

Name: Answer key No. 0 Per: 2/8 Date:
 Grafino · Geometry M T W R F

3QR

3ABC - Triangles & Transformations

Classifying Triangles, Congruence, Reflections & Translations

1. Two sides ΔXYZ are given. State the interval of the possible measures of the third side as a compound inequality.

- a) $x=9, y=5$ $4 < z < 14$ c) $z=5, y=8$ $3 < x < 13$
 b) $y=11, x=14$ $3 < z < 25$ d) $x=15, z=15$ $0 < y < 30$

2. State whether the three numbers could be sides of a triangle. If so, classify the triangle by sides and angles.

- a) 7, 5, 4 yes b) 13, 5, 12 yes c) 6, 12, 4 no d) 8, 2, 8 yes
 $49 > 41$ $169 = 169$ X $8 > 6$
scalene obtuse scalene right isosceles acute

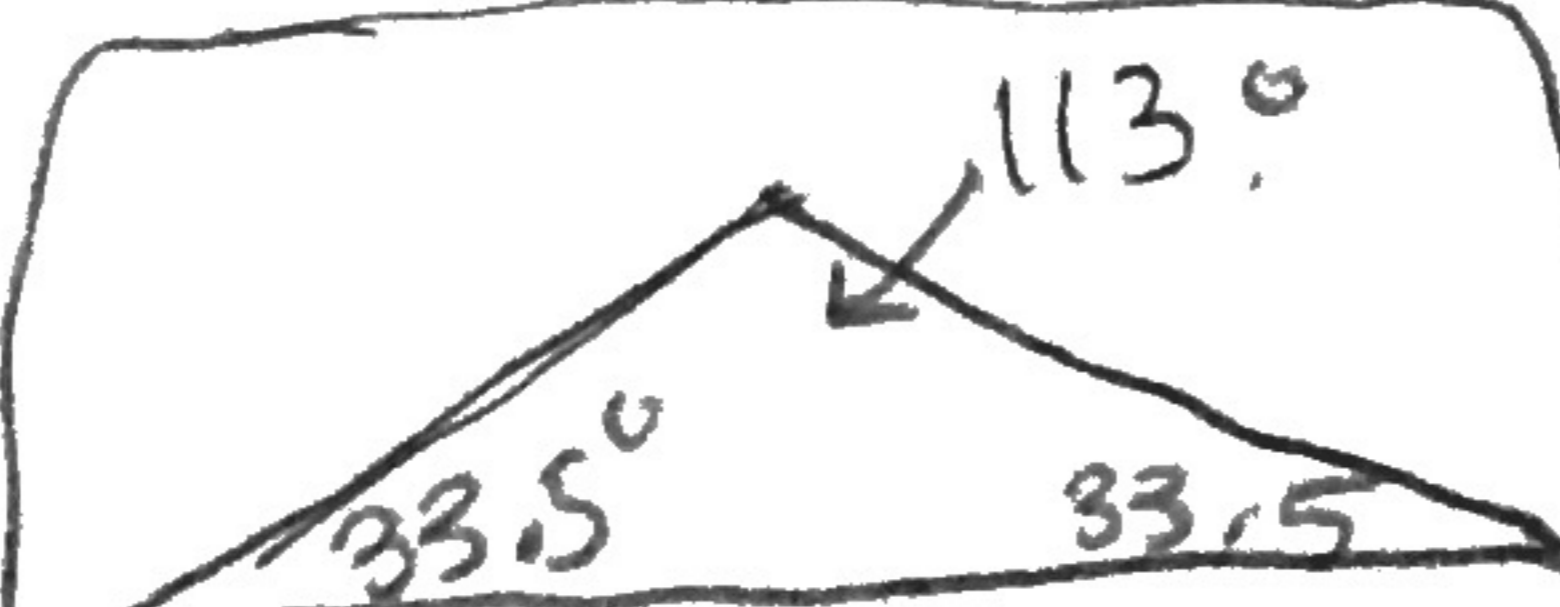
3. For each of the following, set up equations and solve. Then find the measure of each angle.

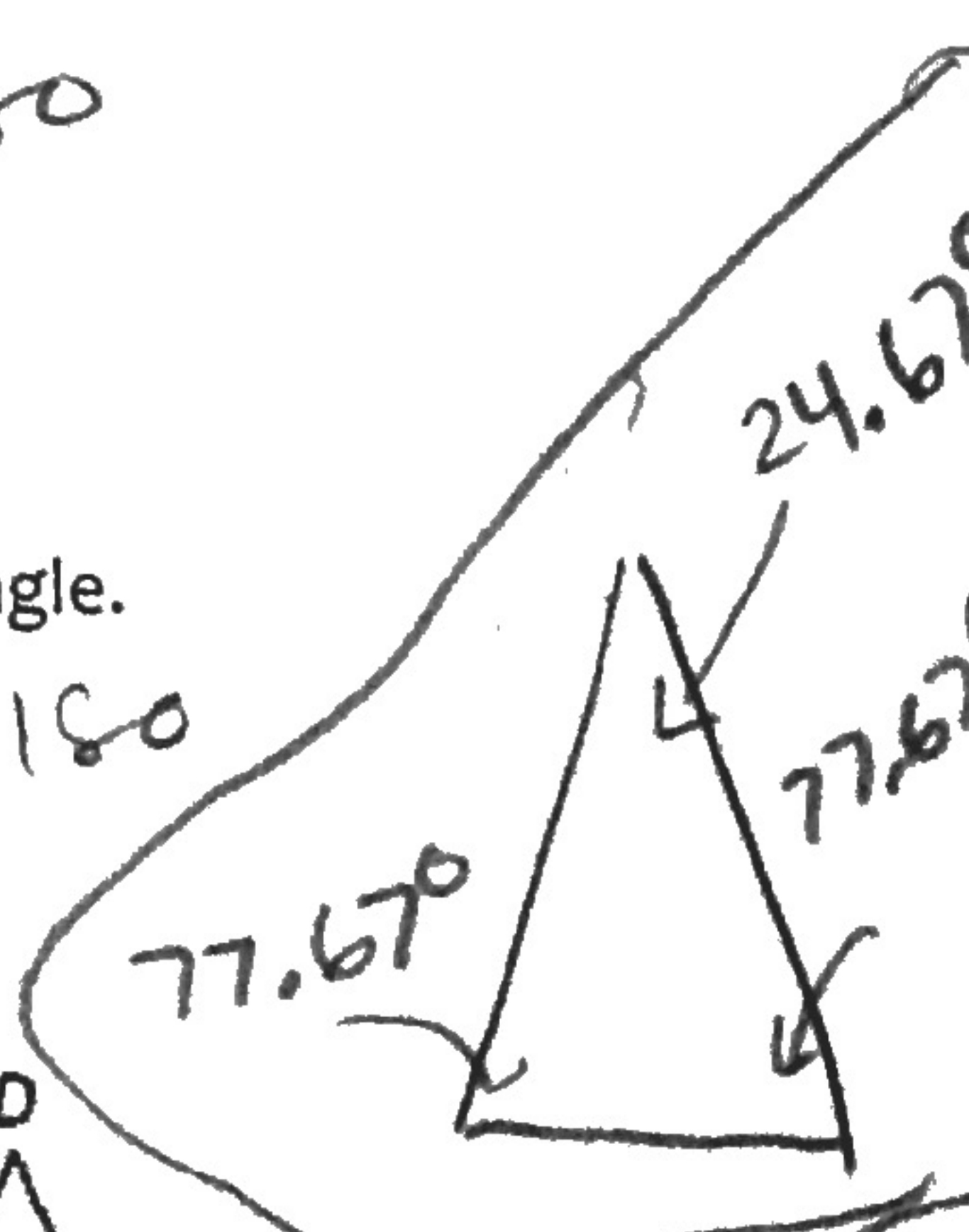
a. ΔHPY has angles $(2x)^\circ$, $(\frac{x}{2}-20)^\circ$ and $(4x+10)^\circ$
 $(2x) + (\frac{x}{2}-20) + (4x+10) = 180$
 $18x - 10 = 180$
 $\frac{18x}{18} = \frac{190}{18}$ $x \approx 10.56$
 $m\angle H = 21.11^\circ$
 $m\angle P = 106.67^\circ$ $m\angle Y = 52.22^\circ$

b. ΔTNX is scalene. The middle angle is 25.8° more than the smaller one. The largest angle is triple the sum of the other two.

