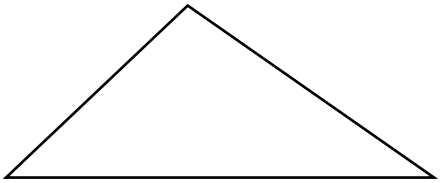
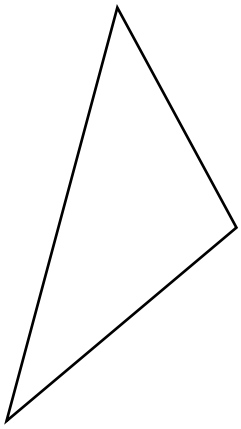
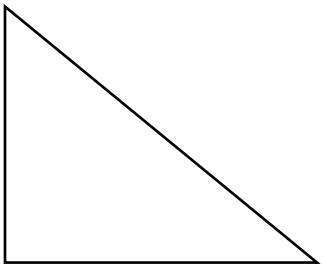
Session #3: Triangles (Day 3 Math Lesson)

Find the missing angles:







What kind of triangle?

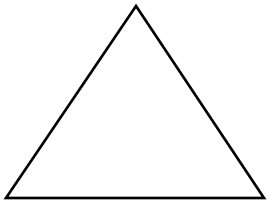
a. _____

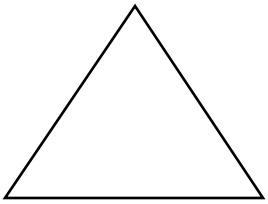
b. _____

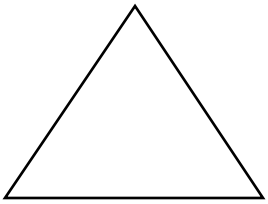
c. _____

d. _____

Which triangle is impossible?







Construct a triangle:

AB =

BC =

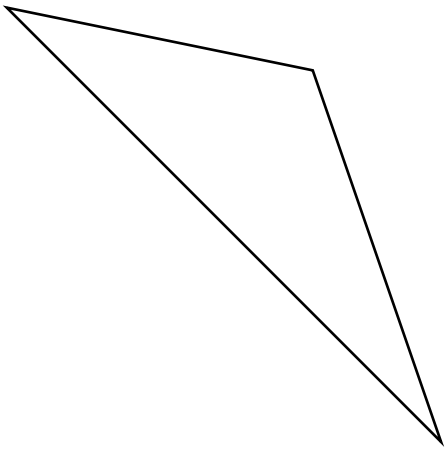
∠ABC =

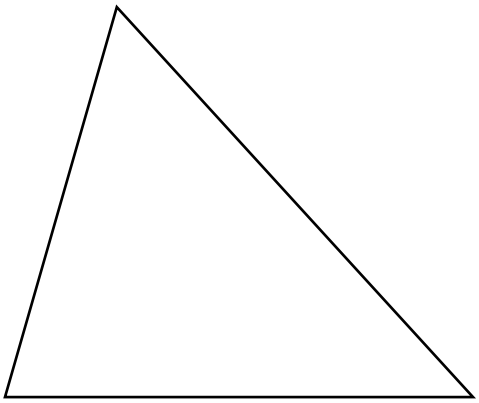
Construct an equilateral triangle:

AB =

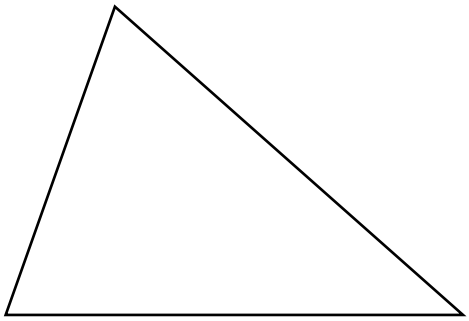
Construct a triangle with a 30^{o} angle between two 4” sides.

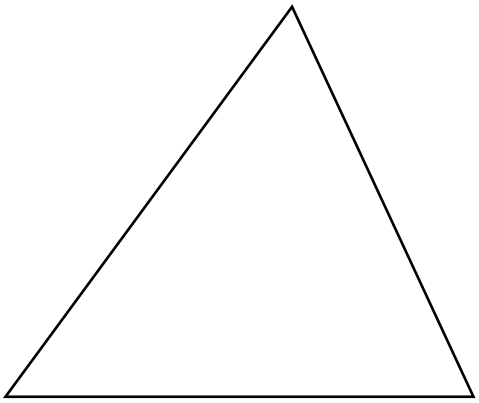
Find the missing angles:



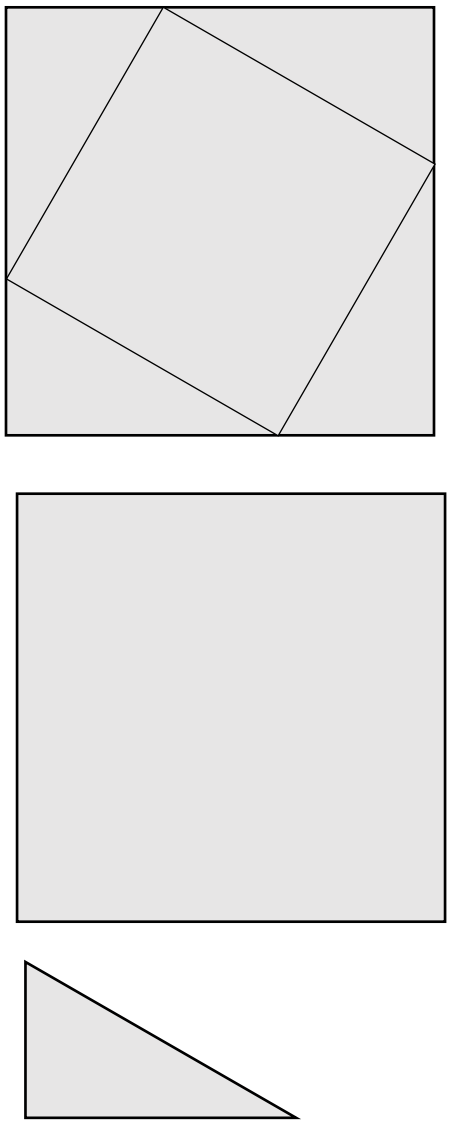


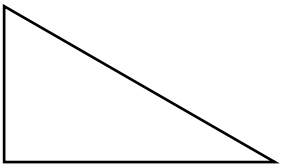
Find the missing angles:

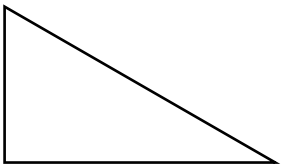


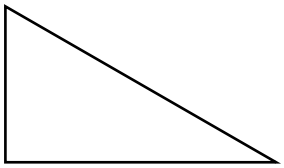


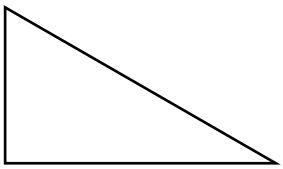
Pythagorean Theorem

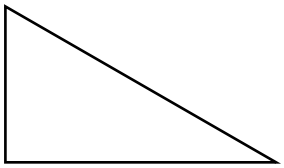


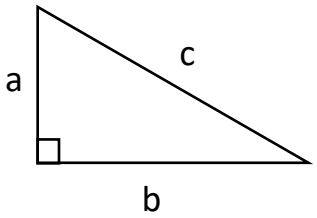








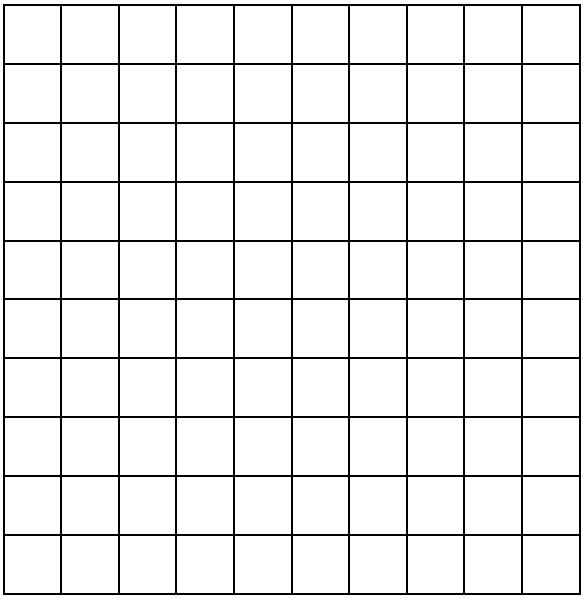




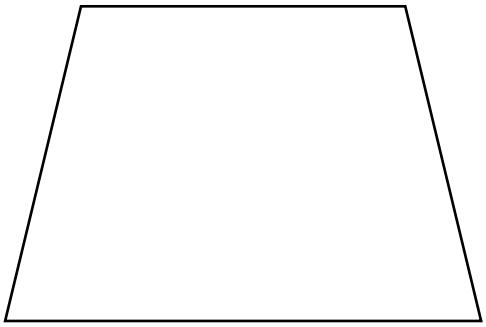
$c^2 = a^2 + b^2$

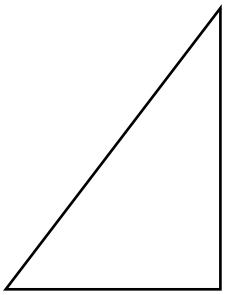
Marathon Map:

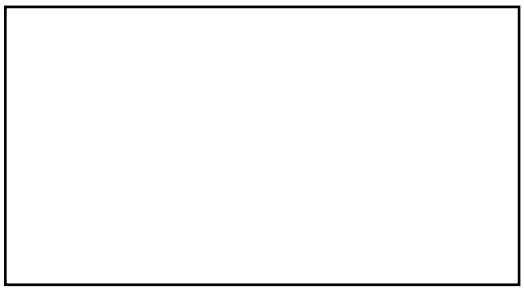
1. Plot the following coordinates: A(3,8) B(3,4) C(6,4)
2. Each unit on the graph represents 104 meters.
   How many circuits are needed for a 5k marathon?

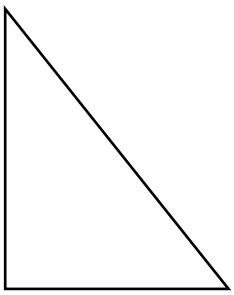


Trapezoids









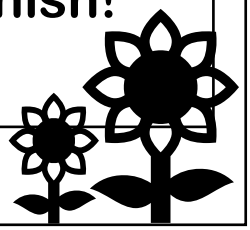
Pythagorean Maze #1

Determine the missing length of the right triangle described in each box and follow the answer to the next box.
The right answers will lead the bee to the flowers!

