8.1 Answer Key

(1) $\sqrt{4\cdot 3}$ $2\sqrt{3}$

(2) $6\sqrt{2}$

(3) $3\sqrt{5}$

(4) $5\sqrt{3}$

(5) $\sqrt{400\cdot 2}$ $20\sqrt{2}$

(6) $3\sqrt{6}$

(7) $9(2\sqrt{10})$ $18\sqrt{10}$

(8) $4(2\sqrt{7})$ $8\sqrt{7}$

(9) $\sqrt{5}\sqrt{6}\sqrt{6}$ $6\sqrt{5}$

(10) $\sqrt{5}\sqrt{5}\sqrt{7}$ $5\sqrt{7}$

(11) $\frac{\sqrt{3}}{\sqrt{7}}\cdot\frac{\sqrt{7}}{\sqrt{7}}=\frac{\sqrt{21}}{7}$

(12) $\frac{3}{\sqrt{5}}\cdot\frac{\sqrt{5}}{\sqrt{5}}=\frac{3\sqrt{5}}{5}$

(13) $\frac{18}{\sqrt{3}}\cdot\frac{\sqrt{3}}{\sqrt{3}}=\frac{18\sqrt{3}}{3}=6\sqrt{3}$

(14) $\frac{24}{3\sqrt{2}}\rightarrow\frac{8}{\sqrt{2}}\cdot\frac{\sqrt{2}}{\sqrt{2}}=\frac{8\sqrt{2}}{2}=4\sqrt{2}$

(15) $\frac{\sqrt{15}}{3(3\sqrt{5})}\rightarrow\frac{1}{9}\sqrt{\frac{15}{5}}=\frac{\sqrt{3}}{9}$

OR

$\frac{\sqrt{1}}{3\sqrt{3}}=\frac{1}{3\sqrt{3}}\cdot\frac{\sqrt{3}}{\sqrt{3}}=\frac{\sqrt{3}}{9}$

(16) $\frac{2}{x}=\frac{x}{18}$ OR $x=\sqrt{2\cdot 18}$

$x^2=36$ $x=6$

$x=6$

(17) $\frac{3}{x}=\frac{x}{27}$

$x^2=81$

$x=9$

(18) $\frac{49}{x}=\frac{x}{25}$

$x^2=1225$

$x=35$

(19) $\frac{1}{x}=\frac{x}{1000}$

$x=\sqrt{100\cdot 10}$

$x=10\sqrt{10}$

(20) $\frac{16}{x}=\frac{x}{24}$

$x=\sqrt{16\cdot 24}$

$x=8\sqrt{6}$

(21) $\frac{22}{x}=\frac{x}{55}$

$x^2=1210=$

$x=\sqrt{121\cdot 10}=11\sqrt{10}$

(22) $x=JM$

$\frac{hs_1}{AL}=\frac{AL}{hs_2}$

$\frac{x}{4}=\frac{4}{8}$

$8x=16$

$x=2$

$JM=2$

(23) $x=MK$

$\frac{4}{6}=\frac{6}{x}$

$4x=36$

$x=9$

$JM=9$

(24) $\frac{3}{x}=\frac{x}{6}$

$x^2=18$

$x=3\sqrt{2}$

(25) $L_2=LK$

$\frac{h}{L_2}=\frac{L_2}{hs_2}$

$\frac{9}{L_2}=\frac{L_2}{5}$

$L^2=45$

$L=3\sqrt{5}$

$LK=3\sqrt{5}$

(26) $L_1=LJ$

$\frac{12}{L_1}=\frac{L_1}{3}$

$L^2=36$

$L=6$

$LJ=6$

(27) $h=3+x$

$\frac{h}{L_1}=\frac{L_1}{hs_1}$

$\frac{3+x}{6}=\frac{6}{3}$

$3(3+x)=36$

$9+3x=36$

$3x=27$

$x=9$

$MK=9$

8.1 $MK = x$

(28) $\frac{h}{L_1} = \frac{L_1}{hs_1}$

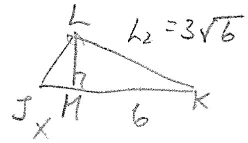
$\frac{6+x}{9} = \frac{9}{6}$

$36 + 6x = 81$

$6x = 45$

$x = \frac{15}{2}$

$MK = 7\frac{1}{2}$

(29) 