$T = x$ $N = x + 25.8$ $X = 3(x + x + 25.8)$
 $x + (x + 25.8) + (6x + 77.4) = 180$
 $8x + 103.2 = 180$
 $x = 9.6$
 $m\angle T = 9.6^\circ$
 $m\angle N = 35.4^\circ$
 $m\angle X = 135^\circ$

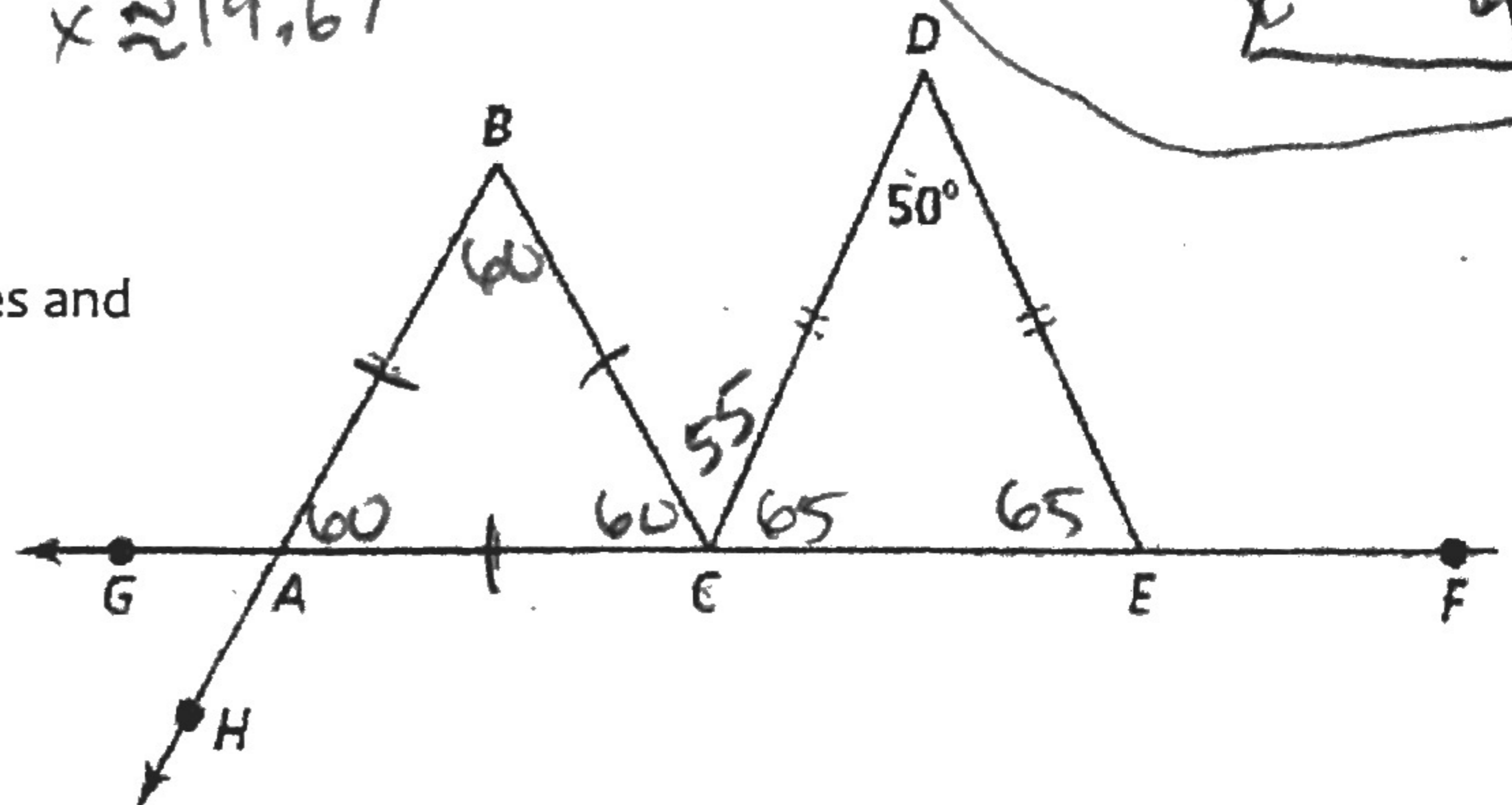
c. ΔGIV is isosceles and has angles $(x+5)^\circ$ and $(4x-1)^\circ$. There are two ways you could draw the triangle. Provide both triangles, with all the angles