Start

a= 3 b=? c=5	4	a= 5 b=12 c=?
8 / 10		14 / 10
a= ? b=12 c=15	15	a= 8 b=? c=17
9 / 7		16 / 52
a= 10 b=? c=26	22	a= 9 b=40 c=?
24 / 20		45 / 23
a= 12 b=16 c=?	30	a= 15 b=? c=25

a= 6 b=8 c=?	13	
11		
a= ? b=24 c=25	18	
18		
a= ? b=35 c=37	41	
12		
Finish!	19	



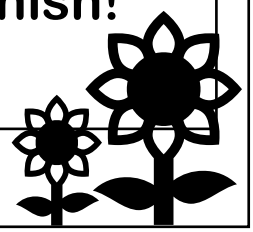
Pythagorean Maze #2

Determine the missing length of the right triangle described in each box and follow the answer to the next box.
The right answers will lead the bee to the flowers!

Start

a= 8 b=? c=20	14.2	a= 9 b=10 c=?
18.3 / 33.4		13.5 / 18.4
a= 22 b=? c=40	35.1	a= 7 b=17 c=?
39.5 / 27.3		27.3 / 9.4
a= 12 b=32 c=?	22.9	a= 10 b=? c=25
34.2 / 9.7		14.8 / 10.9
a= ? b=11 c=15	10.2	a= 5 b=? c=12

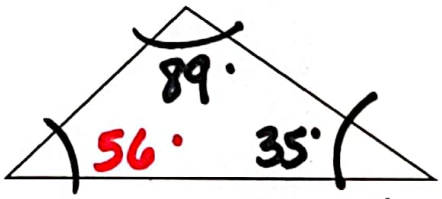
a= 6 b=? c=14	13	
12.6		
a= 5 b=8 c=?	17.3	
18.2		
a= ? b=30 c=36	16.3	
19.9		
Finish!	7.6	



Session #3: Triangles (Day 3 Math Lesson)

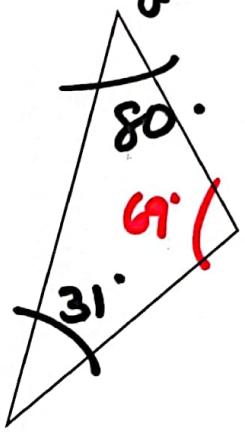
Find the missing angles:

Sum all ∠ = 180°



acute triangle

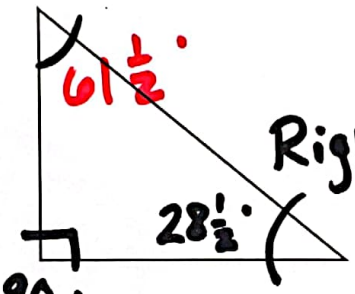
$$\begin{array}{r} 180 \\ -89 \\ -35 \\ \hline 56^\circ \end{array}$$



acute triangle

$$\begin{array}{r} 180^\circ \\ -80^\circ \\ -31^\circ \\ \hline 69^\circ \end{array}$$

$$\begin{array}{r} 180^\circ \\ -90^\circ \\ -28\frac{1}{2}^\circ \\ \hline 61\frac{1}{2}^\circ \end{array}$$



Right triangle

What kind of triangle?

a. 30°, 60°, 90° → Right Δ

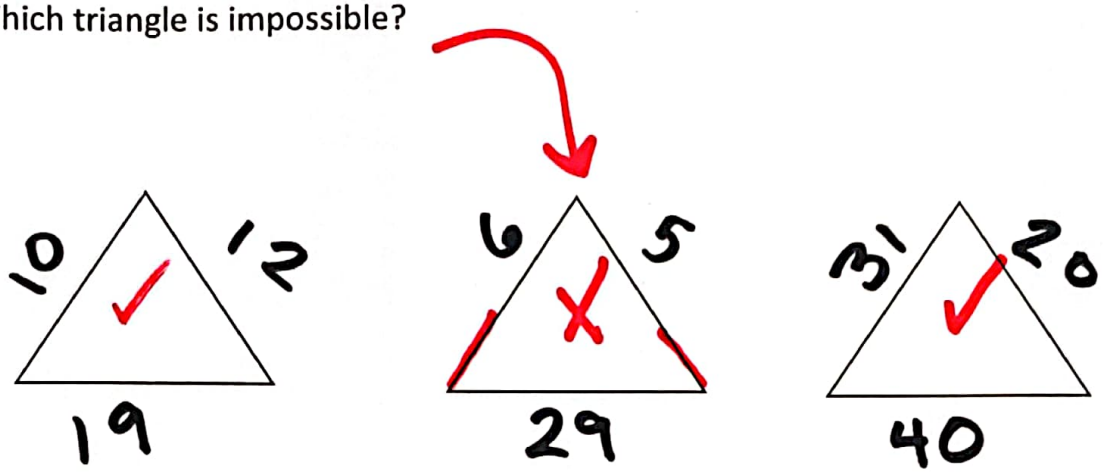
b. 120°, 30°, 30° → Obtuse Isosceles

c. 60°, 60°, 60° → Equilateral Δ

d. 80°, 40°, 40° → Impossible!!

↳ sum to 160° not 180°

Which triangle is impossible?



