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9.4. Honors Geometry

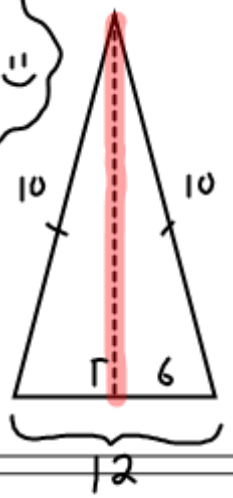
DATE: 3/20

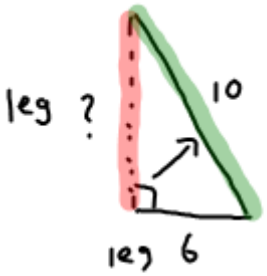
Target 8B. Understand and apply the Pythagorean Theorem

Pythagorean Theorem Examples

1. Find the altitude to the base of an isosceles triangle with base 12 and congruent sides 10.

2 Δs ≅ by HL





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

$a^2 + 6^2 = 10^2$

$a^2 + 36 = 100$

$-36 \quad -36$

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

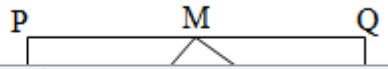
$a = 8$

"Across from the right ∠ is the longest side of right Δ"

HYPOTENUSE

NOTE: It doesn't matter if you substitute the leg value for a or b in the Pyth Thm

2. M is the midpoint of a side of rectangle PQRS. QT = 9, TR = 7, SR = 24.
Find the perimeter of ΔMST.



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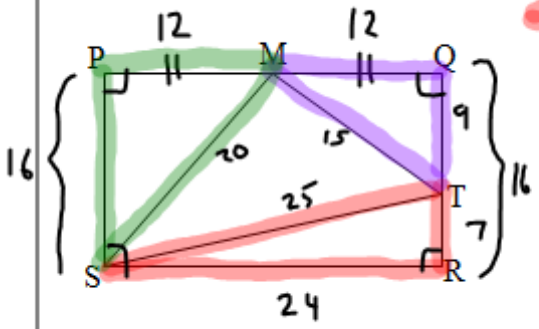
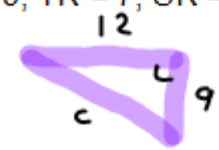
2. M is the midpoint of a side of rectangle PQRS. QT = 9, TR = 7, SR = 24. Find the perimeter of ΔMST.

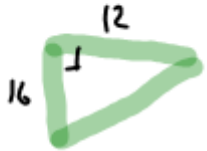
midpt ⇒ $\overline{PM} \cong \overline{MQ}$



$a^2 + b^2 = c^2$
$7^2 + 24^2 = c^2$
$49 + 576 = c^2$
$\sqrt{625} = \sqrt{c^2}$
$25 = c$



$a^2 + b^2 = c^2$
$9^2 + 12^2 = c^2$
⋮
$15 = c$



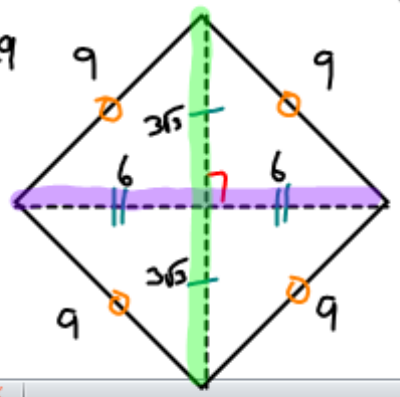
$a^2 + b^2 = c^2$
$16^2 + 12^2 = c^2$
⋮
$20 = c$

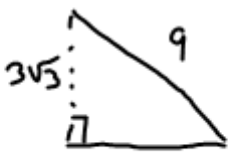
Perimeter ΔMST = ST + MT + SM = 25 + 15 + 20 = $\boxed{60}$