CK

$\frac{9}{3\sqrt{6}} = \frac{3\sqrt{6}}{6}$

$\frac{6+x}{3\sqrt{6}} = \frac{3\sqrt{6}}{6}$

$36 + 6x = 9(6)$

$6x = 18$

$x = 3$

$JM = 3$

(30) $x = JM$

$\frac{x+6}{7} = \frac{7}{6}$

$6x + 36 = 49$

$6x = 13$

$x = \frac{13}{6}$

$JM = \frac{13}{6}$

(31) $x = 10$

$\frac{4}{x} = \frac{x}{25}$

$x^2 = 100$

$x = 10$

$y =$

$\frac{29}{y} = \frac{y}{4}$

$y^2 = 116$

$y = 2\sqrt{29}$

$z =$

$\frac{29}{z} = \frac{z}{25}$

$z^2 = 25 \cdot 29$

$z = 5\sqrt{29}$

(32) $x =$

$\frac{9}{x} = \frac{x}{7}$

$x^2 = 9 \cdot 7$

$x = 3\sqrt{7}$

$y =$

$\frac{16}{y} = \frac{y}{9}$

$y^2 = 144$

$y = 12$

$z =$

$\frac{16}{z} = \frac{z}{7}$

$z^2 = 16 \cdot 7$

$z = 4\sqrt{7}$

(33) $\frac{\frac{1}{6}}{x} = \frac{x}{\frac{1}{3}}$

$x^2 = \frac{1}{18}$

$x = \frac{1}{3\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{6}$

$h = \frac{1}{3} + \frac{1}{6}$

$= \frac{2}{6} + \frac{1}{6} = \frac{1}{2}$

$\frac{\frac{1}{2}}{y} = \frac{y}{\frac{1}{6}}$

$y^2 = \frac{1}{12}$

$y = \frac{1}{2\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{6}$

$\frac{\frac{1}{2}}{z} = \frac{z}{\frac{1}{3}}$

$z^2 = \frac{1}{6}$

$z = \frac{1}{\sqrt{6}} \cdot \frac{\sqrt{6}}{\sqrt{6}} = \frac{\sqrt{6}}{6}$

(34) $\frac{8}{x} = \frac{x}{8}$

$x^2 = 64$

$x = 8$

$\frac{16}{y} = \frac{y}{8}$

$y^2 = 128$

$y = 8\sqrt{2}$

$\frac{15}{9} = \frac{9}{x}$

$15x = 81$

$x = \frac{81}{15} = \frac{27}{5}$

8.1 Key

36

$$\frac{x}{6}=\frac{6}{2}$$
$$2x=36$$
$$x=18$$
$(hyp=18)$

$$\frac{2}{z}=\frac{z}{16}$$
$$z^2=32$$
$$z=4\sqrt{2}$$

$$\frac{18}{y}=\frac{y}{16}$$
$$y^2=18(16)$$
$$y=12\sqrt{2}$$

37

$$\frac{x+\sqrt{2}}{2}=\frac{2}{\sqrt{2}}$$
$$4=\sqrt{2}(x+\sqrt{2})$$
$$4=\sqrt{2}x+2$$
$$2=\sqrt{2}x$$
$$\frac{\sqrt{2}}{\sqrt{2}}\cdot\frac{2}{\sqrt{2}}=x$$
$$\sqrt{2}=\frac{2\sqrt{2}}{2}=x$$
$$x=\sqrt{2}$$

$$\frac{\sqrt{2}}{z}=\frac{z}{\sqrt{2}}$$
$$z^2=2$$
$$z=\sqrt{2}$$

$$\frac{2\sqrt{2}}{y}=\frac{y}{\sqrt{2}}$$
$$y^2=4$$
$$y=2$$

38

$$\frac{x}{12}=\frac{12}{x+7}$$
$$x^2+7x=144$$
$$x^2+7x-144=0$$
$$(x+16)(x-9)=0$$
$x=-16$ OMIT $\quad$ $x=9$

$$hyp=9+16=25$$
$$\frac{25}{y}=\frac{y}{9}$$
$$y^2=225$$
$$y=15$$

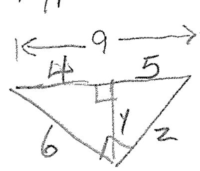
$$\frac{25}{z}=\frac{z}{16}$$
$$z^2=25(16)$$
$$z=20$$

39

$hyp=2x+1$

$$\frac{2x+1}{x+2}=\frac{x+2}{x}$$
$$x^2+4x+4=2x^2+x$$
$$0=x^2-3x-4$$
$$0=(x-4)(x+1)$$
$x=4$ $\quad$ $x=-1$ OMIT

