

8.1 Answer key

① $\frac{\sqrt{4 \cdot 3}}{2\sqrt{3}}$ ② $6\sqrt{2}$ ③ $3\sqrt{5}$ ④ $5\sqrt{3}$ ⑤ $\frac{\sqrt{400 \cdot 2}}{20\sqrt{2}}$

⑥ $3\sqrt{6}$ ⑦ $\frac{9(2\sqrt{10})}{18\sqrt{10}}$ ⑧ $\frac{4(2\sqrt{7})}{8\sqrt{7}}$ ⑨ $\frac{\sqrt{5}\sqrt{6}\sqrt{6}}{6\sqrt{5}}$ ⑩ $\frac{\sqrt{5}\sqrt{5}\sqrt{7}}{5\sqrt{7}}$

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 $\frac{18 \cdot \sqrt{3}}{\sqrt{3} \sqrt{3}} = \frac{18\sqrt{3}}{3} = 6\sqrt{3}$

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
 $\frac{\sqrt{15}}{3\sqrt{3}} = \frac{1}{3\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{9}$

⑯ $\frac{2}{x} = \frac{x}{18}$ OR $x = \sqrt{2 \cdot 18}$ ⑰ $\frac{3}{x} = \frac{x}{27}$ ⑱ $\frac{49}{x} = \frac{x}{25}$
 $x^2 = 36$ $x = 6$ $x^2 = 81$ $x = 9$
 $x = 6$ $x = 9$ $x^2 = 1225$ $x = 35$

⑲ $\frac{1}{x} = \frac{x}{1000}$ ⑳ $\frac{16}{x} = \frac{x}{24}$ ㉑ $\frac{22}{x} = \frac{x}{55}$
 $x = \sqrt{100 \cdot 10}$ $x = \sqrt{16 \cdot 24}$ $x^2 = 1210 = 11\sqrt{10}$
 $x = 10\sqrt{10}$ $x = 8\sqrt{6}$ $x = \sqrt{121 \cdot 10} = 11\sqrt{10}$

㉒ $\frac{hs_1}{Al} = \frac{Al}{hs_2}$ ㉓ $\frac{4}{6} = \frac{6}{x}$ ㉔ $\frac{3}{x} = \frac{x}{6}$ ㉕ $\frac{h}{h_2} = \frac{L_2}{hs_2}$
 $x = JM$ $x = MK$ $x^2 = 18$ $\frac{9}{L_2} = \frac{L_2}{5}$
 $\frac{x}{4} = \frac{4}{8}$ $4x = 36$ $x = 3\sqrt{2}$ $L^2 = 45$
 $8x = 16$ $x = 9$ $JM = 9$ $L = 3\sqrt{5}$
 $x = 2$ $h = 3 + x$ $LK = 3\sqrt{5}$
 $JM = 2$

㉖ $L_1 = LJ$ ㉗ $\frac{h}{L_1} = \frac{L_1}{hs_1}$ $x = 9$
 $\frac{12}{L_1} = \frac{L_1}{3}$ $\frac{3+x}{6} = \frac{6}{3}$ $MK = 9$
 $L^2 = 36$ $3(3+x) = 36$
 $L = 6$ $9 + 3x = 36$
 $LJ = 6$ $3x = 27$

8.1 MK=X

(28) $\frac{h}{h_1} = \frac{L_1}{h_2}$

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

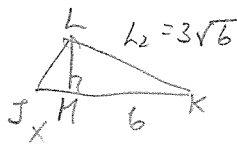
$36+6X=81$

$6X=45$

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

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

(29)



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

$36+6X=9(6)$

$6X=18$

$X=3$

$JM=3$

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

(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)

$\frac{1}{6} = \frac{X}{\frac{1}{3}}$

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

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

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

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

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

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

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

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

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

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

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

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

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

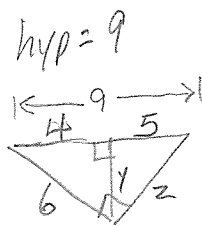
$\frac{\sqrt{2}}{\sqrt{2}} \cdot \frac{2}{\sqrt{2}} = x$
 $\sqrt{2} \cdot \frac{2\sqrt{2}}{2} = x$
 $x = \sqrt{2}$

