Common Tangent Thm

(1) $AC = 24$ (2) $AB = 12$ (3) $CD = 13$ *(4) $ED = 13$

(5) $ED = 10$; No, not tangent.

(6) $EF = 41$ *(7) $AB = 40$ (8) $40 + 6 + 41 + 15$

$9^2 + x^2 = 41^2$

$x^2 = 1600$

$x = 40$

102

(9) $5^2 + x^2 = 13^2$

$x = 12$

$ST = 12$

*(10) $3^2 + x^2 = 13^2$

$x^2 = 160$

$ST = 4\sqrt{10}$

*(11) $6^2 + x^2 = 9^2$

$x^2 = 108$

$ST = 6\sqrt{3}$

(12) $x^2 + 15^2 = 17^2$

$x = 8$

$US = 12\frac{1}{2}$

(13) $x^2 + 24^2 = 25^2$

$x = 7$

$VT = 9$

(14) $\frac{y}{15} = \frac{5}{8}$

$8y = 75$

$y = \frac{75}{8}$

$PB = \frac{75}{8}$

(15) $\frac{5}{8} = \frac{x+5}{17}$

$85 = 8x + 40$

$45 = 8x$

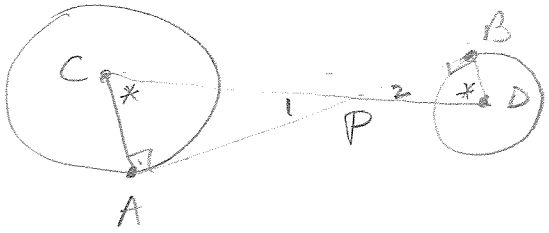
$PD = \frac{45}{8}$

(16) $AB = 15 + \frac{75}{8}$

$= \frac{120}{8} + \frac{75}{8}$

$AB = \frac{195}{8}$

(17)

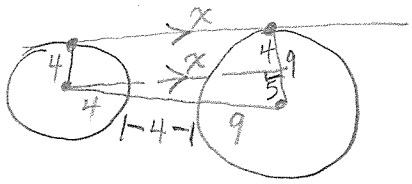


① $\overline{AB}$ is common tangent. → ② $\overline{CA} \perp \overline{AB}$, $\overline{BD} \perp \overline{AB}$ → ③ $\angle CAP$ is right, $\angle DBP$ is rt. →

④ $\angle CAP \cong \angle DBP$
⑤ $\angle 1 \cong \angle 2$
→ ⑥ $\triangle PCA \sim \triangle PDB$ → ⑦ $\angle PCA \cong \angle PDB$

① Given
② A tan is $\perp$ to radius of $\odot$.
③ $\perp$ lines form rt $\angle$s.
④ All rt $\angle$s $\cong$.
⑤ Vertical $\angle$s $\cong$.
⑥ AA ~ AA
⑦ In ~ $\triangle$s, corresp. $\angle$s $\cong$.

(18)



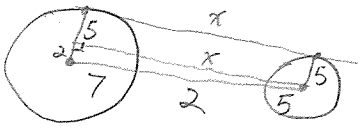
$5^2 + x^2 = 17^2$

$x = \sqrt{264}$

$x = 2\sqrt{66}$

x = length of common ext. tang. = $\boxed{2\sqrt{66}}$

(19)



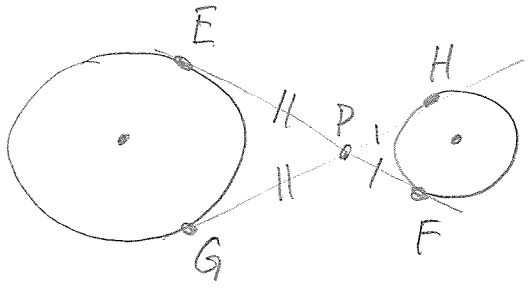
$2^2 + x^2 = 14^2$

$x = \sqrt{192}$

$\boxed{x = 8\sqrt{3}}$

x = length of common ext. tang.

(20)



① $\overline{EF}$ & $\overline{GH}$ are common internal tangents → ② $\overline{PE} \cong \overline{PG}$, $\overline{PH} \cong \overline{PF}$ → ③ $\overline{EP}+\overline{PF} \cong \overline{HP}+\overline{PG}$

④ $EP+PF=HP+PG$

⑤ $EP+PF=EF$. $GP+PH=GH$

→ ⑥ $EF=GH$ → ⑦ $\overline{EF} \cong \overline{GH}$

① Given
② 2 tangs from ext. pt of ⊙ are ≅.
③ Add. property
④ def of ≅ seg.
⑤ Seg. Add Post.
⑥ Substitution
⑦ Def of ≅ seg.

