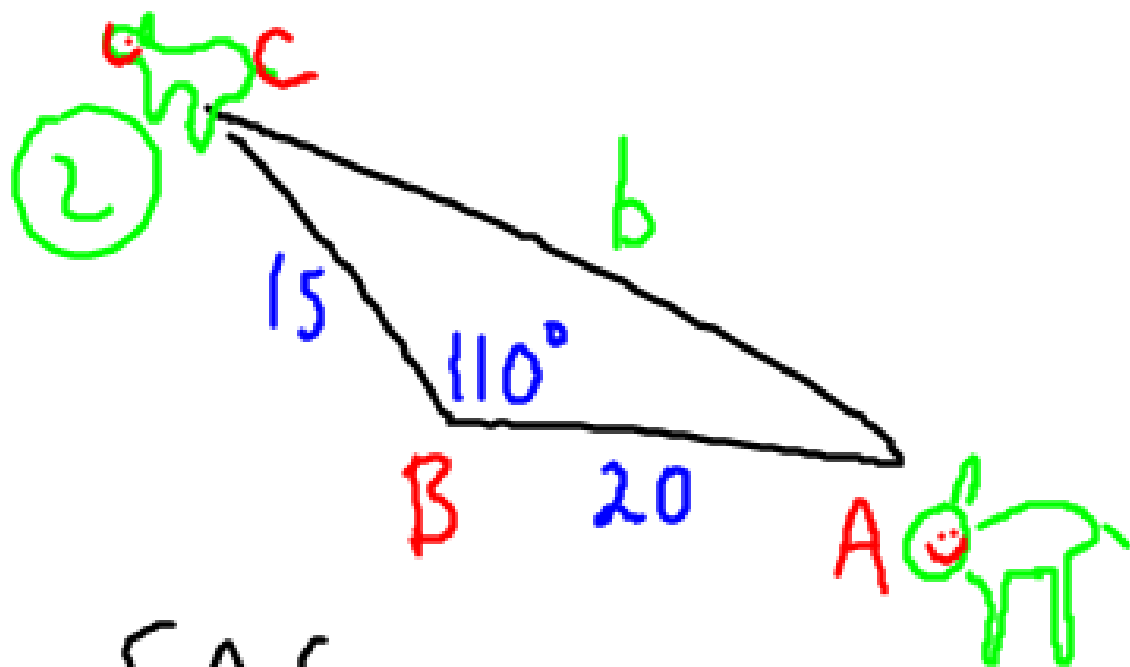
$$15 = \frac{-84\cos B}{-84}$$

$$100.3^\circ = B$$

$$-0.1796 = \cos B$$

$$C = 180 - 100.3 - 43.5$$

$$C = 36.2^\circ$$



How far apart
are the dogs?

SAS

$$b^2 = 15^2 + 20^2 - 2(15)(20)\cos 110^\circ$$

$$\sqrt{b^2} = \sqrt{830.212}$$

$$b \approx 28.8 \text{ ft.}$$

Δ short + short $>$ long

3, 4, 10

$3 + 4 > 10$

No

No Δ possible

Heron's Formula

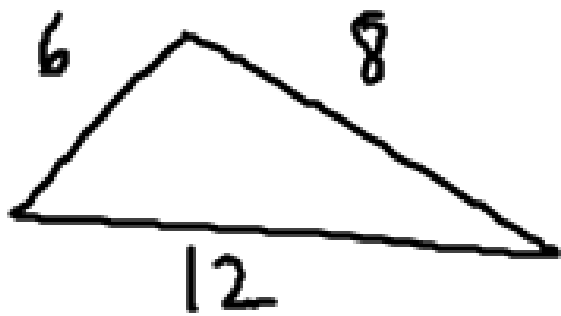
$$\text{Area of } \triangle = \sqrt{s(s-a)(s-b)(s-c)}$$

a, b, c \triangle lengths

s = semiperimeter

$$s = \frac{a+b+c}{2}$$

⑤ Find Area of triangle



$$s = \frac{6+8+12}{2} = \frac{26}{2} = 13$$

$$\text{Area} = \sqrt{13(13-6)(13-8)(13-12)}$$

$$A = \sqrt{13(7)(5)(1)}$$

$$A = \sqrt{455} \approx 21.3 \text{ cm}^2$$