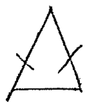
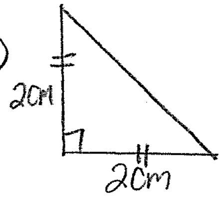
Section 3.4 thr Answer Key

#1-4: sketches may vary.

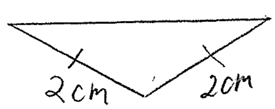
(1) a)



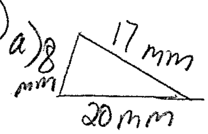
b)



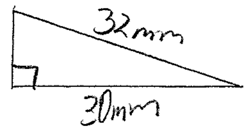
c)



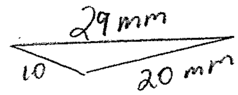
(2) a)



b)

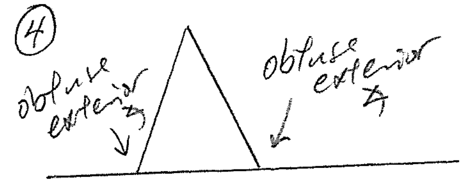


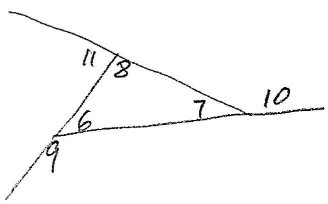
c)



(3) Not possible

(4)





(5) 180

(6) 30

(7) 45

(8) $x + x - 20 = 80$

$x = 50$

(9) $6x - 20 = 4x + 30$

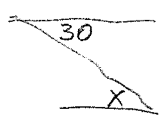
$x = 25$

(10) 360

↑ use equiangular Δ to explain

---

(11)



$x = 30$

$y = 80$

(12) $x = 110$

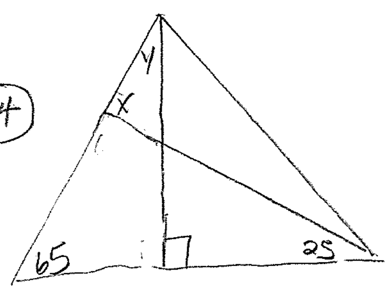
$y = 110 - 40$

$y = 70$

(13) $x = 40$

$y = 50$

(14)



$y = 90 - 65$

$y = 25$

$x = 90$

(15) $x = 40$

$y = 50$

(16) $y = 90 - (40 + 20)$

$y = 30$

$20 + x + y = 90$

$x + 30 = 70$

$x = 40$

(17) Yes, $n = 5$

side #1 side #2

Solve for $4n = 2n + 10$

$n = 5$

But also solve:

side #1 side #3

$4n = 7n - 15$

$n = 5$

Then do a check:

$4(5) = 20$

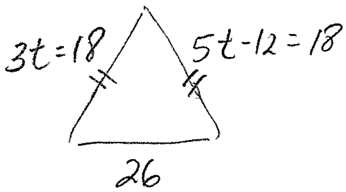
$2(5) + 10 = 20$

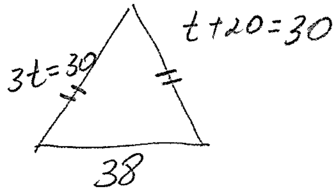
$7(5) - 15 = 20$

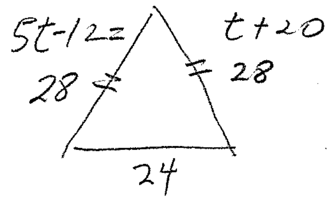
(18) $3t = 5t - 12$ $\quad$ $3t = t + 20$ $\quad$ $5t - 12 = t + 20$

a) $12 = 2t$ $\quad$ $2t = 20$ $\quad$ $4t = 32$

$6 = t$ $\quad$ $t = 10$ $\quad$ $t = 8$







b) No, there is no such value.
As shown above, the 3rd side in each Δ is different in each case.