$(x+5) + (x+5) + (4x-1) = 180$
 $6x + 9 = 180$
 $x = 28.5$


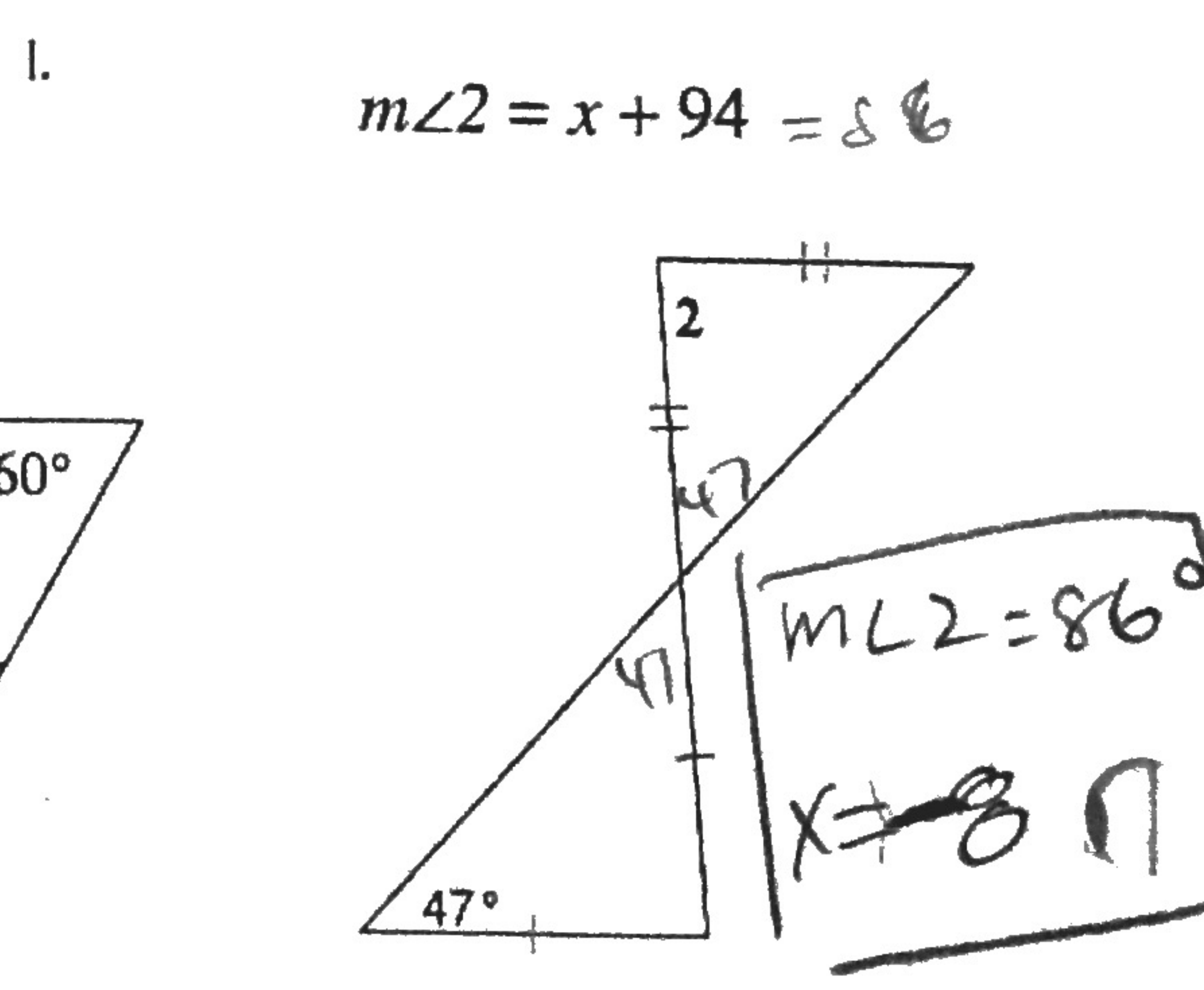
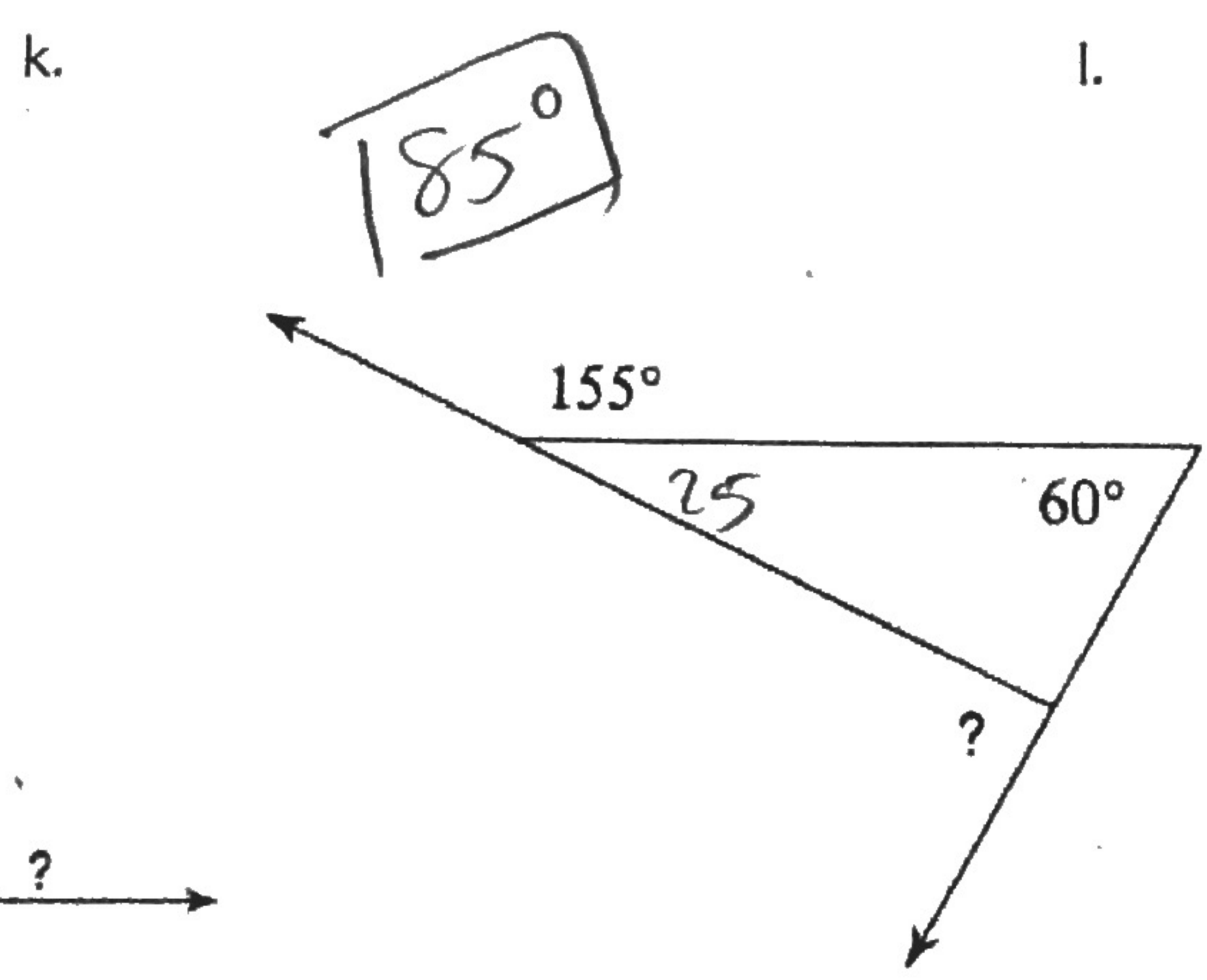
