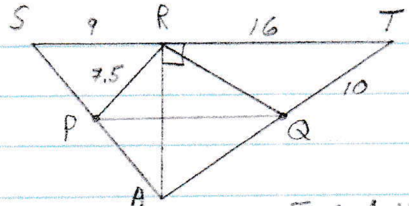
A#44 Pt I: p.188 WE #24-31
Pt II: p.661-662 #9-11

Key

Pt I p.188 WE #24-31



For #24-27, $\overline{RA}$ is an altitude of $\triangle SAT$;
P and Q are midpoints of $\overline{SA}$ and $\overline{TA}$;
$SR = 9$; $RT = 16$; $QT = 10$; $PR = 7.5$.

24. $RQ = QT$ [The midpt of the hypotenuse of a Rt $\triangle$ is equidistant from the 3 vertices]
$\boxed{RQ = 10}$

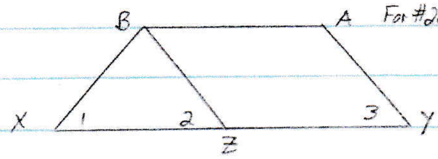
For #24-27: ① $\overline{RA} \perp \overline{ST}$ [Def. of altitude]
② $\overline{PQ}$ is a midseg of $\triangle AST$ [Def. of $\triangle$ midseg]

25. $SP = PR$ ["]
$SP = 7.5$
$SP = \frac{1}{2} SA$ [Midpt Thm]
$7.5 = \frac{1}{2} SA$
$\boxed{SA = 15}$

26. Perimeter of $\triangle PQR = PR + RQ + PQ$ [Def. of Perimeter]
$PR = 7.5$ [Given] $RQ = 10$ [#24]
$PQ = \frac{1}{2} ST$ [$\triangle$ midseg Thm]
$PQ = \frac{1}{2}(25) \rightarrow PQ = 12.5$
$P = 7.5 + 10 + 12.5 \rightarrow \boxed{P = 30 \text{ units}}$

27. Perimeter of $\triangle SAT = SA + ST + AT$ [Def. of Perimeter]
$SA = 15$ [#25] $ST = 25$ [Seg. Add Post] $QT = \frac{1}{2} AT$ [Midpt Thm]
$10 = \frac{1}{2} AT \rightarrow AT = 20$
$P = 15 + 25 + 20 \rightarrow \boxed{P = 60 \text{ units}}$

For #28-29.



28. Given: ▱ABZY; $\overline{ZY} \cong \overline{BX}$; $\angle 1 \cong \angle 2$
Prove: ABZY is a Rhombus

Statements	Reasons
1. ▱ABZY; $\overline{ZY} \cong \overline{BX}$; $\angle 1 \cong \angle 2$	1. Given
2. $\overline{BX} \cong \overline{BZ}$	2. Base $\angle$s Thm
3. $\overline{ZY} \cong \overline{BZ}$	3. Trans Prop. of $\cong$
4. ABZY is a Rhombus	4. ▱ with 2 $\cong$ consec sides $\rightarrow$ Rhombus

29. Given: ▱ABZY; $\overline{AY} \cong \overline{BX}$ — see diagram above.
Prove: $\angle 1 \cong \angle 2$ and $\angle 1 \cong \angle 3$

Statements	Reasons
1. ▱ABZY; $\overline{AY} \cong \overline{BX}$	1. Given
2. $\overline{AY} \cong \overline{BZ}$	2. Opp. sides of a ▱ are $\cong$
3. $\overline{BX} \cong \overline{BZ}$	3. Trans. Prop. of $\cong$
4. $\angle 1 \cong \angle 2$	4. Base $\angle$s Thm
5. $\overline{BZ} \parallel \overline{AY}$	5. Def. of ▱
6. $\angle 2 \cong \angle 3$	6. Corr. $\angle$s Post.
7. $\angle 1 \cong \angle 3$	7. Trans. Prop. of $\cong$

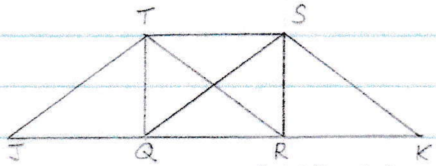
A#44 Continued

Key

P+I: p. 188 WE #30-31   P+II: p. 661-662 #9-11

P+I 30. Given: Rectangle QRST; ▱RKST

Prove: $\triangle QSK$ is isosceles



For #30-31.