Construct a triangle:

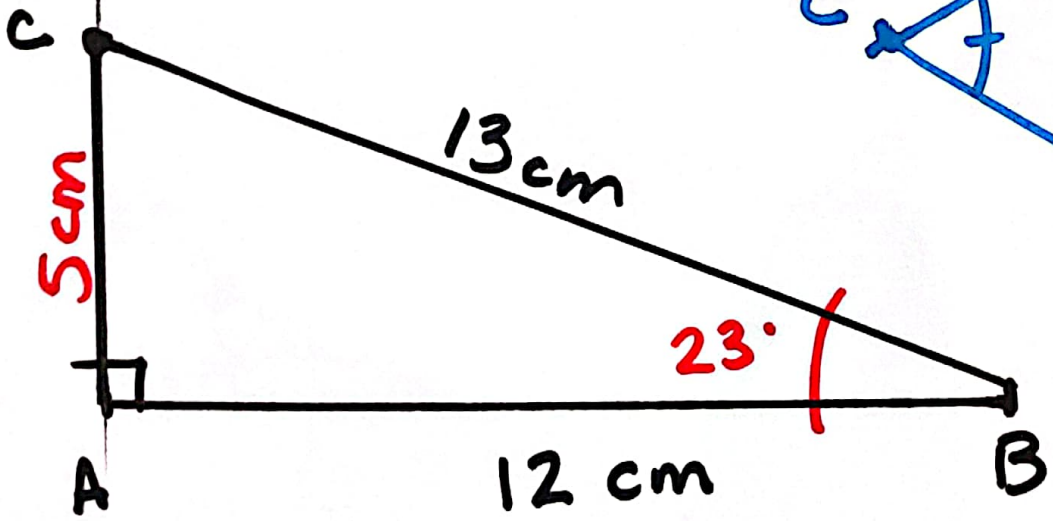
AB = 12 cm

BC = 13 cm

∠ABC = ?

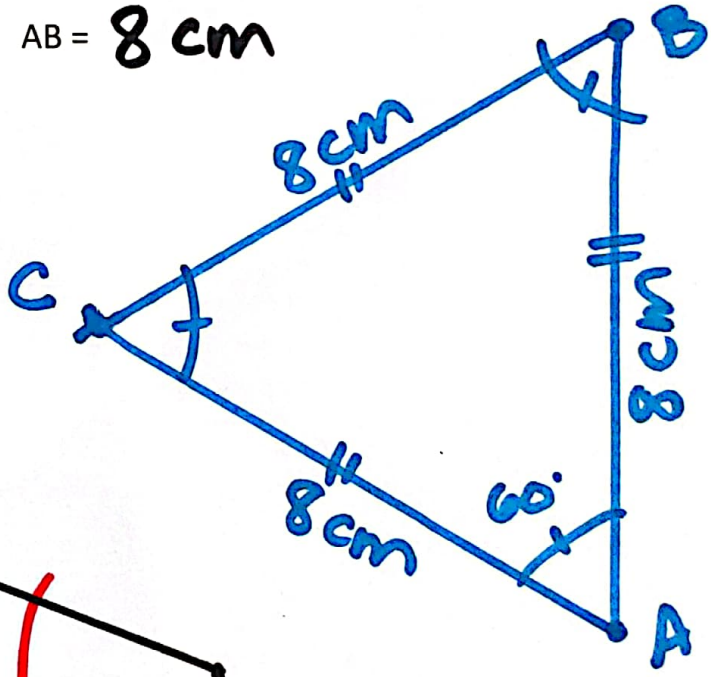
$\overline{AC}$ = ?

∡ CAB = 90°



Construct an equilateral triangle:

AB = 8 cm

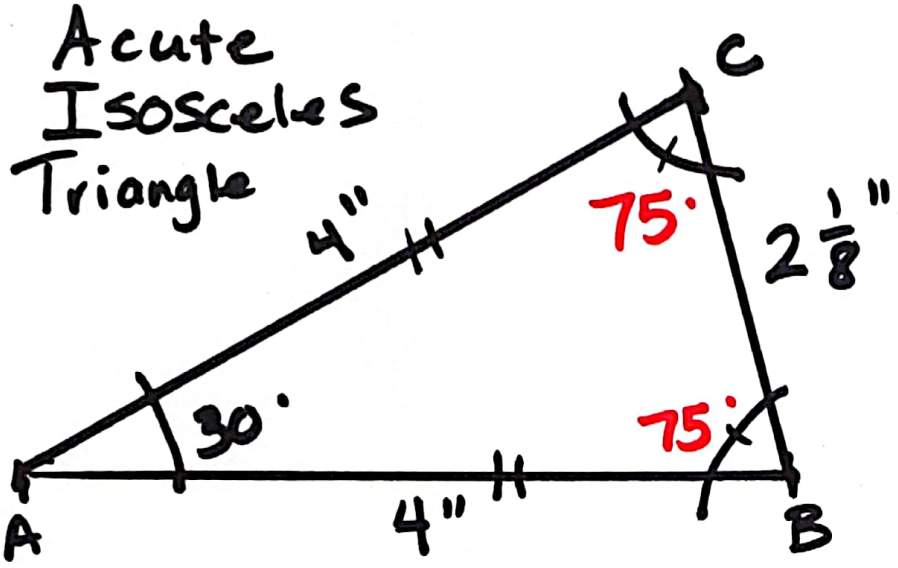


Equilateral: $180° = 3x$

$\frac{180}{3} = 60°$

Construct a triangle with a 30° angle between two 4" sides.

