Answers: Chapter 5 Review

(1) $3x-y=5$
$\underline{x+y=5}$
$4x=10$
$x=\frac{10}{4}=5/2$

$\frac{5}{2}+y=5$
$y=5/2$
$\boxed{\left(\frac{5}{2},\frac{5}{2}\right)}$

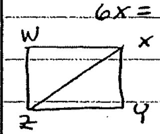
(2) $y=x+7$ $-1(y-x)=(7)(-1)$ $-y+x=-7$
$y-2x=x+1$ $\underline{y-3x=1}$ $\underline{y-3x=1}$
$-2x=-6$
$x=3$
$\boxed{(3,10)}$
$y=3+7=10$

(3) $x+y+x+y=-3x$ $2x+2y=-3x$ $-2(5x+2y)=(0)(-2)$ $-10x-4y=0$
$2y-7+2y-7=-3x$ $3x+4y=14$ $\underline{3x+4y=14}$ $\underline{3x+4y=14}$
$-7x=14$
$x=-2$
$5(-2)+2y=0$
$2y=10$
$y=5$
$\boxed{(-2,5)}$

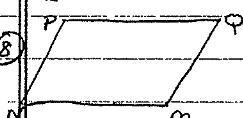
(4) $180-124=56$ $m\angle IJ=56$ $m\angle 1=28$, $m\angle 4=62$; $m\angle 6=180-28-62=90$

(5) $2x+30=3x-1$ $x=31$

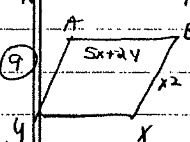
(6) $4(x+1)+2(x+1)=90$
$4x+4+2x+2=90$
$6x+6=90$
$6x=84$
$x=14$

(7)


$m\angle ZXY=\frac{1}{2}(90)=\underline{45}$

(8)


$7x-10=5x+6$
$2x=16$
$x=8$

(9)


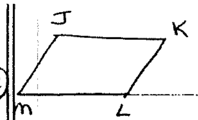
$x^2=5x+24$
$x^2-5x-24=0$
$(x-8)(x+3)=0$
$x-8=0$ $x+3=0$
$x=8$ $x=-3$

(10) $\frac{1}{2}(20+14)=\frac{1}{2}(34)=17$
$TV=17$

(11) $23.2=\frac{1}{2}(14.3+x)$
$46.4=14.3+x$
$32.1=x$
$\boxed{PS=32.1}$

(12) $x+7=\frac{1}{2}(5x+2)$
$2x+14=5x+2$
$12=3x$
$4=x$

(13) If $m\angle VTP=a$
then $m\angle TPS=180-a$

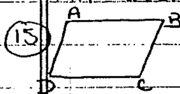
(14)


$3x-5=2y+5$
$3x-2y=10$
$3x-2y=10$
$\underline{-3x+12y=21}$
$10y=31$
$y=3.1$

$x+5=4y-2$
$x-4y=-7$
$x-4(3.1)=-7$
$x-12.4=-7$
$x=5.4$

$3x-[illegible]=10$
$-3(x-4y)=(-7)(-3)$

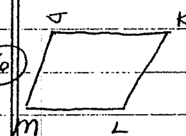
$JK=3(5.4)-5=16.2-5=11.2$
$LM=2(3.1)+5=6.2+5=11.2$
$KL=5.4+5=10.4$
$JM=4(3.1)-2=12.4-2=10.4$

(15)


$3x-7=3y+5$
$3x-3y=12$
Divide each term by 3
$x-y=4$

$5y+8=4x+3$
$-4x+5y=-5$
$-4x+5y=-5$
$5(x-y)=(4)5$
$15-y=4$
$-y=-11$
$y=11$

$-4x+5y=-5$
$\underline{5x-5y=20}$
$x=15$

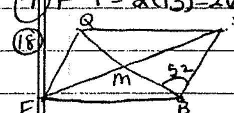
(16)


$3x-5=5x-17$
$12=2x$
$6=x$
$JK=3(6)-5=18-5=\underline{13}$

$JM=2x+1$
$JM=2(6)+1$
$JM=12+1=\underline{13}$

JKLM is a ▱. JK = JM which means $\overline{JK}\cong\overline{JM}$. Since 2 consecutive sides of a ▱ are ≅ the ▱ is a rhombus.

