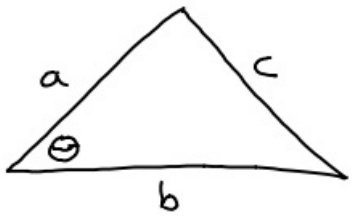
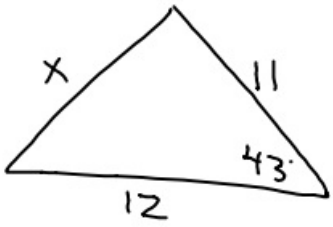
1-31-18 1st Trig

Law of Cosines



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

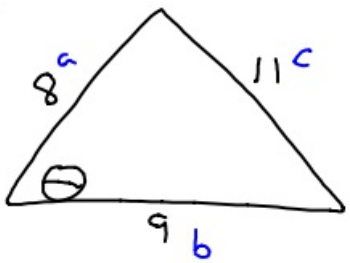
①



$X^2 = 12^2 + 11^2 - 2 \cdot 12 \cdot 11 \cdot \cos 43°$

$X \approx 8.5$

②



$11^2 = 9^2 + 8^2 - 2 \cdot 9 \cdot 8 \cdot \cos\theta$

$121 = 81 + 64 - 144 \cdot \cos\theta$

$121 = 145 - 144 \cdot \cos\theta$

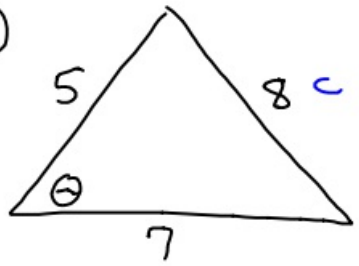
$-145 \quad -145$

$\frac{-24}{-144} = \frac{-144 \cdot \cos\theta}{-144}$

$\cos^{-1}\frac{24}{144} = {}^{\cos^{-1}}\cos\theta$

$\theta \approx 80.4°$

(3)



$8^2 = 7^2 + 5^2 - 2 \cdot 5 \cdot 7 \cdot \cos\theta$

$64 = 49 + 25 - 70 \cdot \cos\theta$

$64 = 74 - 70 \cdot \cos\theta$

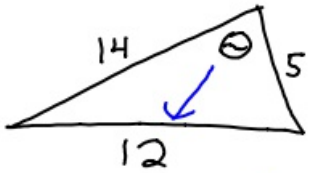
$-74 \quad -74$

$\frac{-10}{-70} = \frac{-70 \cdot \cos\theta}{-70}$

$\cos^{-1}\frac{10}{70} = \cos^{-1}\cos\theta$

$\theta \approx 81.8°$

(4)



$12^2 = 5^2 + 14^2 - 2 \cdot 5 \cdot 14 \cdot \cos\theta$

$144 = 25 + 196 - 140 \cdot \cos\theta$

$144 = 221 - 140 \cdot \cos\theta$

$-221 \quad -221$

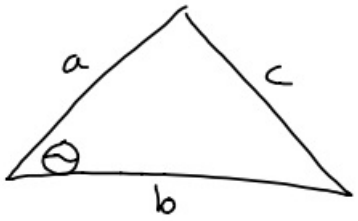
$\frac{-77}{-140} = \frac{-140 \cdot \cos\theta}{-140}$

$\cos^{-1}\frac{77}{140} = \cos^{-1}\cos\theta$

$\theta \approx 56.6°$

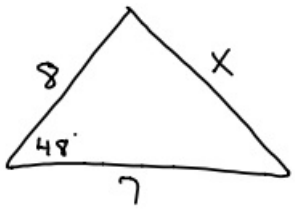
1-31-18 3rd Trig

Law of Cosines



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

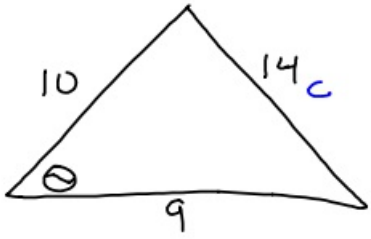
①



$$X^2 = 7^2 + 8^2 - 2 \cdot 7 \cdot 8 \cdot \cos 48^\circ$$

$$X \approx 6.2$$

②



$$14^2 = 9^2 + 10^2 - 2 \cdot 9 \cdot 10 \cdot \cos\Theta$$

$$196 = 81 + 100 - 180 \cdot \cos\Theta$$

$$196 = 181 - 180 \cdot \cos\Theta$$

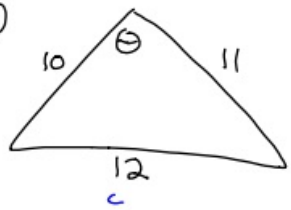
$$-181 \quad -181$$

$$\frac{15}{-180} = \frac{-180 \cdot \cos\Theta}{-180}$$

$$\cos^{-1}\left(-\frac{15}{180}\right) = \cos^{-1}\cos\Theta$$

$$\Theta \approx 94.8^\circ$$

(3)