3. Find the length of the longer diagonal of rhombus ABCD if the shorter diagonal is 12 and the perimeter is 36.

Rhombus ⇒ diagonals bisect eachother, diag. ⊥, 4 ≅ sides

$\frac{36}{4} = 9$





Longer diagonal
$3\sqrt{3} + 3\sqrt{3} = \boxed{6\sqrt{3}}$ ✓

$a^2 + b^2 = c^2$
$a^2 + 6^2 = 9^2$
$a^2 + 36 = 81$
$-36 \quad -36$
$\sqrt{a^2} = \sqrt{45}$

$\sqrt{45}$
$\sqrt{9 \cdot 3}$
$3\sqrt{3}$

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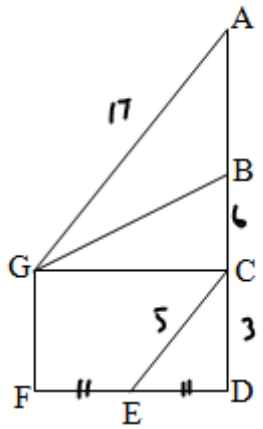
4. Given FDCG is a rectangle. E is the midpoint of FD. CD = 3, CE = 5, BC = 6, AG = 17. Find the perimeter of ΔABG.



You try it! Similar to #2. See me if you need help.

Perimeter = 17 + 10 + 9 = $\boxed{36}$ ← You should get this.

5. Jason walks 3 miles north, 10 miles east, 4 miles north and 14 miles east. How far is he from his starting point?

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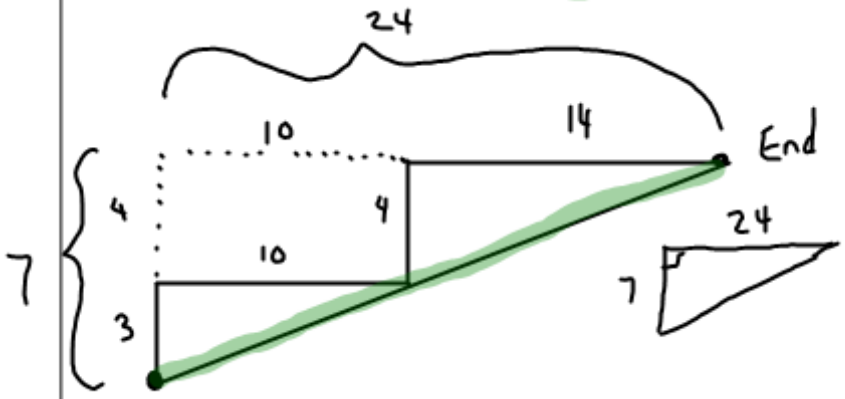
5. Jason walks 3 miles north, 10 miles east, 4 miles north and 14 miles east. How far is he from his starting point?



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

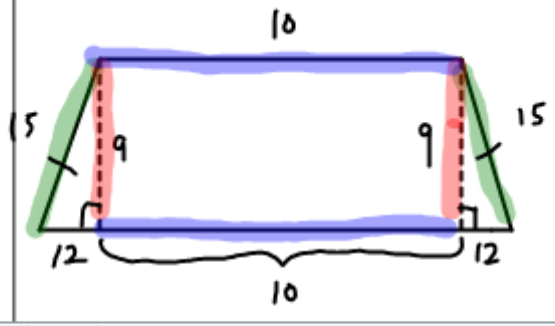
$7^2 + 24^2 = c^2$

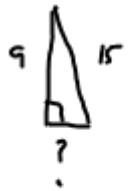
$\sqrt{625} = \sqrt{c^2}$

$25 = c$

Jason is 25 miles from his starting point.

6. Find the perimeter of an isosceles trapezoid whose congruent sides are each 15, whose height is 9 and whose smaller base is 10.





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

$a^2 + 9^2 = 15^2$

$a^2 + 81 = 225$

$-81 \quad -81$

$\sqrt{a^2} = \sqrt{144}$

$a = 12$

$P = 10 + 15 + 12 + 10 + 12 + 15$

$= 74$

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