Statements	Reasons
1. Rectangle QRST; ▱RKST	1. Given
2. $\overline{TR} \cong \overline{SK}$	2. Opp. sides of a ▱ are $\cong$.
3. $\overline{TR} \cong \overline{QS}$	3. Diagonals of a Rectangle are $\cong$.
4. $\overline{SK} \cong \overline{QS}$	4. Trans. Prop. of $\cong$
5. $\triangle QSK$ is isosceles	5. Def. of isosceles $\triangle$

31. Given: Rectangle QRST; ▱RKST; ▱JQST   See diagram above.

Prove: $\overline{JT} \cong \overline{KS}$

Statements	Reasons
1. Rectangle QRST; ▱RKST; ▱JQST	1. Given
2. $\overline{JT} \cong \overline{QS}$; $\overline{TR} \cong \overline{KS}$	2. Opp. sides of a ▱ are $\cong$.
3. $\overline{TR} \cong \overline{QS}$	3. Diagonals of a Rectangle are $\cong$.
4. $\overline{JT} \cong \overline{KS}$	4. Trans. Prop. of $\cong$

p. 661-662 #9-11

P+II 9. A(-4, 5) B(4, -1) C(7, 3) D(-1, 9) : Quad ABCD

a. $m \text{ of } \overline{AB} = \frac{\Delta y}{\Delta x} = \frac{5-(-1)}{-4-4} = \frac{6}{-8} = -\frac{3}{4}$

$m \text{ of } \overline{CD} = \frac{\Delta y}{\Delta x} = \frac{3-9}{7-(-1)} = \frac{-6}{8} = -\frac{3}{4}$

Since they have the same slope, $\overline{AB} \parallel \overline{CD}$ and $\overline{BC} \parallel \overline{AD}$.

$m \text{ of } \overline{BC} = \frac{\Delta y}{\Delta x} = \frac{3-(-1)}{7-4} = \frac{4}{3}$

$m \text{ of } \overline{AD} = \frac{\Delta y}{\Delta x} = \frac{9-5}{-1-(-4)} = \frac{4}{3}$

Since they have opp. reciprocal slopes, $\overline{AB} \perp \overline{BC}$, $\overline{BC} \perp \overline{CD}$, $\overline{CD} \perp \overline{AD}$, $\overline{AD} \perp \overline{AB}$.

b. Since both pairs of opposite sides are $\parallel$, ABCD is a ▱.

Since ABCD is a ▱ with consecutive sides $\perp$, ABCD is a Rectangle.

10. Quad RSTU: R(5, -3) S(9, 0) T(3, 8) U(-1, 5)

This is only 1 possible Proof.

a. ① Show diagonals bisect each other. midpt of $\overline{RT}$ $\left(\frac{5+3}{2}, \frac{-3+8}{2}\right)$ $\left(4, \frac{5}{2}\right)$

midpt of $\overline{SU}$ $\left(\frac{9+(-1)}{2}, \frac{0+5}{2}\right)$ $\left(4, \frac{5}{2}\right)$

Since they have the same midpt, $\overline{RT}$ and $\overline{SU}$ bisect each other.

$\therefore$ RSTU is a ▱.

② Show consec. sides of a ▱ are $\perp$.

$m \text{ of } \overline{RS} = \frac{\Delta y}{\Delta x} = \frac{-3-0}{5-9} = \frac{-3}{-4} = \frac{3}{4}$

$m \text{ of } \overline{ST} = \frac{\Delta y}{\Delta x} = \frac{8-0}{3-9} = \frac{8}{-6} = -\frac{4}{3}$

Since they have opp. reciprocal slopes, $\overline{RS} \perp \overline{ST}$. $\therefore$ RSTU is a Rectangle.

b. $RT = \sqrt{(5-3)^2 + (8-(-3))^2} = \sqrt{4+121} = \sqrt{125} = 5\sqrt{5}$

$SU = \sqrt{(9-(-1))^2 + (5-0)^2} = \sqrt{100+25} = \sqrt{125} = 5\sqrt{5}$

Since they have the same length, $\overline{RT} \cong \overline{SU}$.

A#44 Continued

Key

P+II : p. 662 #11

P+I 11. Quad DEFG: $D(-4,1)$ $E(2,3)$ $F(4,9)$ $G(-2,7)$

a. Show all sides are $\cong$.

$DE = \sqrt{(2-(-4))^2 + (3-1)^2} = \sqrt{36+4} = \sqrt{40} = 2\sqrt{10}$

$EF = \sqrt{(4-2)^2 + (9-3)^2} = \sqrt{4+36} = \sqrt{40} = 2\sqrt{10}$

$FG = \sqrt{(4-(-2))^2 + (9-7)^2} = \sqrt{36+4} = \sqrt{40} = 2\sqrt{10}$

$DG = \sqrt{(-2-(-4))^2 + (7-1)^2} = \sqrt{4+36} = \sqrt{40} = 2\sqrt{10}$

Since they have the same length, $\overline{DE} \cong \overline{EF} \cong \overline{FG} \cong \overline{DG}$.

$\therefore$ DEFG is a Rhombus.

b. Show the diagonals of a Rhombus are $\perp$.

m of $\overline{DF} = \frac{\Delta y}{\Delta x} = \frac{9-1}{4-(-4)} = \frac{8}{8} = 1$

m of $\overline{EG} = \frac{\Delta y}{\Delta x} = \frac{7-3}{-2-2} = \frac{4}{-4} = -1$

Since they have opp. reciprocal slopes, $\overline{DF} \perp \overline{EG}$.