$hyp=9$



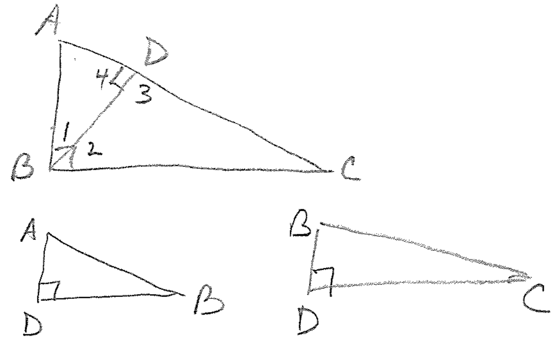
$$\frac{4}{y}=\frac{y}{5}$$
$$y^2=4.5$$
$$y=2\sqrt{5}$$

$$\frac{9}{z}=\frac{z}{5}$$
$$z^2=9.5$$
$$z=3\sqrt{5}$$

(40) If alt. is drawn from right ∡ to hyp., the 2 △s formed are similar to the original △ & each other.

G: △ABC w/ right ∡ABC
altitude $\overline{BD}$

P: △ADB ~ △ABC
△BDC ~ △ABC
△ADB ~ △BDC



(1) Altitude $\overline{BD}$ → (2) $\overline{BD} \perp \overline{AC}$ → (3) ∡4 is Rt ∡

(4) ∡ABC is Rt → (5) ∡4 ≅ ∡ABC

(6) ∡A ≅ ∡A → (7) △ADB ~ △ABC

Do horizontally

(8) ∡3 is Rt ∡

(9) ∡ABC is Rt ∡ → (10) ∡3 ≅ ∡ABC

(11) ∡C ≅ ∡C → (12) △BDC ~ △ABC

(13) △ADB ~ △BDC

(1) Given
(2) Def of altitude
(3) Def of ⊥ lines.
(4) Given
(5) All Rt ∡s ≅.
(6) Reflexive Prop
(7) AA ~ AA ...
(8) def of ⊥ lines.
(9) Given
(10) All Rt ∡s ≅
(11) Reflexive
(12) AA ~ AA
(13) Transitive property of similarity

8.1 Hw

(41) a) $a^2 = cd$, $b^2 = ce$

b) $a^2 + b^2 = cd + ce$

$a^2 + b^2 = c(d+e)$

since $c = d + e$,

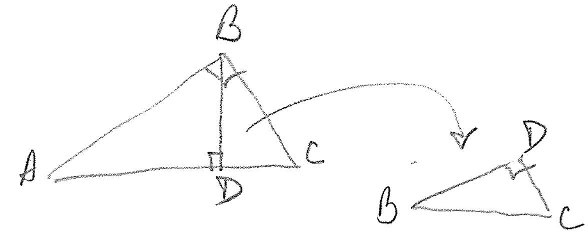
$a^2 + b^2 = c(c)$

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

(42) Given: $\triangle ABC$, $\measuredangle ABC$ is right $\measuredangle$.

$\overline{BD}$ altitude to $\overline{AC}$.

Prove: $AC \cdot BD = AB \cdot BC$



(Plan: show $\frac{AC}{AB} = \frac{BC}{BD}$)

① $\triangle ABC$ w/ right $\measuredangle ABC$ $\overline{BD}$ is altitude. $\rightarrow$ ② $\triangle ABC \sim \triangle BDC$ $\rightarrow$ ③ $\frac{AC}{AB} = \frac{BC}{BD}$ $\rightarrow$ ④ $(AC)(BD) = (AB)(BC)$

① Given

② Thm: In a $\triangle$, if altitude is drawn to the hyp. of a right $\triangle$, then the 2 $\triangle$s formed are similar to the original.

③ $\sim \triangle$s $\rightarrow$ corresp. sides in proportion.

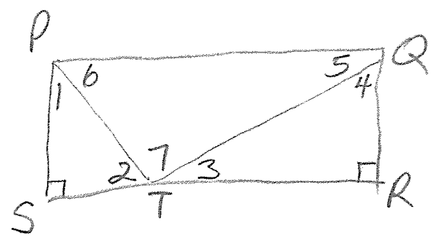
④ Means-extremes product property

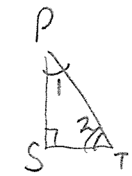
(43)

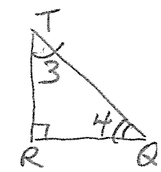
8-1 hw

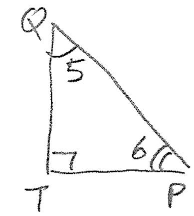
Given: PQRS is a rectangle.
PS is the geometric mean between ST & TR.