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)
 $x = 9$

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



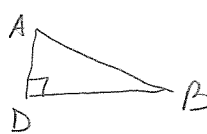
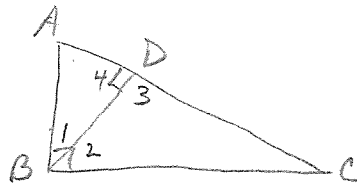
$\frac{4}{y} = \frac{y}{5}$
 $y^2 = 4 \cdot 5$
 $y = 2\sqrt{5}$

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

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

G: ΔABC w/ right $\angle ABC$
altitude \overline{BD}

P: $\Delta ADB \sim \Delta ABC$
 $\Delta BDC \sim \Delta ABC$
 $\Delta ADB \sim \Delta BDC$



① Altitude \overline{BD} \rightarrow ② $\overline{BD} \perp \overline{AC}$ \rightarrow ③ $\angle 4$ is Rt \angle } \rightarrow ⑤ $\angle 4 \cong \angle ABC$
 ④ $\angle ABC$ is Rt \angle } ⑥ $\angle A \cong \angle A$

Do horizontally.

\rightarrow ⑦ $\Delta ADB \sim \Delta ABC$

\rightarrow ⑧ $\angle 3$ is Rt \angle } \rightarrow ⑩ $\angle 3 \cong \angle ABC$
 ⑨ $\angle ABC$ is Rt \angle } ⑪ $\angle C \cong \angle C$ } \rightarrow ⑬ $\Delta ADB \sim \Delta BDC$

\rightarrow ⑫ $\Delta BDC \sim \Delta ABC$

- ① Given
- ② Def of altitude
- ③ Def of \perp lines
- ④ Given
- ⑤ All Rt \angle s \cong .
- ⑥ Reflexive Prop
- ⑦ AA \sim AA ...

- ⑧ def of \perp lines.
- ⑨ Given
- ⑩ All Rt \angle s \cong
- ⑪ Reflexive
- ⑫ AA \sim 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 $c = d+e$,

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

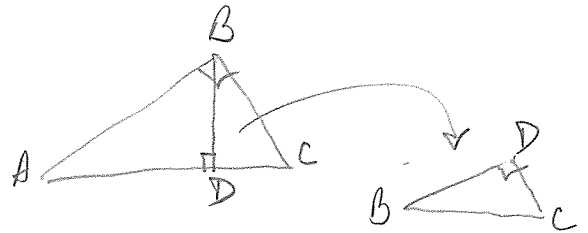
$a^2 + b^2 = c^2$

④2 Given: $\triangle ABC$, $\angle ABC$ is right \angle .

\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 $\angle ABC$ \rightarrow ② $\triangle ABC \sim \triangle BDC$ \rightarrow ③ $\frac{AC}{AB} = \frac{BC}{BD}$
 \overline{BD} is altitude.

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.

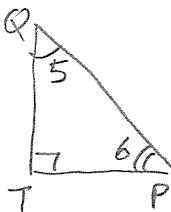
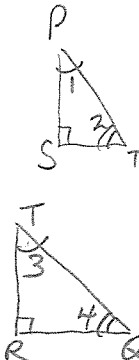
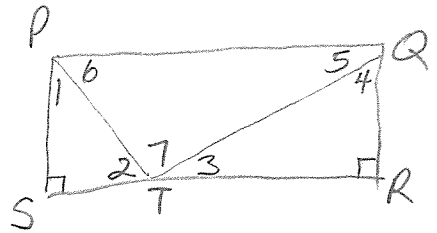
③ $\sim \triangle$ s \rightarrow corresp. sides in proportion.

④ Means - extremes product property

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Given: PQRS is a rectangle.
PS is the geometric mean between ST & TR.
Prove: $\angle PTQ$ is a right \angle .