$12^2 = 11^2 + 10^2 - 2 \cdot 10 \cdot 11 \cdot \cos\theta$

$144 = 121 + 100 - 220 \cdot \cos\theta$

$144 = 221 - 220 \cdot \cos\theta$

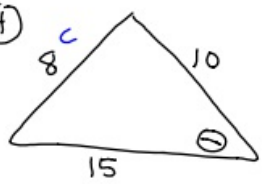
$-221 \quad -221$

$\frac{-77}{-220} = \frac{-220 \cdot \cos\theta}{-220}$

$\cos^{-1}\frac{77}{220} = \cos^{-1}\cos\theta$

$\theta \approx 69.5°$

(4)



$8^2 = 15^2 + 10^2 - 2 \cdot 15 \cdot 10 \cdot \cos\theta$

$64 = 225 + 100 - 300 \cdot \cos\theta$

$64 = 325 - 300 \cdot \cos\theta$

$-325 \quad -325$

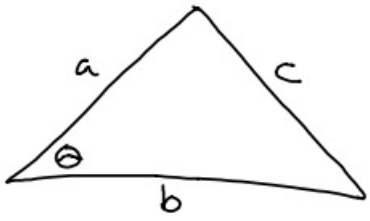
$\frac{-261}{-300} = \frac{-300 \cdot \cos\theta}{-300}$

$\cos^{-1}\frac{261}{300} = \cos^{-1}\cos\theta$

$\theta \approx 29.5°$

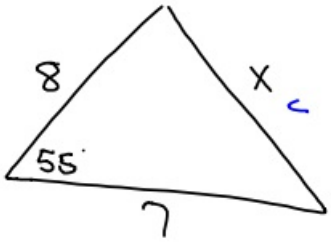
1-31-18 4th Trig

Law of Cosines



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

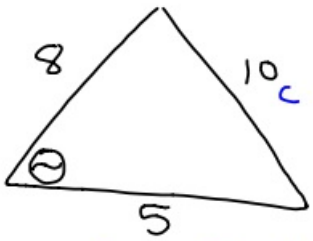
①



$$x^2 = 7^2 + 8^2 - 2 \cdot 7 \cdot 8 \cdot \cos 55^\circ$$

$$x \approx 7.0$$

②



$$10^2 = 5^2 + 8^2 - 2 \cdot 5 \cdot 8 \cdot \cos\theta$$

$$100 = 25 + 64 - 80 \cdot \cos\theta$$

$$100 = 89 - 80 \cdot \cos\theta$$

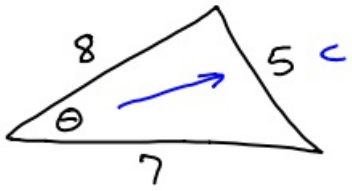
$$-89 \quad -89$$

$$\frac{11}{-80} = \frac{-80 \cdot \cos\theta}{-80}$$

$$\cos^{-1}\frac{-11}{80} = \cos^{-1}\cos\theta$$

$$\theta \approx 97.9^\circ$$

(3)



$5^2 = 7^2 + 8^2 - 2 \cdot 7 \cdot 8 \cdot \cos\theta$

$25 = 49 + 64 - 112 \cdot \cos\theta$

$25 = 113 - 112 \cdot \cos\theta$

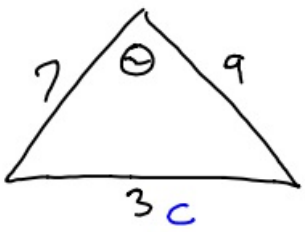
$-113 \quad -113$

$\frac{-88}{-112} = \frac{-112 \cdot \cos\theta}{-112}$

$\cos^{-1} \frac{88}{112} = \cos^{-1} \cos\theta$

$38.2^{\circ} \approx \theta$

(4)



$3^2 = 9^2 + 7^2 - 2 \cdot 9 \cdot 7 \cdot \cos\theta$

$9 = 81 + 49 - 126 \cdot \cos\theta$

$9 = 130 - 126 \cdot \cos\theta$

$-130 \quad -130$

$\frac{-121}{-126} = \frac{-126 \cdot \cos\theta}{-126}$

$\cos^{-1} \frac{121}{126} = \cos^{-1} \cos\theta$

$16.2^{\circ} \approx \theta$