Prove: ∡PTQ is a right ∡.









① PS is geo. mean bet. ST & TR. → ② $\frac{ST}{PS} = \frac{PS}{TR}$

③ PQRS is a rectangle. → ④ PS = QR

② & ④ → ⑤ $\frac{ST}{PS} = \frac{QR}{TR}$

③ → ⑥ ∡S & ∡R are right ∡s. → ⑦ ∡S ≅ ∡R

⑤ & ⑦ → ⑧ △PST ~ △TRQ

⑧ → ⑨ ∡1 ≅ ∡3, ∡2 ≅ ∡4

③ → ⑩ $\overline{PQ} \parallel \overline{SR}$ → ⑪ ∡6 ≅ ∡2

⑨ & ⑪ → ⑫ ∡4 ≅ ∡6

⑩ → ⑬ ∡5 ≅ ∡3

⑫ & ⑬ → ⑭ △TRQ ~ △QTP

⑭ → ⑮ ∡7 ≅ ∡R → ⑯ m∡7 = m∡R

⑯ & ⑰ m∡R = 90 → ⑱ m∡7 = 90

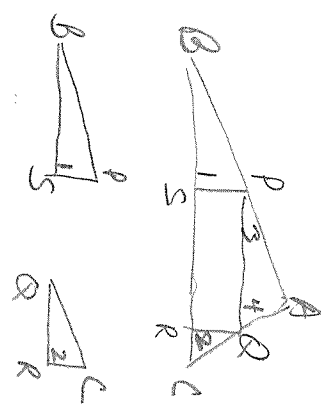
⑱ → ⑲ ∡PTQ is right ∡.

① Given
② Def. of geo. mean
③ Given
④ Rect → opp sides equal.
⑤ Substitution.
⑥ Def of rectangle
⑦ All right ∡s ≅.
⑧ SAS ~ SAS
⑨ ~△s → corresp. ∡s ≅.
⑩ Rect → opp sides ∥.
⑪ 2 ∥ lines → alt. int. ∡s ≅.
⑫ Transitive Prop.
⑬ 2 ∥ lines → alt. int ∡s ≅.
⑭ AA ~ AA postulate
⑮ ~△s → corresp. ∡s. ≅.
⑯ def of ≅ segmts.
⑰ def of right ∡.
⑱ Substitution.
⑲ Def of a right ∡.

(44) Given: PQRS is a rectangle
$\angle A$ is a right $\angle$

Prove: $BS \cdot RC = PS \cdot QR = (PS)^2$

Plan: Show $\frac{BS}{PS} = \frac{QR}{RC}$



① PQRS is a rect. → ② $\angle PSR$ is Rt. $\angle$ → ③ $\overline{PS} \perp \overline{BC}$ → ④ $\angle 1$ is Rt $\angle$

→ $\angle QRS$ is Rt $\angle$ → $\overline{QR} \perp \overline{BC}$ → $\angle 2$ is Rt $\angle$

⑤ $\angle A$ is Rt $\angle$

⑥ $\angle 1 \cong \angle 2 \cong \angle A$

⑦ $\overline{PQ} \parallel \overline{BC}$ → ⑧ $\angle B \cong \angle 3$ → ⑨ $\triangle BSP \sim \triangle PAQ$

⑩ $\angle C \cong \angle 4$

⑪ $\angle 2 \cong \angle A$ → ⑫ $\triangle PAQ \sim \triangle QRC$

⑬ $\triangle BSP \sim \triangle QRC$ → ⑭ $\frac{BS}{PS} = \frac{QR}{RC}$ → ⑮ $BS \cdot RC = PS \cdot QR$

⑯ $PS = QR$

⑰ $BS \cdot RC = PS \cdot PS$ → ⑱ $BS \cdot RC = (PS)^2$

⑲ $PS \cdot QR = (PS)^2$

REASONS

① Given
② Def of rectangle
③ Def of $\perp$ lines.
④ Def of $\perp$ lines.
⑤ Reflexive Prop.
⑥ All right $\angle$s $\cong$.
⑦ Def of rectangle.
⑧ 2 $\parallel$ lines → corresp. $\angle$s $\cong$.
⑨ AA ~ AA
⑩ 2 $\parallel$ lines → corresp. $\angle$s $\cong$.
⑪ See Step 6
⑫ AA ~ AA
⑬ Transitive Prop. of similarity
⑭ ~$\triangle$s → corresp. sides proportional.
⑮ Means - extremes product prop.
⑯ Rect → opp sides $\cong$.
⑰ Substitution.
⑱ Def. of powers.
⑲ Substitution.