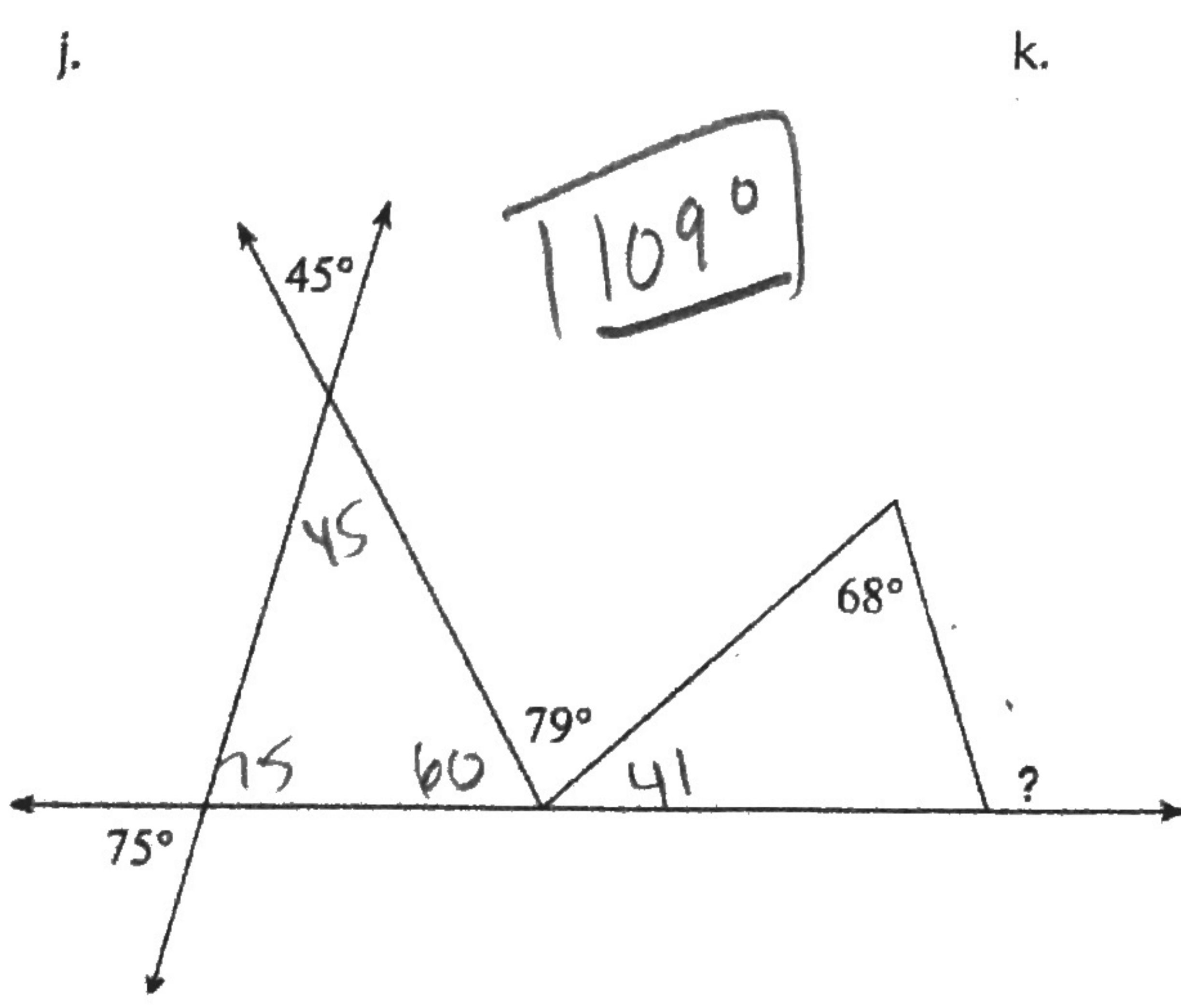
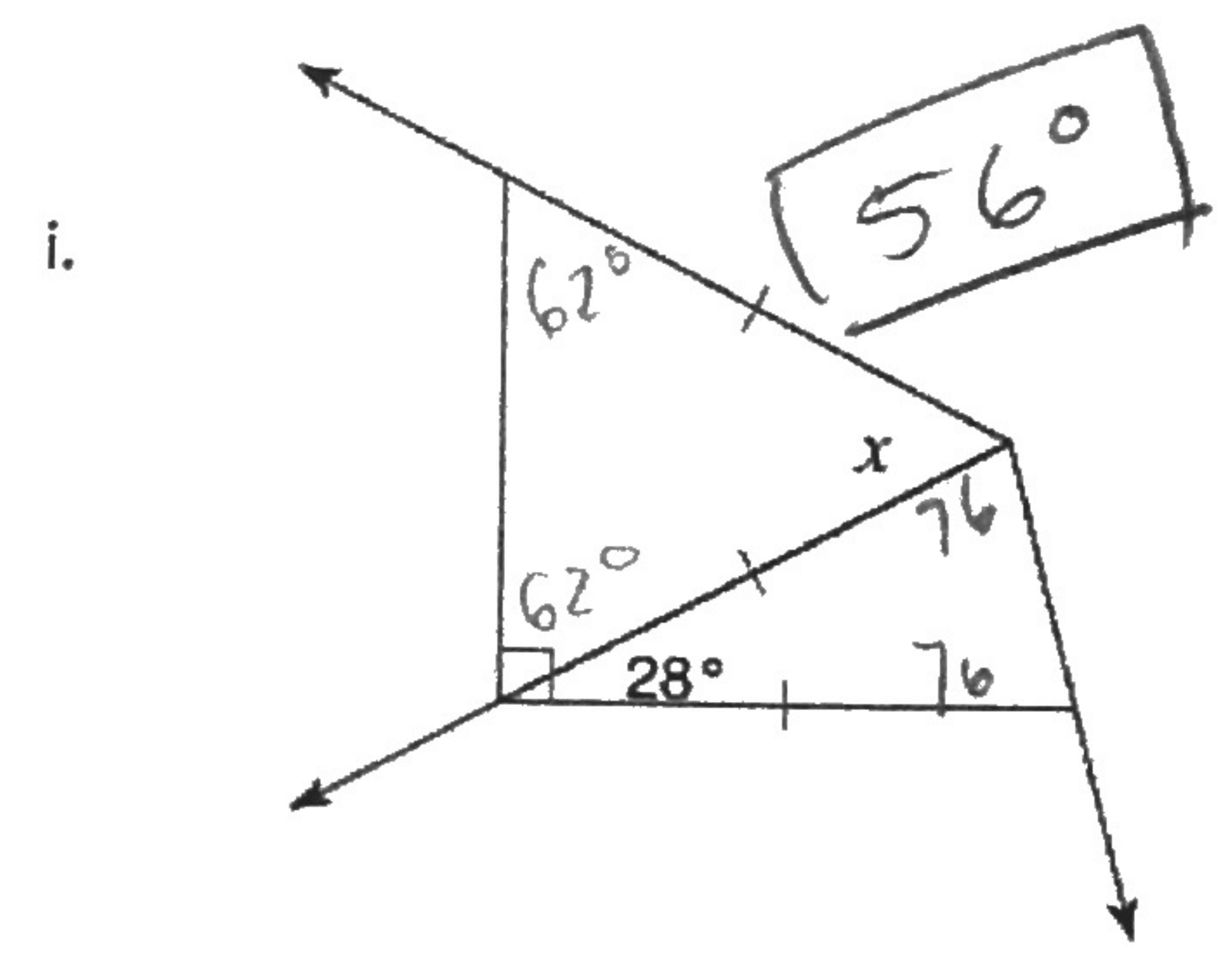
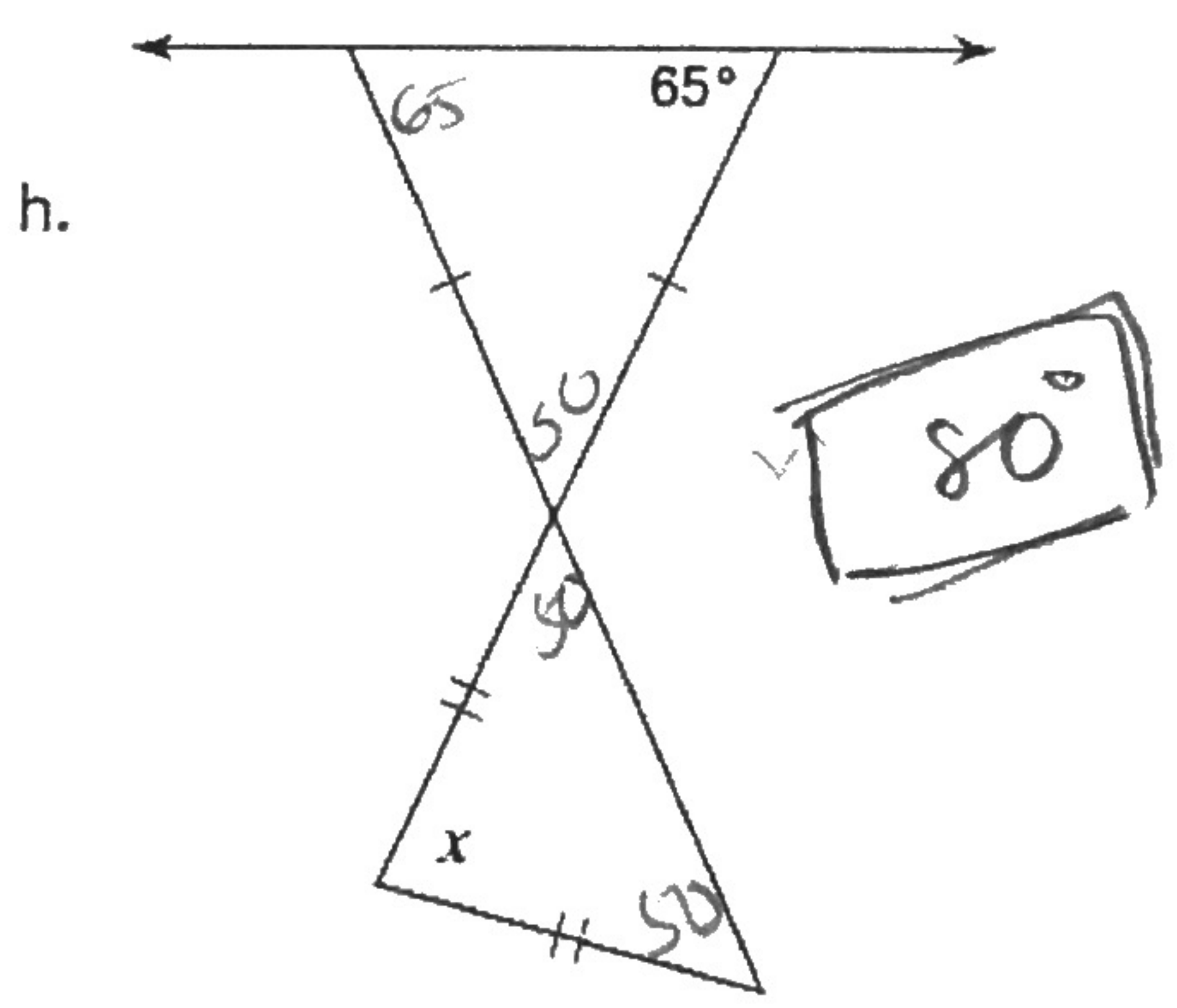