Acute Isosceles Triangle

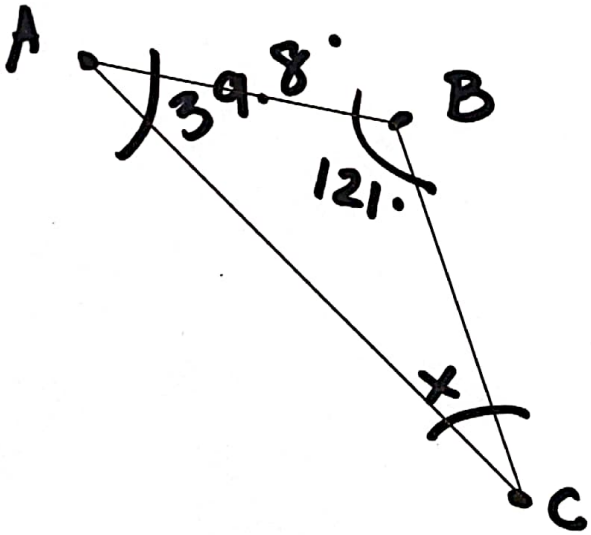


$\overline{CB} = 2\frac{1}{8}$"

$\angle C = 75°$

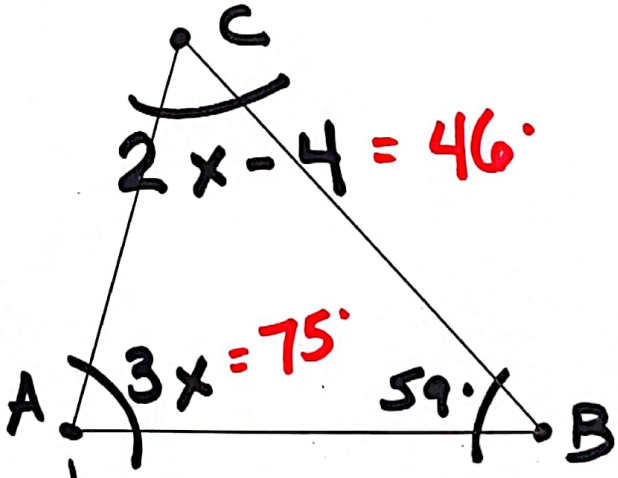
$\angle B = 75°$

Find the missing angles:



$X = 180° - 121° - 39.8°$

$X = 19.2°$



$180° = 59 + 3x + 2x - 4$

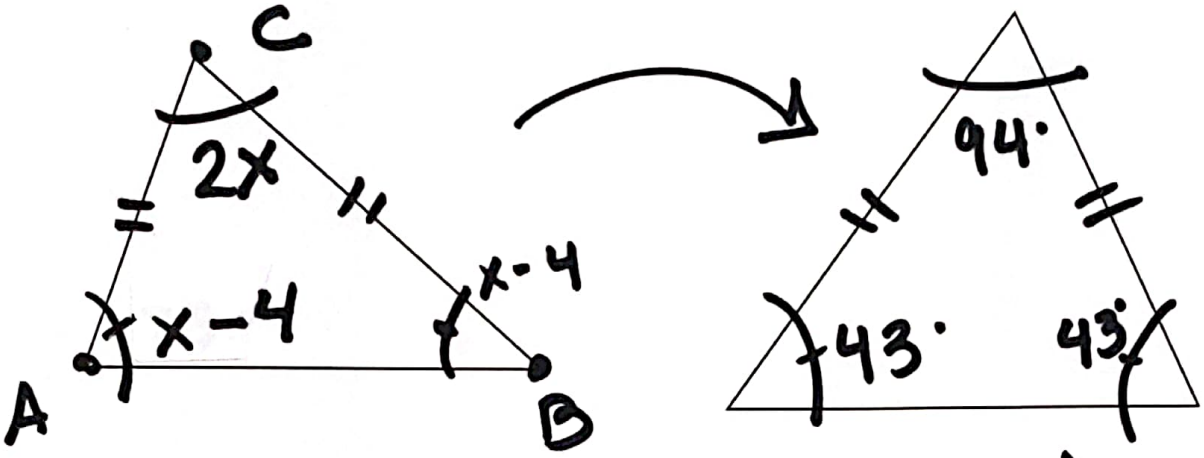
$180 = 55 + 5x$

$-55 \quad -55$

$125 = 5x$

$x = 25°$

Find the missing angles:



$$180^\circ = 2x + (x-4) + (x-4)$$

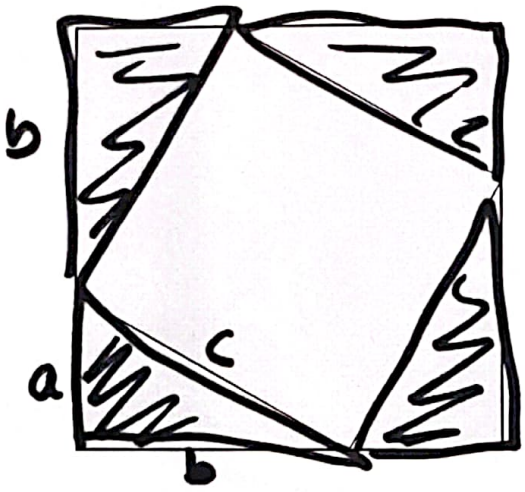
$$180^\circ = 4x - 8$$

$$+8 \qquad +8$$

$$\frac{188}{4} = \frac{4x}{4}$$

$$x = 47^\circ$$

Pythagorean Theorem



Area of small □:

$A = c^2$

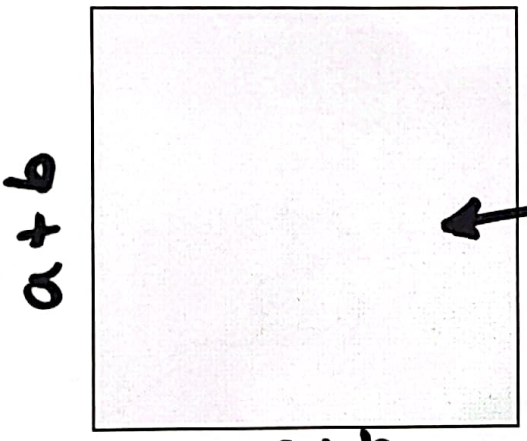
Area of big □:

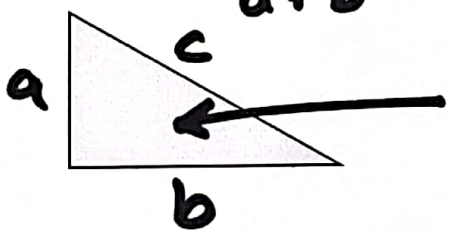
$A = (a+b)^2$

$A = (a+b)(a+b)$

$= a^2 + ab + ab + b^2$

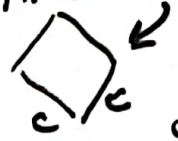
$= a^2 + 2ab + b^2$



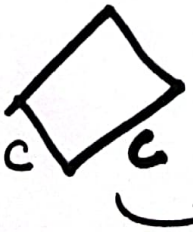


$A = \frac{1}{2}(b)(a) = \frac{ab}{2}$

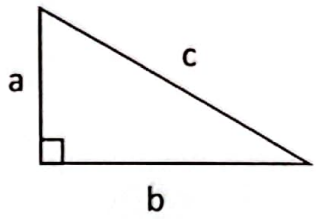
4 △'s: $4 \cdot \frac{ab}{2} = 2ab$

Area of 

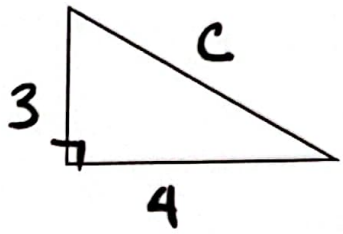
$= \square_{a+b} - 4\triangle = a^2 + 2ab + b^2 - 2ab$

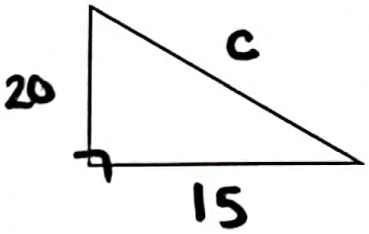


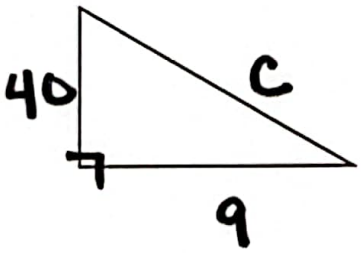
$c^2 = a^2 + b^2$

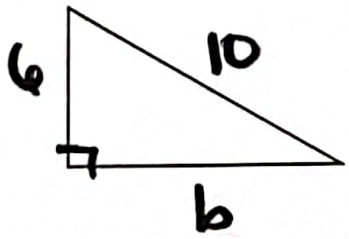


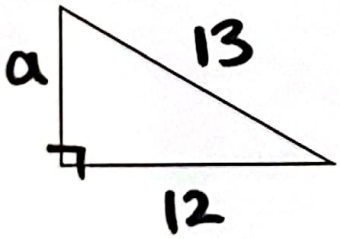
$c^2 = a^2 + b^2$



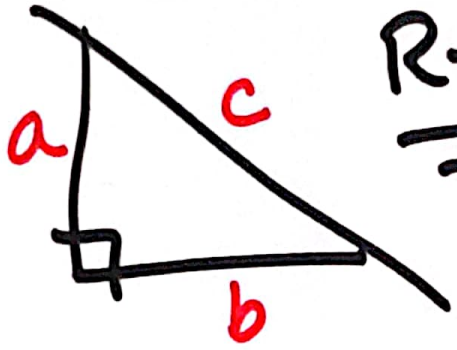






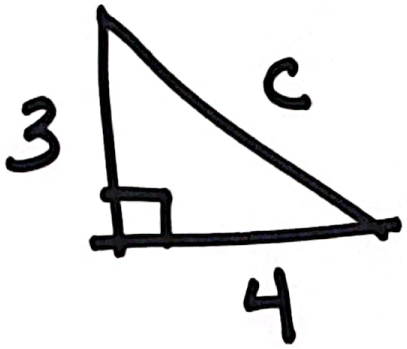


See answers on following pages →



Rt. Δ's only!!

