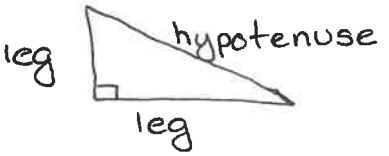
Pythagorean Theorem: * only w/ right △s



$(\text{leg})^2 + (\text{leg})^2 = (\text{hypotenuse})^2$

Pythagorean Triple:

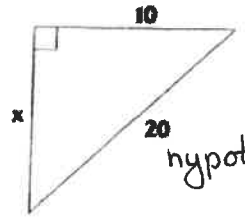
a set of 3 nonzero whole numbers a, b, and c such that $a^2 + b^2 = c^2$

whole numbers = set of 1, 2, 3, 4...

* the sides of the right △ are all whole #s

1. Find the unknown side length. Do the lengths form a pythagorean triple?

a.



$10^2 + x^2 = 20^2$

$100 + x^2 = 400$

$-100 \quad -100$

$x^2 = 300$

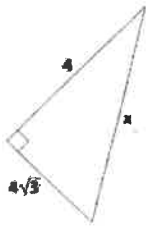
$\sqrt{x^2} = \sqrt{300}$

$x = \sqrt{100 \cdot 3}$

$x = 10\sqrt{3}$

Not a pythagorean triple

b.



Not a pythagorean triple

$4^2 + (4\sqrt{3})^2 = x^2$

$16 + 16(3) = x^2$

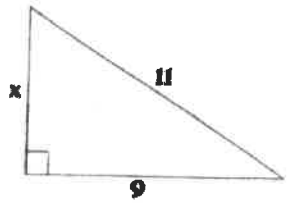
$16 + 48 = x^2$

$64 = x^2$

$\sqrt{64} = \sqrt{x^2}$

$8 = x$

c.



$9^2 + x^2 = 11^2$

$81 + x^2 = 121$

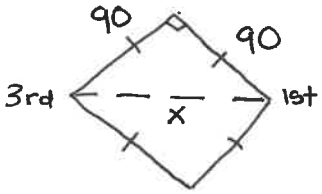
$x^2 = 40$

$x = \sqrt{40}$

$x = \sqrt{4 \cdot 10}$

$x = 2\sqrt{10}$

2. A baseball diamond is square with sides of 90 feet. What is the shortest distance between first base and third base?



$90^2 + 90^2 = x^2$

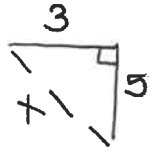
$8100 + 8100 = x^2$

$16200 = x^2$

$\sqrt{16200} = x$

$x \approx 127.3$ ft

3. Two joggers run 5 miles north and then 3 miles west. What is the shortest distance they must travel to return to their starting point?



$x^2 = 5^2 + 3^2$

$x^2 = 25 + 9$

$x^2 = 34$

$x = \sqrt{34}$

$x \approx 5.83$ mi

*attempt pythagorean Thm

$leg^2 + leg^2 ?\ hypotenuse^2$

Equal → Right	Converse of the Pythagorean Theorem	If the sum of the squares of the lengths of the shortest sides of a triangle is equal to the square of the length of the longest side, then the triangle is a right triangle.	
hyp^2 smaller, acute	8.6	If the square of the length of the longest side of a triangle is less than the sum of the squares of the lengths of the other two sides, then the triangle is an acute triangle	
hyp^2 larger, obtuse	8.7	If the square of the length of the longest side of a triangle is greater than the sum of the squares of the lengths of the other two sides, then the triangle is an obtuse triangle.	

4. Determine whether each set of numbers can be the measures of the sides of a triangle. If so, classify the triangle as acute, right or obtuse. Justify your answer.

a. 7, 14, 16

$7^2 + 14^2 ?\ 16^2$

$49 + 196 ?\ 256$

$242 ?\ 256$

obtuse

b. 9, 40, 41

$9^2 + 40^2 ?\ 41^2$

$81 + 1600 ?\ 1681$

$1681 ?\ 1681$

Right

c. 11, 60, 61

$11^2 + 60^2 ?\ 61^2$

$121 + 3600 ?\ 3721$

$3721 ?\ 3721$

Right

d. 3, 4, 7

can't form a △

b/c $3+4 \not> 7$