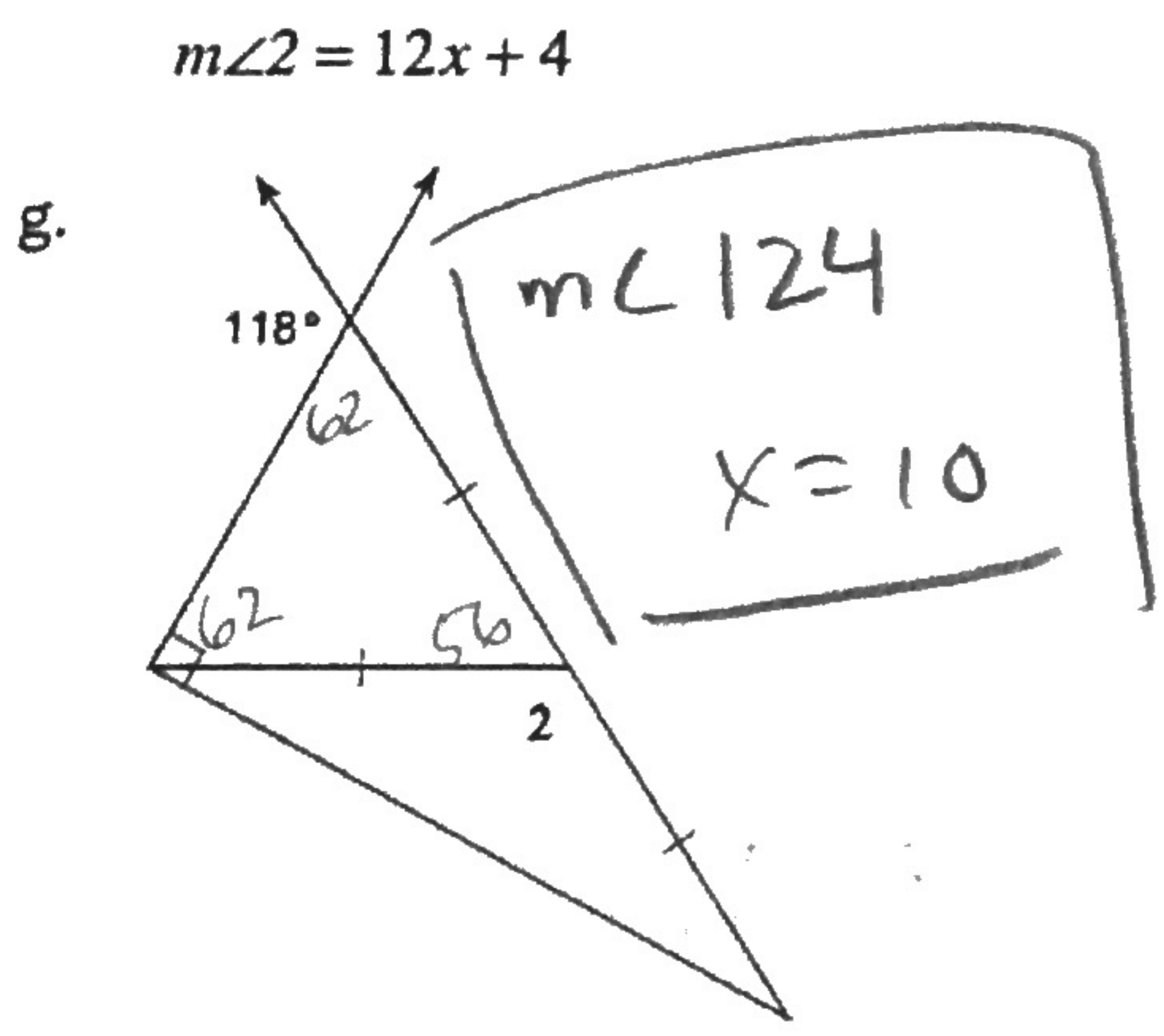
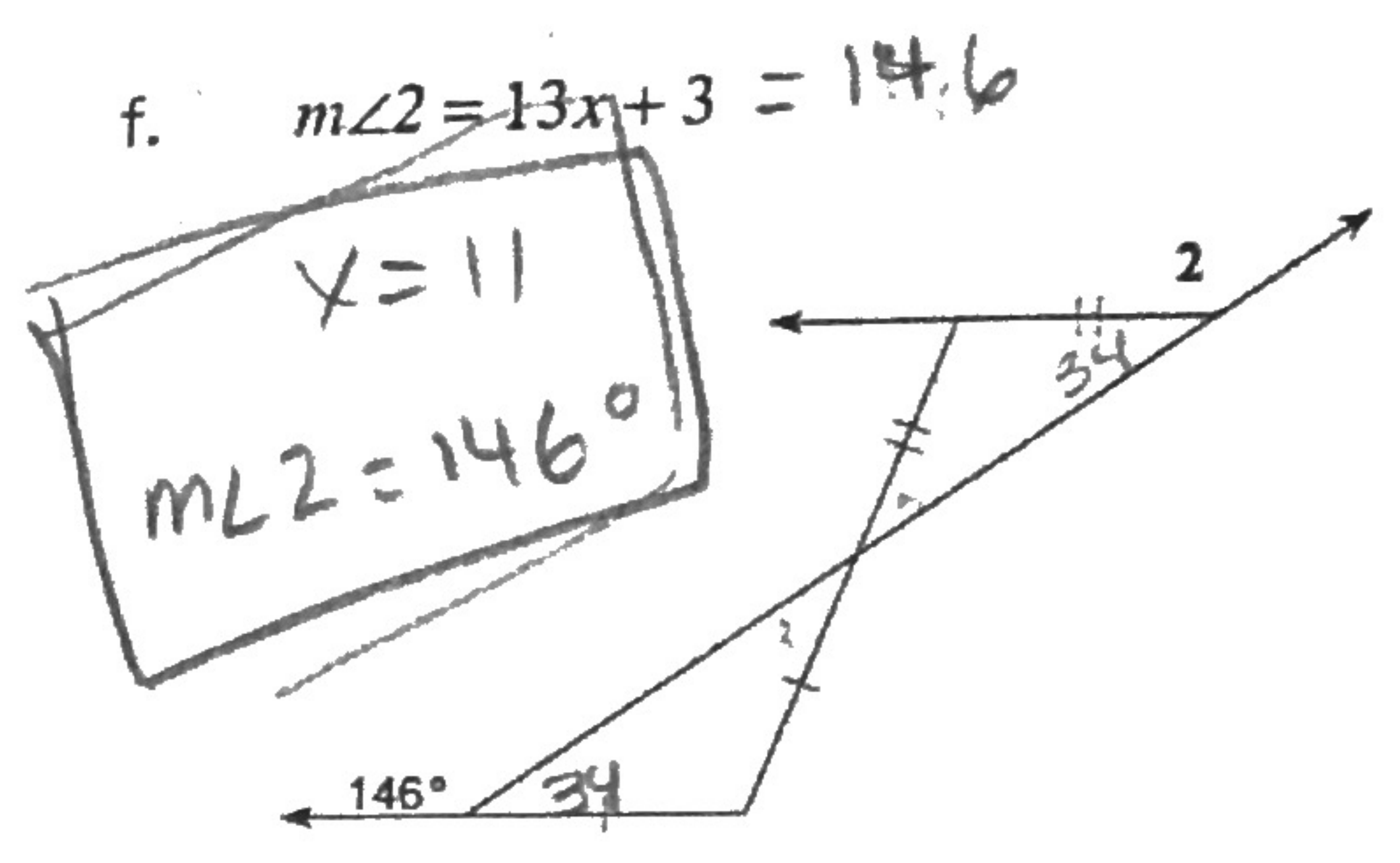
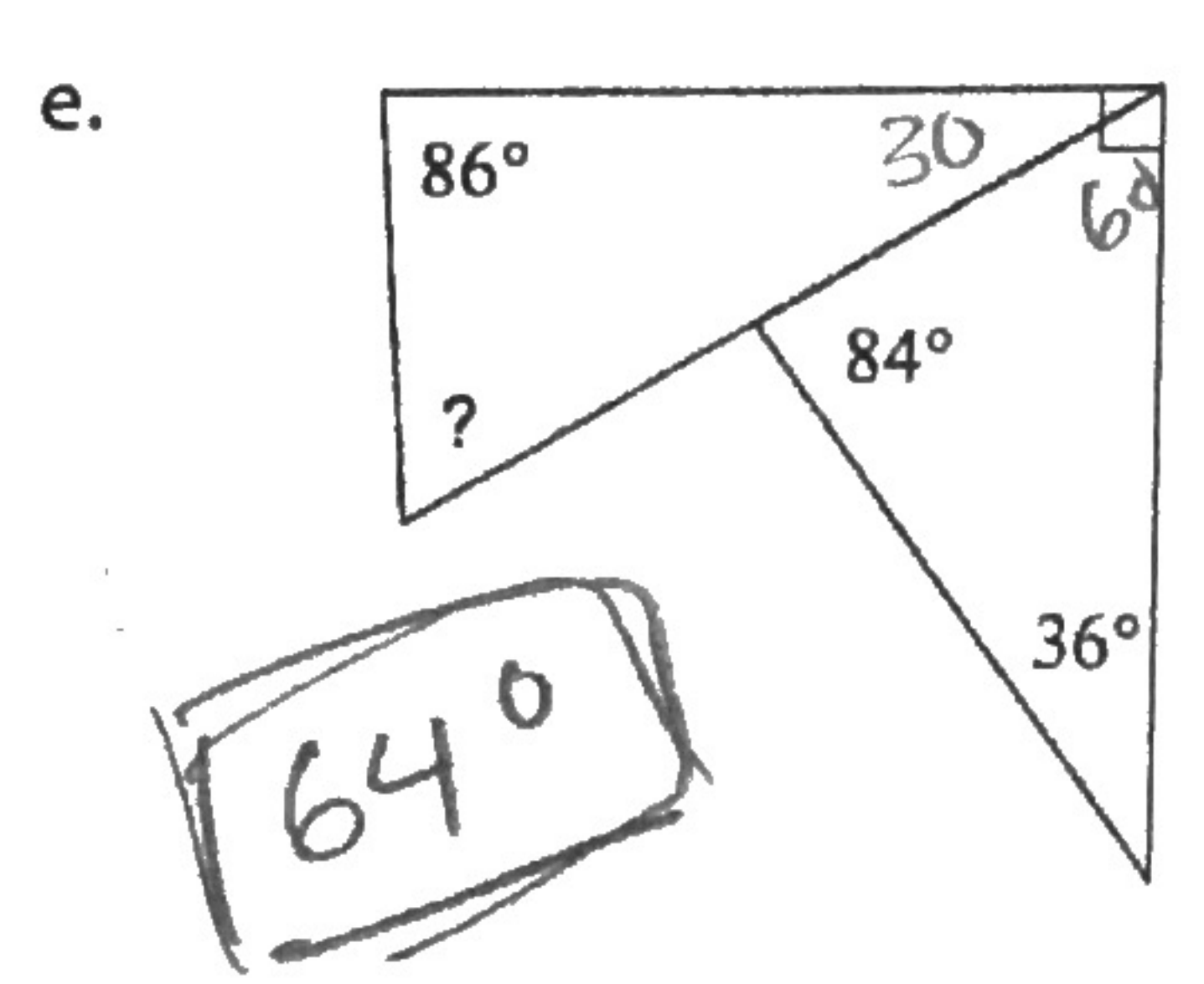
