8.3

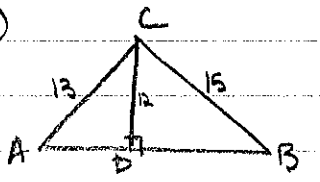
(9) $(ST)^2 + 12^2 = 13^2$ → $25 \square 4^2 + 3^2$

$(ST)^2 = 25$ → $25 = 16 + 9$ → Rt. △

(10) $8^2 + (BC)^2 = 10^2$ → $11^2 \square 36 + 7^2$

$(BC)^2 = 36$ → $121 \boxed{>} 85$ → obtuse △

(11)



$12^2 + AD^2 = 13^2$ $12^2 + DB^2 = 15^2$

$AD = 5$ $DB = 9$

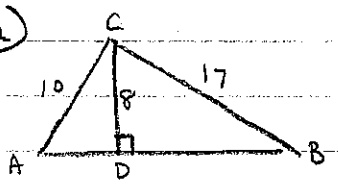
$AB = 14$

$15^2 \square 13^2 + 14^2$

$225 \boxed{<} 365$

acute

(12)



$8^2 + AD^2 = 10^2$ $8^2 + DB^2 = 17^2$

$AD = 6$ $DB = 15$

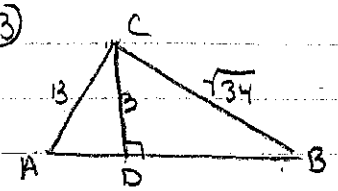
$AB = 21$

$21^2 \square 10^2 + 17^2$

$441 \boxed{>} 389$

obtuse

(13)



$3^2 + AD^2 = 13^2$ $3^2 + DB^2 = (\sqrt{34})^2$

$AD = \sqrt{160}$ $DB = 5$

$AD = 4\sqrt{10}$

$AB = 4\sqrt{10} + 5$

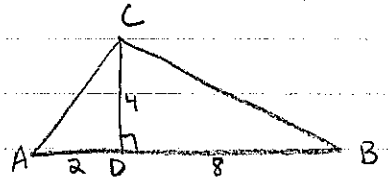
$(4\sqrt{10} + 5)^2 \square 13^2 + (\sqrt{34})^2$

$160 + 40\sqrt{10} + 25 \square 203$

$\approx 311.5 \boxed{>} 203$

Obtuse

(14)



$8^2 + 4^2 = CB^2$ $2^2 + 4^2 = AC^2$

$\sqrt{80} = CB$ $\sqrt{20} = AC$

$4\sqrt{5} = CB$ $2\sqrt{5} = AC$

$AB = 10$

$10^2 \square (4\sqrt{5})^2 + (2\sqrt{5})^2$

$100 \square 80 + 20$

$100 \boxed{=} 100$

Right

(15) $20^2 < x^2 + (x+4)^2$

$400 < x^2 + x^2 + 8x + 16$

$400 < 2x^2 + 8x + 16$

$0 < 2x^2 + 8x - 384$

$0 < 2(x^2 + 4x - 192)$

$0 < 2(x+16)(x-12)$

Either:

$(x+16) > 0$ + $(x-12) > 0$ OR $(x+16) < 0$ + $(x-12) < 0$

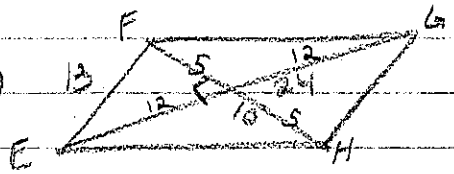
$x > -16$ AND $\boxed{x > 12}$ OR $x < -16$ AND $x < 12$

Discard

longest side → $x + 4 < 20$

$x < 16$

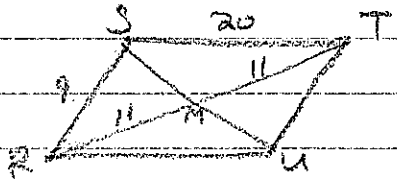
$\boxed{12 < x < 16}$

(16) 

$13^2 \boxed{\quad} 5^2 + 12^2$

$169 \boxed{=} 169$

Rt. Δ → diag. ⊥ → all sides = 13 → Rhombus

(17) 

$22^2 \boxed{\quad} 9^2 + 20^2$

$484 \boxed{>} 481$

$\angle RST$ obtuse + its supp. $\angle SRU$ is acute

SAS ineq. → 2 sides $\Delta \cong$ to 2 sides of another Δ + incl. $\angle$ is larger → side opp. incl. $\angle$ is longer

↓

$RT > SU \rightarrow \boxed{RM > SM}$

(18) $(2xy)^2 + (x^2 - y^2)^2$

$4x^2y^2 + x^4 - 2x^2y^2 + y^4$

$x^4 + 2x^2y^2 + y^2$ ⟷ $=$ $(x^2 + y^2)^2$

$x^4 + 2x^2y^2 + y^4$

17