(19) Let x = meas. of smallest $\angle$
$2x$ = meas. of next largest $\angle$
$3x$ = meas. of largest $\angle$

$x + 2x + 3x = 180$
$6x = 180$
$x = 30$

$30°, 60°, 90°$

ck
$30 + 60 + 90 = 180$ ✓

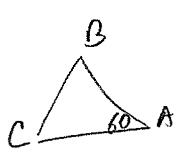
(20) Let x = meas. of smallest $\angle$
$x + 28$ = meas. of one $\angle$
$2x$ = meas. of 3rd $\angle$

$x + (x + 28) + (2x) = 180$
$4x = 152$
$x = 38$

$38°$
$66°$
$76°$

ck
$38 + 66 + 76 = 180$ ✓

(21)



$m\angle C > 60$
$\angle C$ can be acute, obtuse, or right
– not enough information.

(22)

$m\angle T < 70$

19. The largest two angles of a triangle are two and three times as large as the smallest angle. Find all three measures.

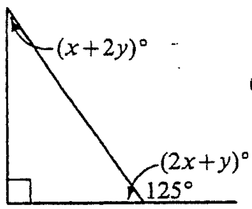
20. The measure of one angle of a triangle is 28 more than the measure of the smallest angle of the triangle. The measure of the third angle is twice the measure of the smallest angle. Find all three measures.

21. In $\triangle ABC$, $m\angle A = 60$ and $m\angle B < 60$. What can you say about $m\angle C$?

22. In $\triangle RST$, $m\angle R = 90$ and $m\angle S > 20$. What can you say about $m\angle T$?

Find the values of x and y.

29.



$$\boxed{\begin{array}{l} (A)\ 2x + y + 125 = 180 \\ (B)\ x + 2y + 90 = 125 \end{array}}$$

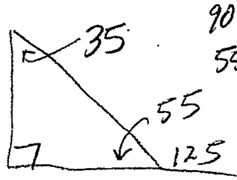
(A) $2x + y = 55$
(B) $x + 2y = 35$

$-2x - 4y = -70$
$2x + y = 55$

$-3y = -15$
$y = 5$

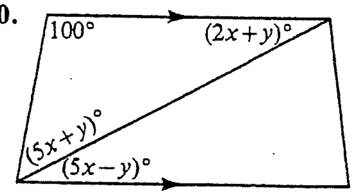
$x + 2y + 90 = 125$
$x + 10 + 90 = 125$
$x = 25$

ck



$90 + 35 = 125$ ✓
$55 + 125 = 180$ ✓

30.

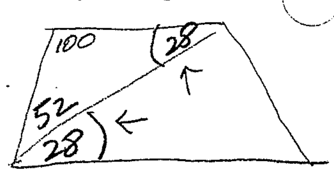


$$\boxed{\begin{array}{l} (A)\ 5x - y = 2x + y \\ (B)\ 5x + y + 5x - y + 100 = 180 \end{array}} \rightarrow 10x = 80$$

$x = 8$

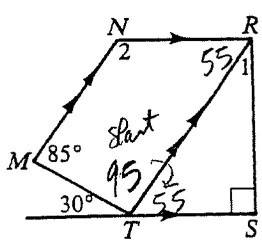
(A) $3x - 2y = 0$
$3(8) - 2y = 0$
$-2y = -24$
$y = 12$

ck



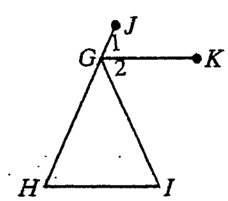
ck
$100 + 52 + 28 = 180$ ✓

26. Find the measures of $\angle 1$ and $\angle 2$.



$m\angle 1 = 35$
$m\angle 2 = 125$

28. Given: $\overrightarrow{GK}$ bisects $\angle JGI$;
$m\angle H = m\angle I$
Prove: $\overline{GK} \parallel \overline{HI}$



(28)

Version A

(1) $m\angle JGI = m\angle 1 + m\angle 2$
(2) $m\angle JGI = m\angle H + m\angle I$

→ (3) $m\angle H + m\angle I = m\angle 1 + m\angle 2$
(4) $m\angle H = m\angle I$