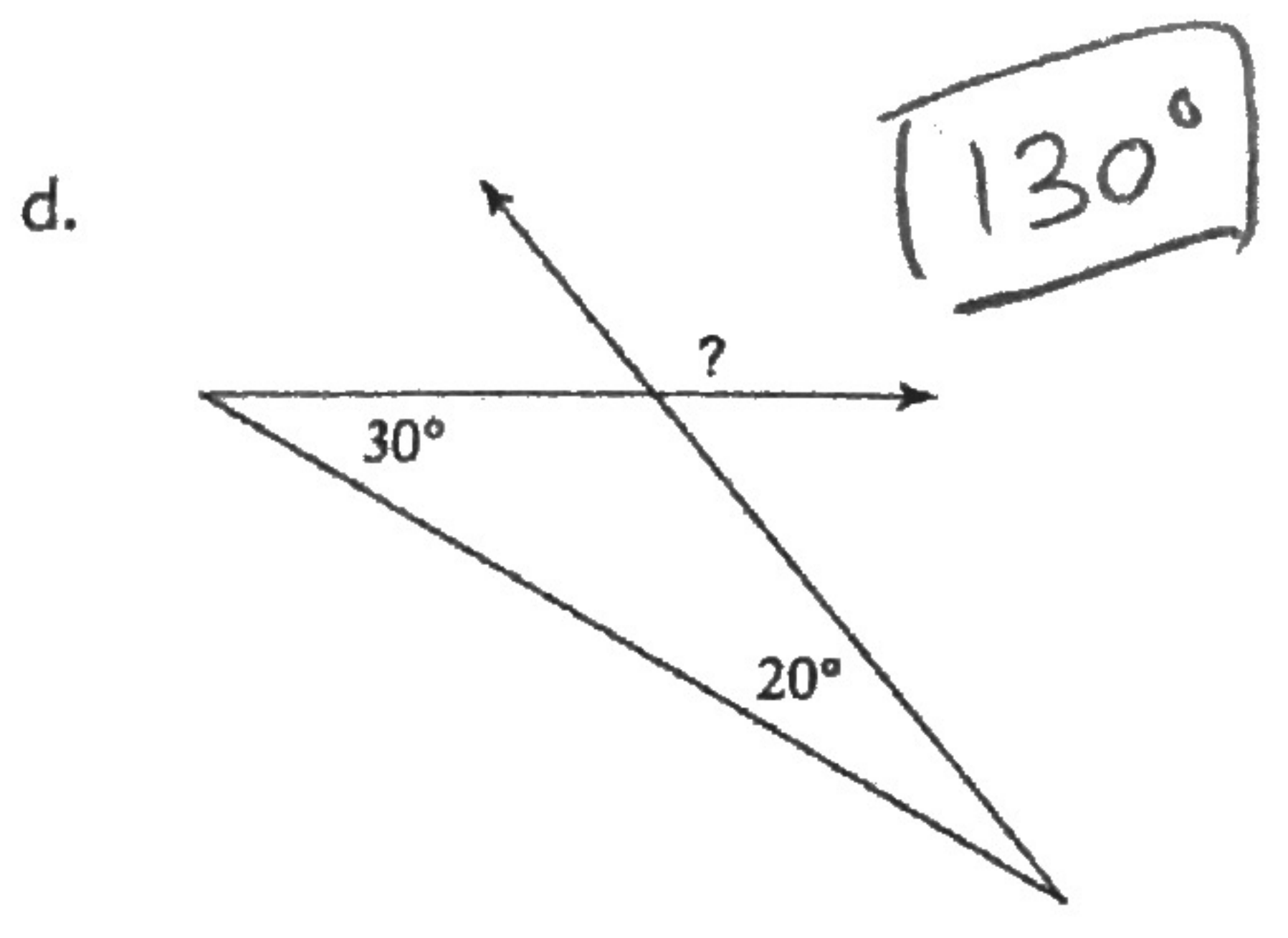
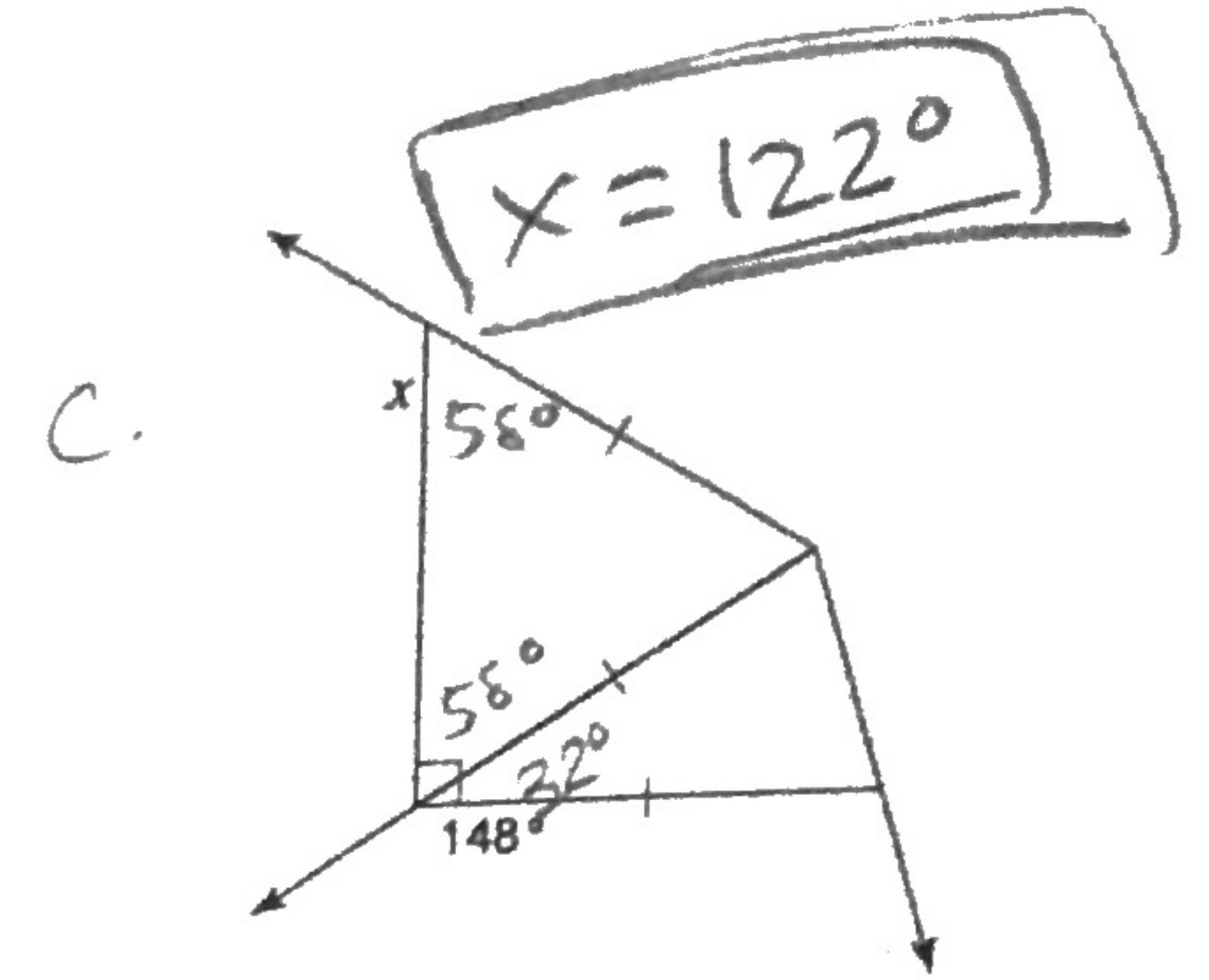
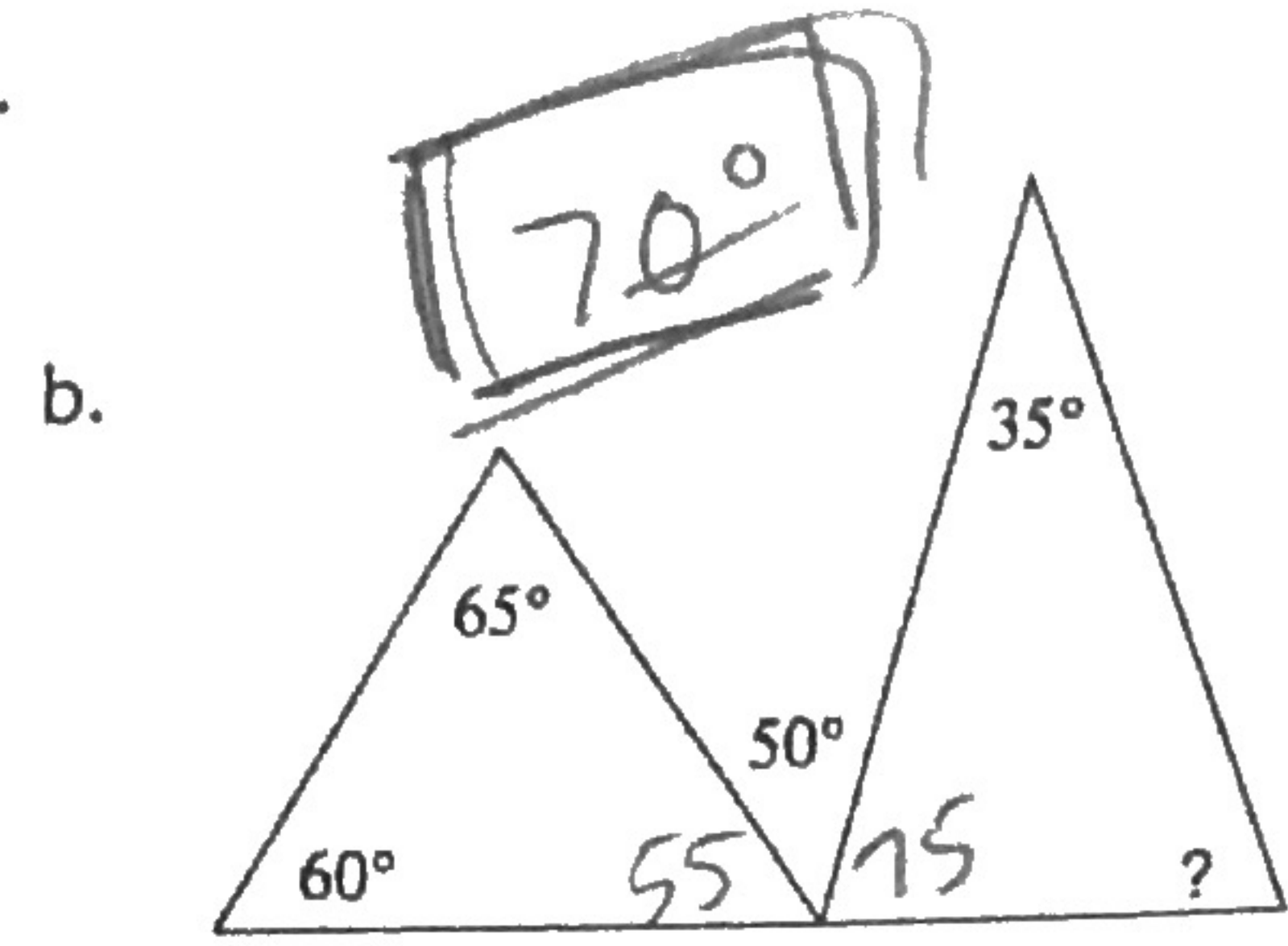