8-1 HW



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

③ PQRS is a rectangle. \rightarrow ④ $PS = QR$

\rightarrow ⑤ $\frac{ST}{PS} = \frac{QR}{TR}$

⑥ $\angle S$ & $\angle R$ are right \angle s. \rightarrow ⑦ $\angle S \cong \angle R$

\rightarrow ⑧ $\triangle PST \sim \triangle TRQ$

⑨ $\angle 1 \cong \angle 3$
 $\angle 2 \cong \angle 4$

⑩ $\overline{PQ} \parallel \overline{SR} \rightarrow$ ⑪ $\angle 6 \cong \angle 2$

\rightarrow ⑫ $\angle 4 \cong \angle 6$

\rightarrow ⑬ $\angle 5 \cong \angle 3$

\rightarrow ⑭ $\triangle TRQ \sim \triangle QTP$

⑮ $\angle 7 \cong \angle R$ \rightarrow ⑯ $m\angle 7 = m\angle R$

⑰ $m\angle R = 90$ \rightarrow ⑱ $m\angle 7 = 90$

⑲ $\angle PTQ$ is right \angle .

- ① Given
- ② Def. of geo. mean
- ③ Given
- ④ Rect \rightarrow opp sides equal.
- ⑤ Substitution.
- ⑥ Def of rectangle
- ⑦ All right \angle s \cong .
- ⑧ SAS \sim SAS
- ⑨ \sim Δ s \rightarrow corresp \angle s \cong .
- ⑩ Rect \rightarrow opp sides \parallel .

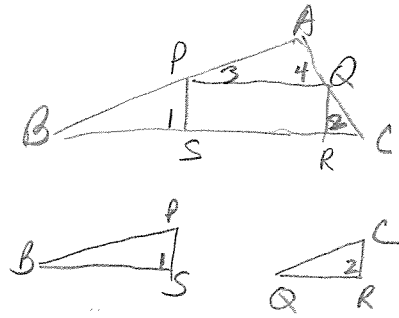
- ⑪ 2 \parallel lines \rightarrow alt. int. \angle s \cong .
- ⑫ Transitive Prop.
- ⑬ 2 \parallel lines \rightarrow alt. int \angle s \cong .
- ⑭ AA \sim AA postulate
- ⑮ \sim Δ s \rightarrow corresp. \angle s. \cong .
- ⑯ def of \cong segmts.
- ⑰ def of right \angle .
- ⑱ Substitution.

⑲ Def of a right \angle .

(H4) 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. \rightarrow ② $\angle PSR$ is rt $\angle \rightarrow$ ③ $\overline{PS} \perp \overline{BC} \rightarrow$ ④ $\angle 1$ is rt \angle
 \rightarrow ⑤ $\angle QRS$ is rt $\angle \rightarrow$ ⑥ $\overline{QR} \perp \overline{BC} \rightarrow$ ⑦ $\angle 2$ is rt \angle
 ⑤ $\angle A$ is rt \angle

⑥ $\angle 1 \cong \angle 2 \cong \angle A$ \rightarrow ⑨ $\triangle BPS \sim \triangle PAQ$
 ⑦ $\overline{QR} \parallel \overline{BC} \rightarrow$ ⑧ $\angle B \cong \angle 3$ \rightarrow ⑩ $\angle C \cong \angle 4$ \rightarrow ⑫ $\triangle PAQ \sim \triangle QRC$
 ⑪ $\angle 2 \cong \angle A$

⑬ $\triangle BPS \sim \triangle QRC \rightarrow$ ⑭ $\frac{BS}{PS} = \frac{QR}{RC} \rightarrow$ ⑮ $BS \cdot RC = PS \cdot QR$
 ⑯ $PS = QR$

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 \rightarrow corresp. $\angle s \cong$.
 - ⑨ AA \sim AA
 - ⑩ 2 \parallel lines \rightarrow corresp. $\angle s \cong$.
 - ⑪ See Step 6
 - ⑫ AA \sim AA
 - ⑬ Transitive Prop. of similarity
 - ⑭ \sim $\angle s \rightarrow$ corresp. sides proportional.
 - ⑮ Means - extremes product prop.
 - ⑯ $\angle 2 \rightarrow$ opp sides \cong .
 - ⑰ Substitution
 - ⑱ Def. of powers.
 - ⑲ Substitution
- ⑰ $BS \cdot RC = PS \cdot PS \rightarrow$ ⑱ $BS \cdot RC = (PS)^2$
 ⑲ $PS \cdot QR = (PS)^2$