$$c^2 = a^2 + b^2$$

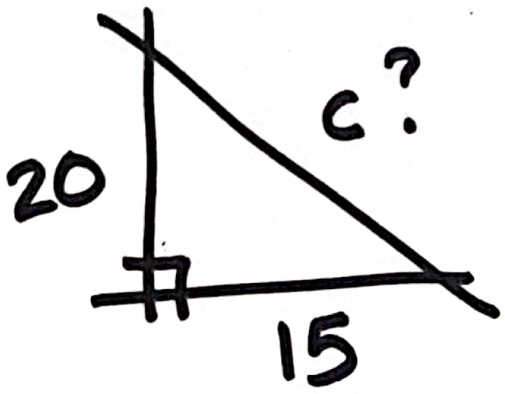


$$c^2 = 3^2 + 4^2$$

$$c^2 = 9 + 16 = 25$$

$$\sqrt{c^2} = \sqrt{25}$$

$$\boxed{c = 5}$$



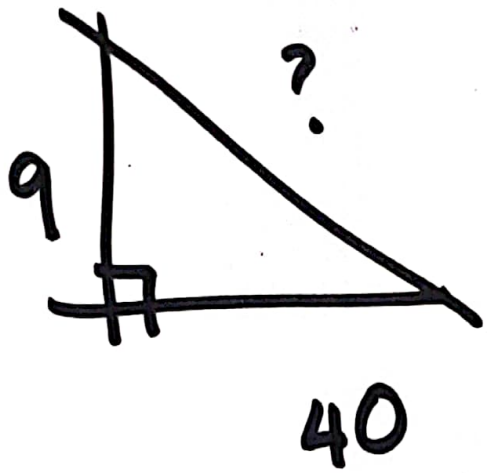
$$a^2 + b^2 = c^2$$

$$c^2 = 20^2 + 15^2$$

$$c^2 = 400 + 225$$

$$c^2 = 625$$

$$\boxed{c = 25}$$



$$c^2 = a^2 + b^2$$

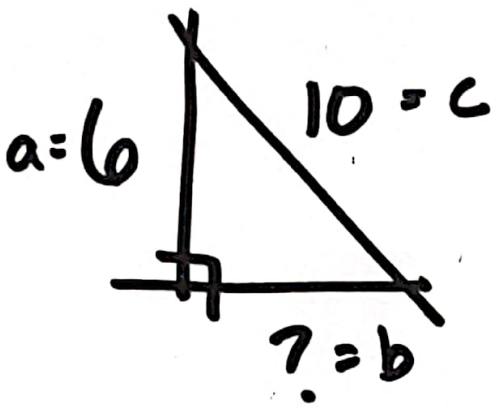
$$c^2 = 9^2 + 40^2$$

$$c^2 = 81 + 1600$$

$$c^2 = 1681$$

$$\boxed{c = 41}$$

$$c^2 = a^2 + b^2$$



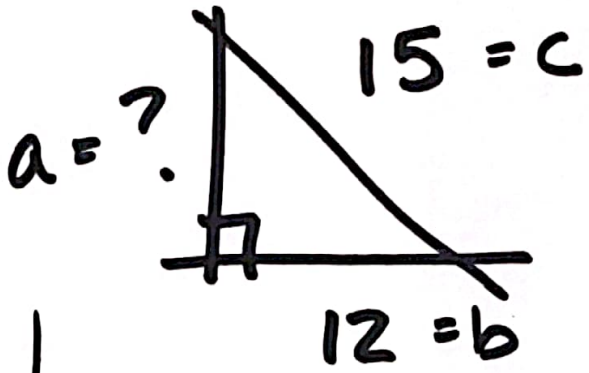
$$10^2 = 6^2 + b^2$$

$$100 = 36 + b^2$$

$$-36 \quad -36$$

$$b^2 = 64$$

$$\boxed{b = 8}$$



$$15^2 = a^2 + 12^2$$

$$225 = a^2 + 144$$

$$-144 \quad -144$$

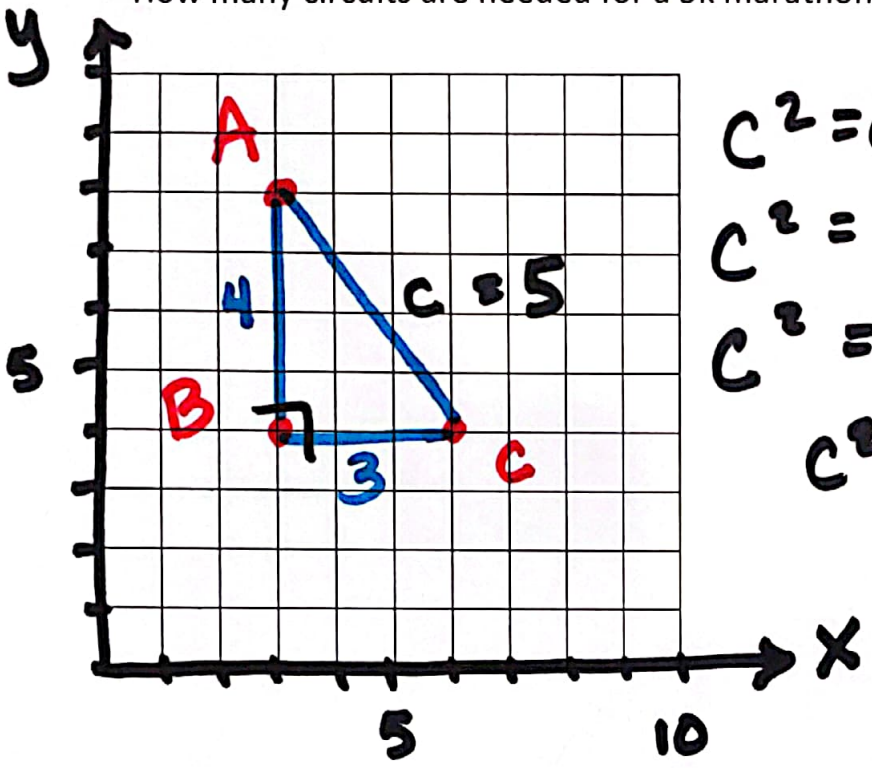
$$\sqrt{81} = \sqrt{a^2}$$

$$\boxed{a = 9}$$

Marathon Map:

1. Plot the following coordinates: A(3,8) B(3,4) C(6,4)
2. Each unit on the graph represents 104 meters.
   How many circuits are needed for a 5k marathon?