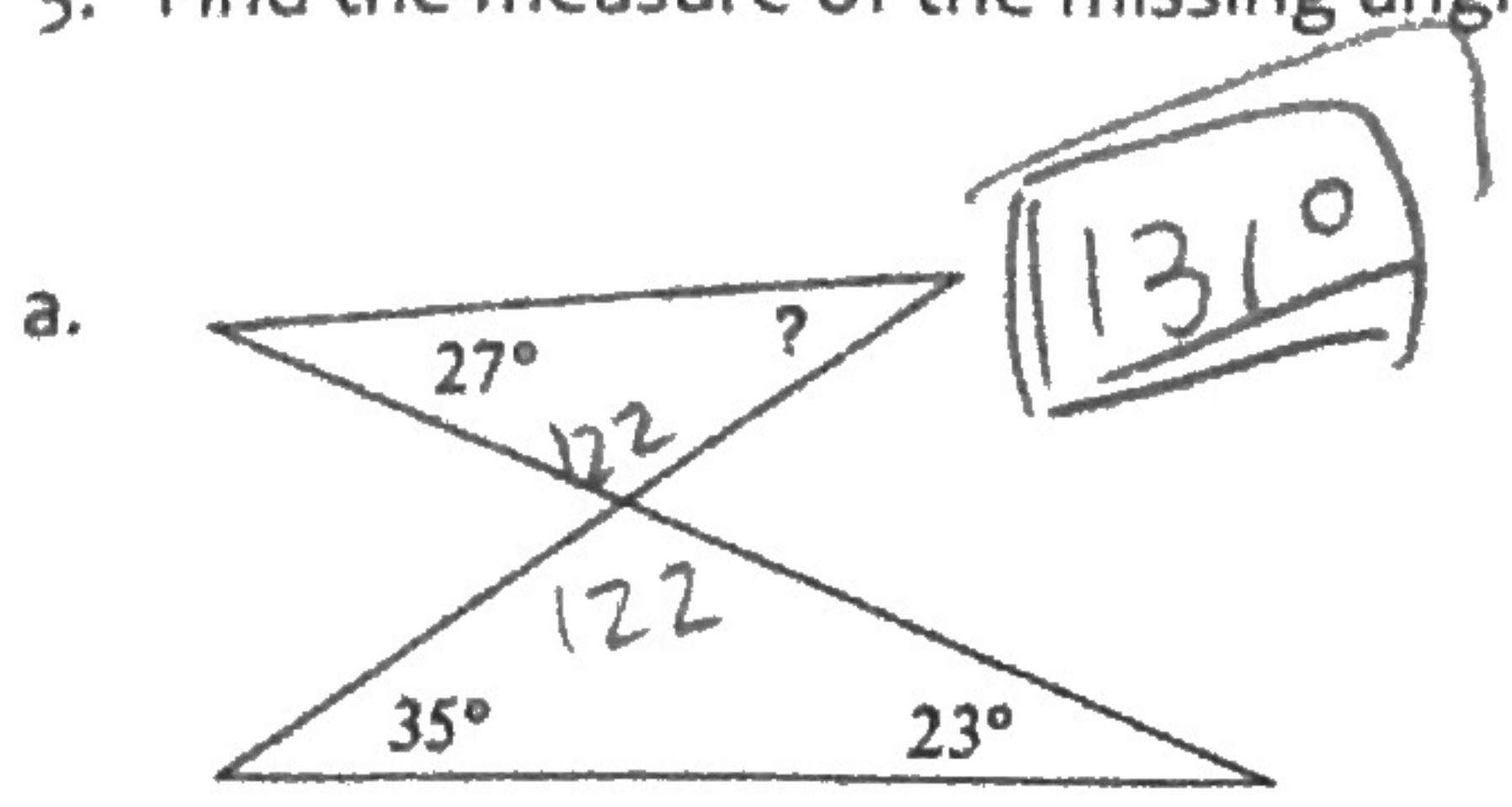
$(4x-1) + (4x-1) + (x+5) = 180$
 $9x + 3 = 180$
 $x \approx 19.67$