→ (5) $m\angle H + m\angle H = m\angle 1 + m\angle 2$

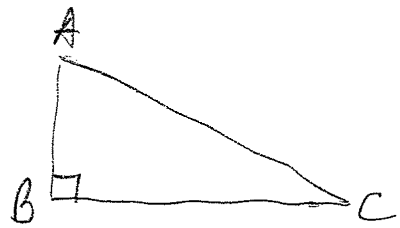
(6) $\overrightarrow{GK}$ bisects $\angle JGI$ → (7) $\angle 1 \cong \angle 2$ → (8) $m\angle 1 = m\angle 2$

→ (9) $m\angle H + m\angle H = m\angle 1 + m\angle 1$

→ (10) $2m\angle H = 2m\angle 1$ → (11) $m\angle H = m\angle 1$ → (12) $\angle H \cong \angle 1$ → (13) $\overline{GK} \parallel \overline{HI}$

(1) Angle Addition Postulate
(2) Meas. of ext. $\angle$ = sum of 2 remote interior $\angle$s
(3) Substitution
(4) Given
(5) Substitution
(6) Given
(7) Def $\angle$ bisector
(8) Def of $\cong$ $\angle$s
(9) Substitution
(10) Distributive Prop.
(11) Division prop.
(12) Def of $\cong$ $\angle$s
(13) 2 lines & transv. & $\cong$ corresp. $\angle$s → 2 $\parallel$ lines

Corollary: The acute $\measuredangle$s of a right $\triangle$ are complementary.



Given: $\triangle ABC$, $\overline{AB} \perp \overline{BC}$

Prove: $\measuredangle A$ complements $\measuredangle C$

① $\overline{AB} \perp \overline{BC}$ → ② $\measuredangle B$ is a rt $\measuredangle$ → ③ $m\measuredangle B = 90$

④ $m\measuredangle A + m\measuredangle B + m\measuredangle C = 180$

⑤ $m\measuredangle A + 90 + m\measuredangle C = 180$ → ⑥ $m\measuredangle A + m\measuredangle C = 90$ → ⑦ $\measuredangle A$ supp $\measuredangle C$

① Given

② $\perp$ lines form right $\measuredangle$s.

③ Def of right $\measuredangle$

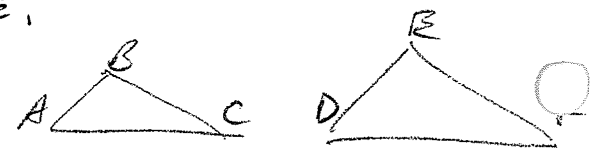
④ Sum of meas. of $\measuredangle$s of $\triangle$ is 180.

⑤ Substitution Prop.

⑥ Subtraction Prop

⑦ If 2 $\measuredangle$s total 90, then they are complementary $\measuredangle$s.

Corollary: If 2 angles of one $\triangle$ are $\cong$ to 2 $\angle$s of another $\triangle$, then the 3rd $\angle$s are $\cong$.



Given: $\angle A \cong \angle D$, $\angle B \cong \angle E$

Prove: $\angle C \cong \angle F$

(1) $m\angle A + m\angle B + m\angle C = 180$

(2) $\angle A \cong \angle D$ → (3) $m\angle A = m\angle D$

→ (4) $m\angle D + m\angle B + m\angle C = 180$

(5) $\angle B \cong \angle E$ → (6) $m\angle B = m\angle E$

(7) $m\angle D + m\angle E + m\angle C = 180$

(8) $m\angle D + m\angle E + m\angle F = 180$

→ (9) $m\angle D + m\angle E + m\angle C = m\angle D + m\angle E + m\angle F$

(10) $m\angle C = m\angle F$ → (11) $\angle C \cong \angle F$

(1) Sum of meas. of $\angle$s of $\triangle = 180$.

(2) Given

(3) Def of $\cong$ $\angle$s

(4) Substitution

(5) Given

(6) Def of $\cong$ $\angle$s

(7) Substitution

(8) Sum of meas. of $\angle$s of $\triangle = 180$.

(9) Substitution

(10) Subtraction Property

(11) Def of $\cong$ $\angle$s