(x, y)



$c^2 = a^2 + b^2$

$c^2 = 4^2 + 3^2$

$c^2 = 16 + 9 = 25$

$c^2 = 25 \Rightarrow c = 5$

Perimeter = 5 + 3 + 4 = 12 units

one unit = 104 meters

104 x 12 = 1248 m in one loop

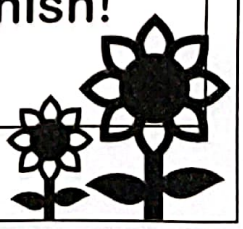
$$\frac{5000\text{m}}{\frac{1248\text{m}}{1\text{loop}}} = \boxed{4 \text{ loops}}$$

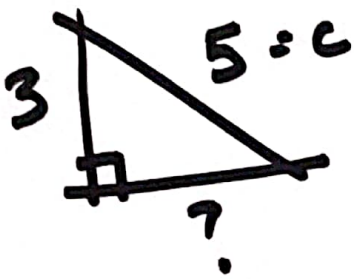
Pythagorean Maze #1

Determine the missing length of the right triangle described in each box and follow the answer to the next box.
The right answers will lead the bee to the flowers!

Start

a= 3 b=? c=5	4 → a= 5 b=12 c=?	13 a= 6 b=8 c=?
8 / 10	14 / 10	11
a= ? b=12 c=15	15 a= 8 b=? c=17	18 a= ? b=24 c=25
9 / 7	16 / 52	18
a= 10 b=? c=26	22 a= 9 b=40 c=?	41 a= ? b=35 c=37
24 / 20	45 / 23	12
a= 12 b=16 c=?	30 a= 15 b=? c=25	19 Finish!





$c^2 = a^2 + b^2$

$5^2 = 3^2 + b^2$

$25 = 9 + b^2$

$-9 \quad -9$

$16 = b^2$

$b = 4$ ← $b = 4$

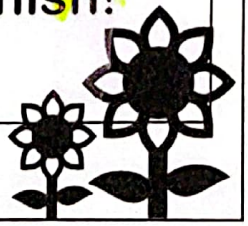
Pythagorean Maze #1

Determine the missing length of the right triangle described in each box and follow the answer to the next box.
The right answers will lead the bee to the flowers!

Start

a= 3 b=? c=5	4	a= 5 b=12 c=?
8 / 10		14 / 10
a= ? b=12 c=15	15	a= 8 b=? c=17
9 / 7		16 / 52
a= 10 b=? c=26	22	a= 9 b=40 c=?
24 / 20		45 / 23
a= 12 b=16 c=?	30	a= 15 b=? c=25

a= 6 b=8 c=?	13	a= ? b=24 c=25
11		18
a= ? b=35 c=37	41	Finish!
12		

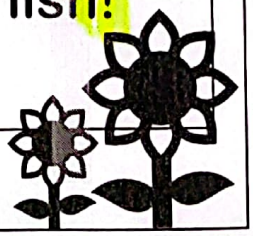


Pythagorean Maze #2

Determine the missing length of the right triangle described in each box and follow the answer to the next box.
The right answers will lead the bee to the flowers!

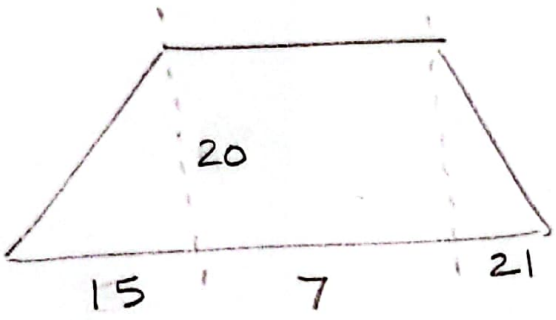
Start

a= 8 b=? c=20	14.2	a= 9 b=10 c=?	13	a= 6 b=? c=14
18.3	33.4	13.5	18.4	12.6
a= 22 b=? c=40	35.1	a= 7 b=17 c=?	17.3	a= 5 b=8 c=?
39.5	27.3	27.3	9.4	18.2
a= 12 b=32 c=?	22.9	a= 10 b=? c=25	16.3	a= ? b=30 c=36
34.2	9.7	14.8	10.9	19.9
a= ? b=11 c=15	10.2	a= 5 b=? c=12	7.6	Finish!



Trapezoids

Perimeter = ?

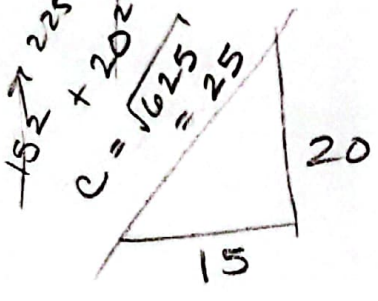


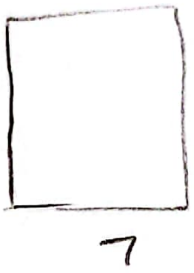
$15^2 = 225$

$+ 20^2 = 400$

$c = \sqrt{625}$

$= 25$

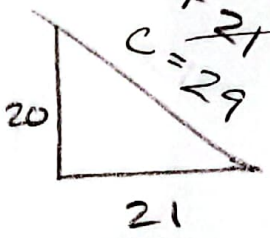




$20^2 = 400$

$+ 21^2 = 441$

$c = 29 = c^2$



$P = 15 + 7 + 21 + 29 + 7 + 25$

$P = 104$