(17) $FY=2(13)=26$

(18)


$m\angle YBF=2(52)=104$

(19) $3x-7=x+3$
$2x=10$
$x=5$

$QM=3(5)-7$
$=15-7=8$
$QB=2(8)=16$

(20) Let $x=SR$
$24=\frac{1}{2}(x+18)$
$48=x+18$
$30=x$

(21) $TU=\frac{1}{2}(9+15)$
$TU=\frac{1}{2}(24)=12$

(22) $24=\frac{1}{2}(3x+4+5x+8)$
$48=8x+12$
$36=8x$
$4.5=x$

$SR=5(4.5)+8$
$=22.5+8$
$\boxed{SR=30.5}$

(23) $x -$ [illegible] $\frac{1}{2}(x+6)$

$2x-10 = x+6$

$x = 16$

$VW = 16-5 = \underline{\underline{11}}$

(24) $2x+2 = y+3$

$\boxed{2x-y=1}$

$-2(2x-y=1)(-2)$

$3x-2y=-1$

$3x = \frac{1}{2}(4y-2)$

$3x = 2y-1$

$\boxed{3x-2y=-1}$

$-4x+2y=-2$

$3x-2y=-1$

$-x=-3$

$x=3$

$3(3)-2y=-1$

$9-2y=-1$

$-2y=-10$

$y=5$

$\boxed{MN = 3(3) = 9}$

$\boxed{AB = 4(5)-2 = 20-2 = 18}$

(25) $2x^2-3x=5x-6$

$2x^2-8x+6=0$

$2(x^2-4x+3)=0$

$2(x-3)(x-1)=0$

$x-3=0$ $\quad$ $x-1=0$

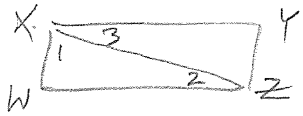
$x=3$ $\quad$ $\cancel{x=1}$ reject

$AD = 2(9)-9 = 18-9 = 9$

$DB = 5(3)-6 = 15-6 = 9$

$AB = 9+9 = \underline{\underline{18}}$

IX. Proofs



① ▱ WXYZ → ② $\overline{XY} \parallel \overline{WZ}$ → ③ $\angle 3 \cong \angle 2$ → ⑥ $m\angle 3 = m\angle 2$

④ $\angle 1$ & $\angle 2$ complement → ⑤ $m\angle 1 + m\angle 2 = 90$

⑦ $m\angle 1 + m\angle 3 = 90$.

⑧ $m\angle WXY = m\angle 1 + m\angle 3$ → ⑨ $m\angle WXY = 90$

→ ⑩ $\angle WXY$ is Rt.
▱ WXYZ → ⑪ WXYZ is a rect.

① Given
② ▱ → opp sides $\parallel$
③ 2 $\parallel$ lines → alt. int. $\angle$s $\cong$.
④ Given
⑤ def of compl. $\angle$s.
⑥ def of $\cong$ $\angle$s.
⑦ Substitution Prop.
⑧ Angle Addition Post.
⑨ Substitution Prop.
⑩ def of Rt $\angle$
⑪ A ▱ with 1 Rt. $\angle$s is a rectangle.

OR

① $\angle 1$ & $\angle 2$ complement. → ② $m\angle 1 + m\angle 2 = 90$

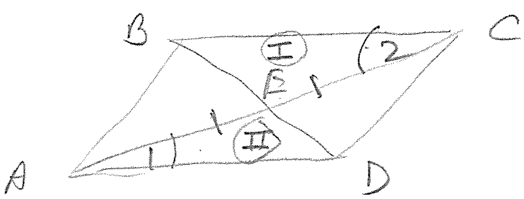
③ $m\angle 1 + m\angle 2 + m\angle W = 180$ → ④ $90 + m\angle W = 180$

→ ⑤ $m\angle W = 90$ → ⑥ $\angle W$ is Rt.

⑦ ▱ WXYZ → ⑧ WXYZ is a rectangle.

① Given
② def of complementary $\angle$s
③ meas. of 3 $\angle$s of $\triangle$ is 180.
④ Substitution Prop.
⑤ Subtraction Prop.
⑥ def of Rt. $\angle$
⑦ Given
⑧ A ▱ with a right $\angle$ is a rectangle

(2)



ΔI is ΔBEC
ΔII is ΔDEA

Plan
Can show $\Delta \text{I} \cong \Delta \text{II}$ to get $\overline{BC} \cong \overline{AD}$.
Then use the method: If 1 pair opp sides are both $\cong$ & $\parallel \rightarrow \boxed{P}$.

(1) $\overline{BD}$ bisects $\overline{AC}$ at E. $\rightarrow$ (2) $\overline{AE} \cong \overline{EC}$
(3) $\angle BEC \cong \angle DEA$
(4) $\angle 1 \cong \angle 2$
$\rightarrow$ (5) $\Delta BEC \cong \Delta DEA$

$\rightarrow$ (6) $\overline{BC} \cong \overline{AD}$
$\rightarrow$ (7) $\overline{BC} \parallel \overline{AD}$
$\rightarrow$ (8) ABCD is a $\boxed{P}$

(1) Given
(2) def. of segment bisector
(3) Vertical $\angle$s $\cong$.
(4) Given
(5) ASA thm
(6) CPCTC
(7) If 2 lines w/ alt. int. $\angle$s $\cong \rightarrow$ 2 $\parallel$ lines.
(8) If 1 pair of sides are $\cong$ & $\parallel$ $\rightarrow$ a $\boxed{P}$