(21) ① $\overline{AB}$ & $\overline{CD}$ are common ext. tangents → ② $\overline{PA} \cong \overline{PC}$ → ④ $PA=PC$; ③ $\overline{PB} \cong \overline{PD}$ → ⑤ $PB=PD$

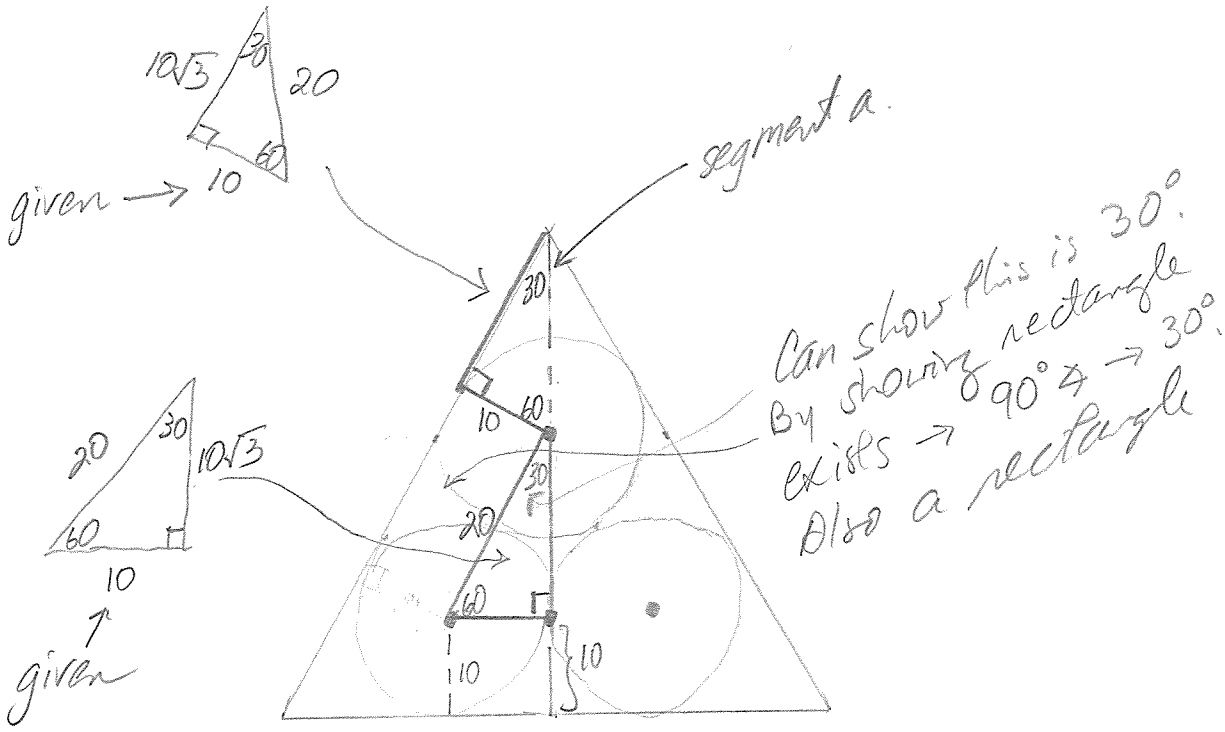
⑥ $PA-PB=PC-PD$

⑦ $PA=PB+AB$, $PC=PD+CD$

→ ⑧ $AB=CD$ → ⑨ $\overline{AB} \cong \overline{CD}$

① Given
② 2 tangents from same ext. pt of ⊙ are ≅.
③ same as #2
④ def of ≅ seg.
⑤ same as #4
⑥ Subtraction Prop.
⑦ Seg. Add Post.
⑧ Substitution
⑨ Def of ≅ seg

(24)

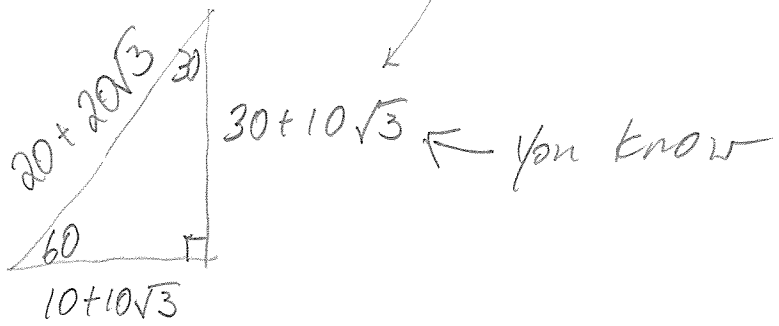


Segment a is ⊥ bisector to equilateral Δ.

① Use 30-60-90 Δs to find parts of segment a.

$$\text{Segment } a = 20 + 10\sqrt{3} + 10$$
$$= 30 + 10\sqrt{3}$$

② Use half of large Δ. You get a 30-60-90 Δ.



Answer: one side of original Δ = $20+20\sqrt{3}$ cm!