4. Find the values of the variables. Then classify the triangle by sides and

- a) $m\angle BCA = 60^\circ$ d) $m\angle DCE = 65^\circ$
 b) $m\angle ACD = 115^\circ$ e) $m\angle BCD = 55^\circ$
 c) $m\angle DEF = 115^\circ$ f) $m\angle HAC = 120^\circ$



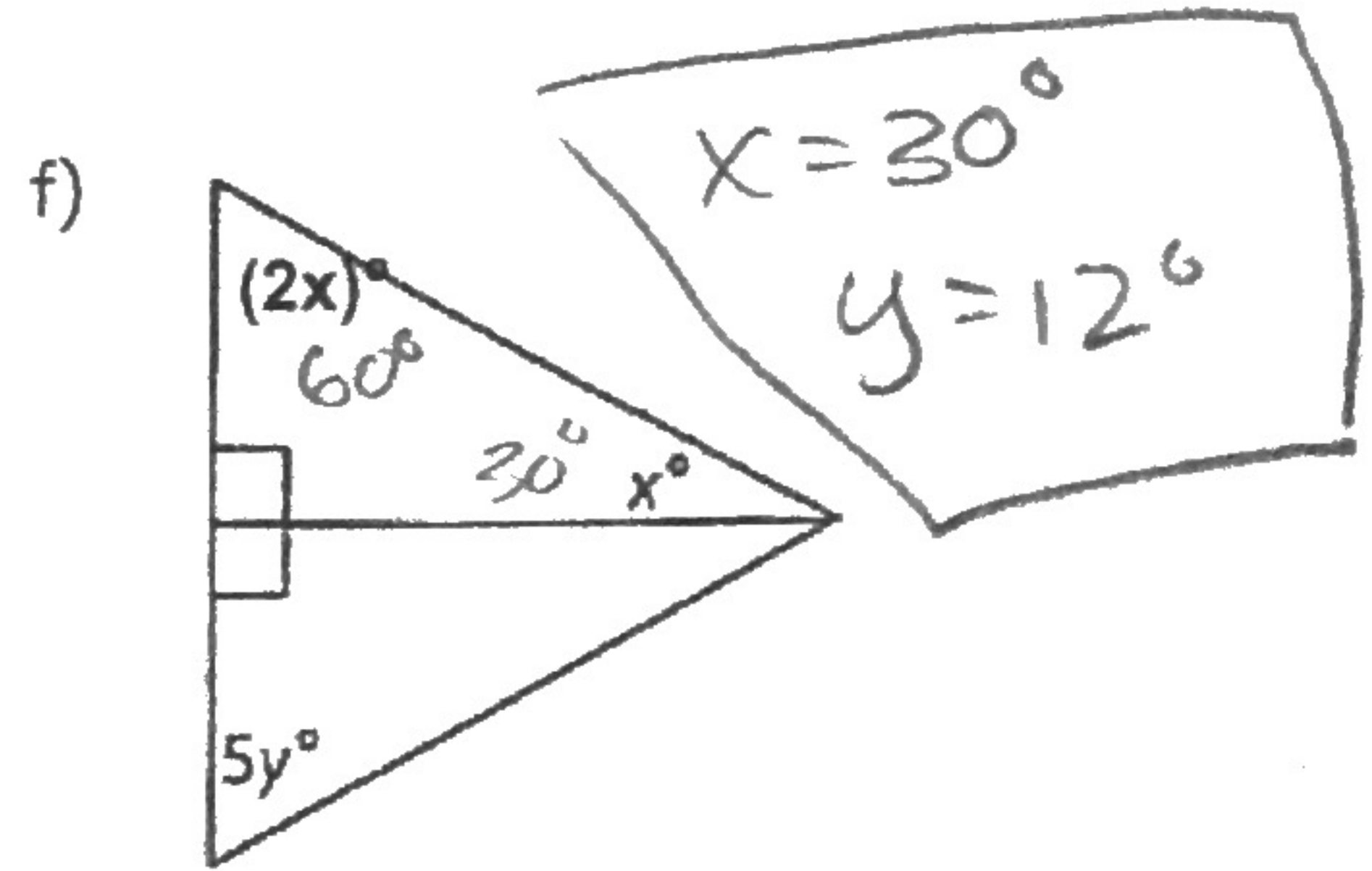
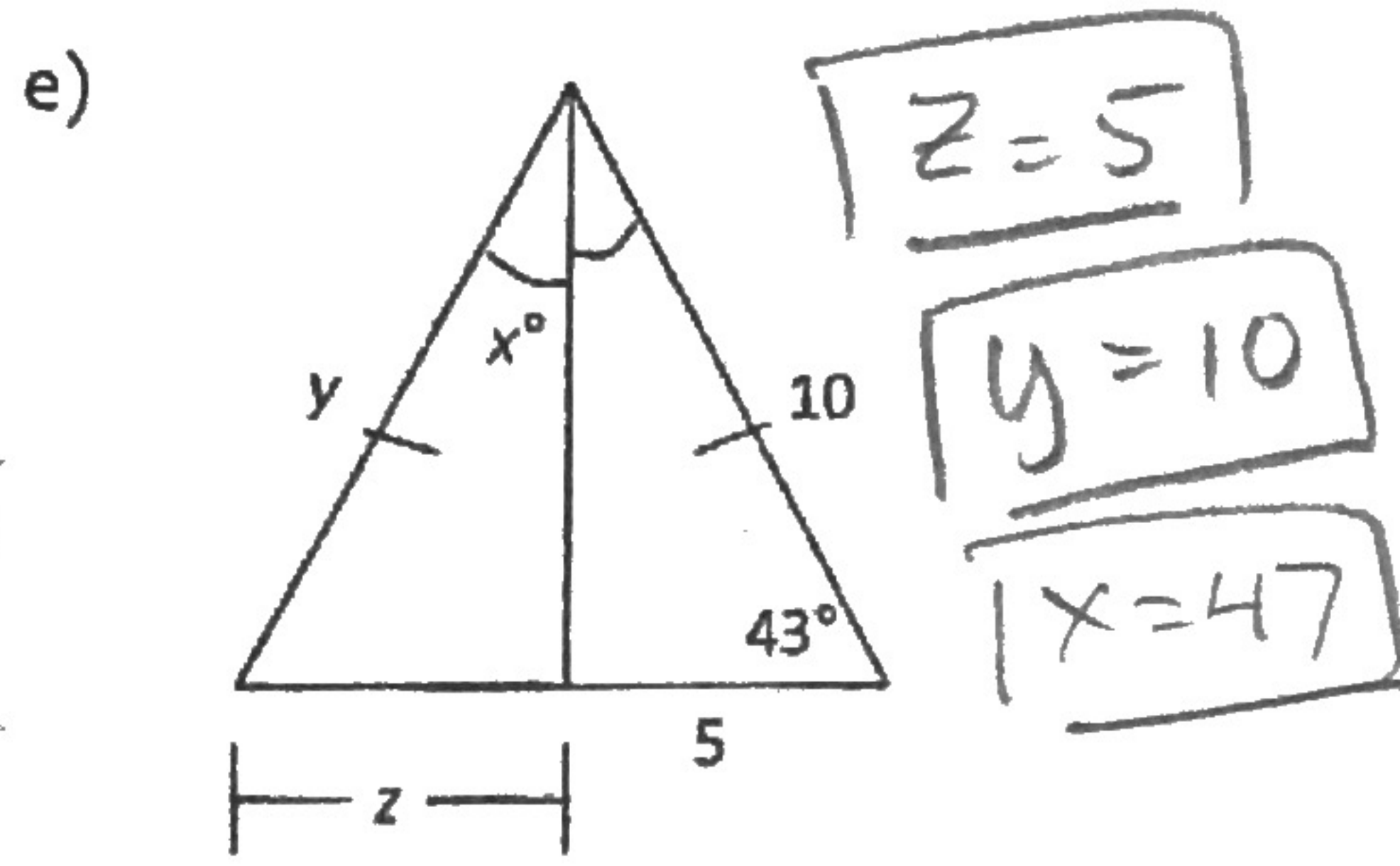
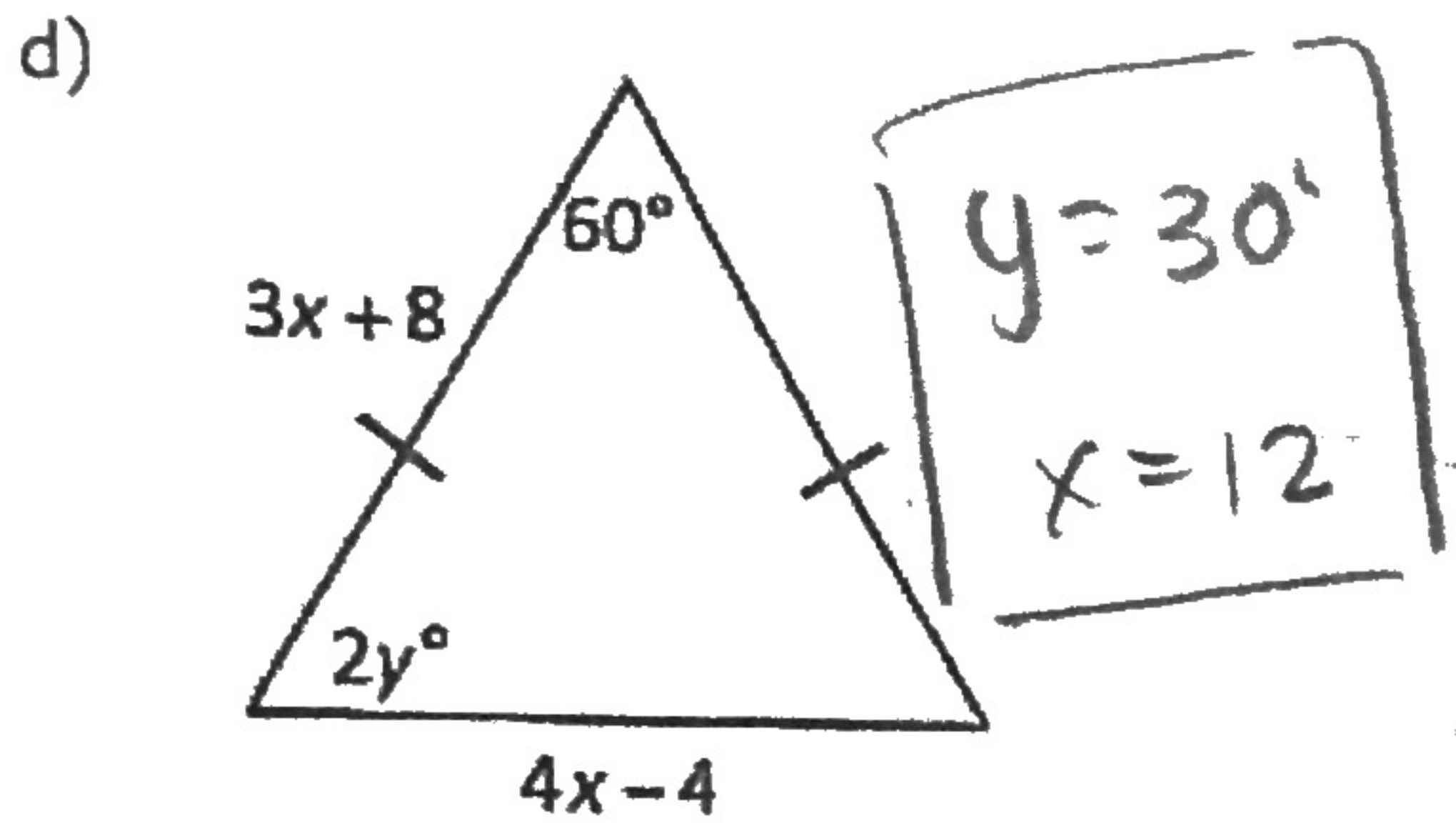
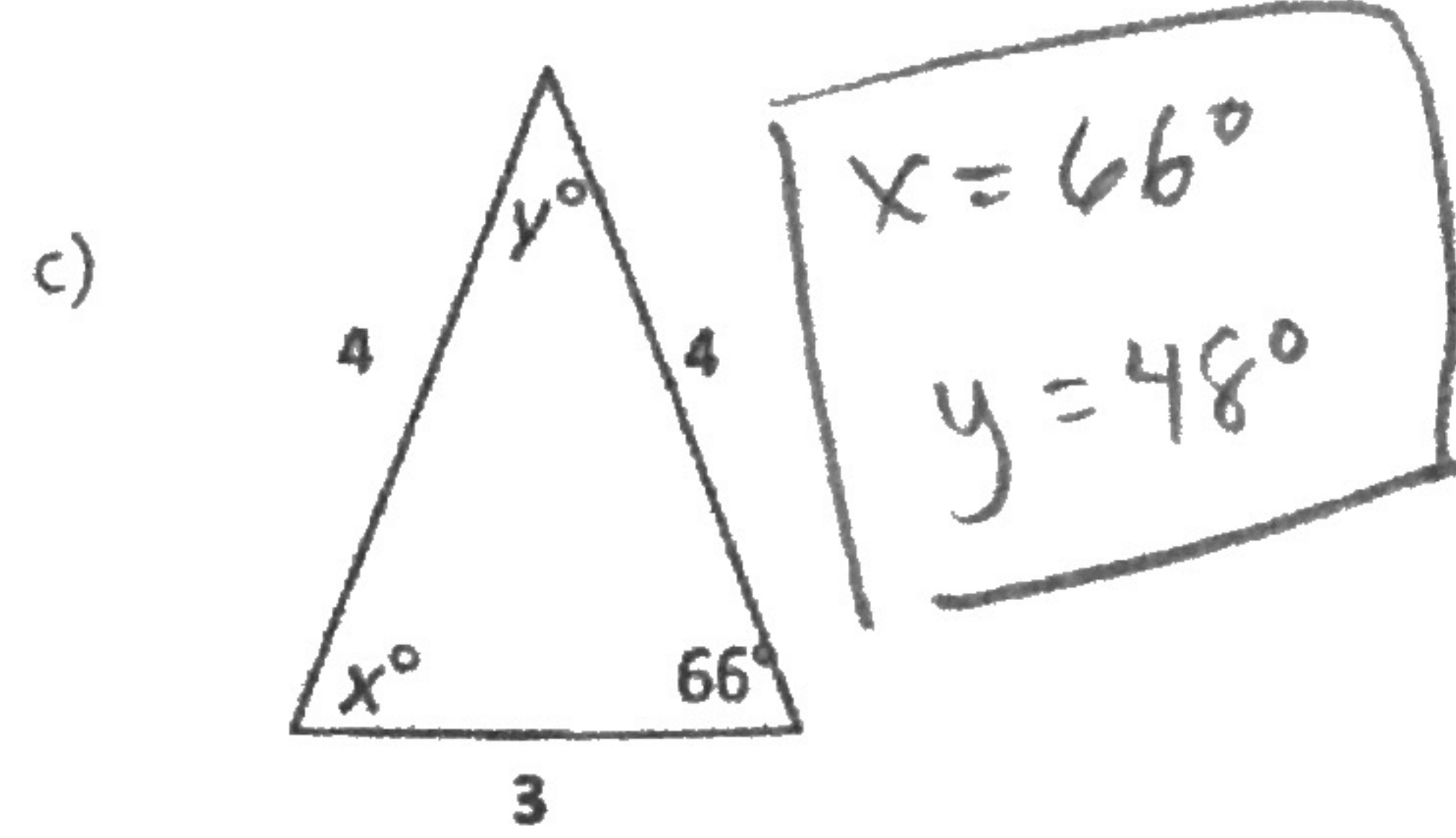
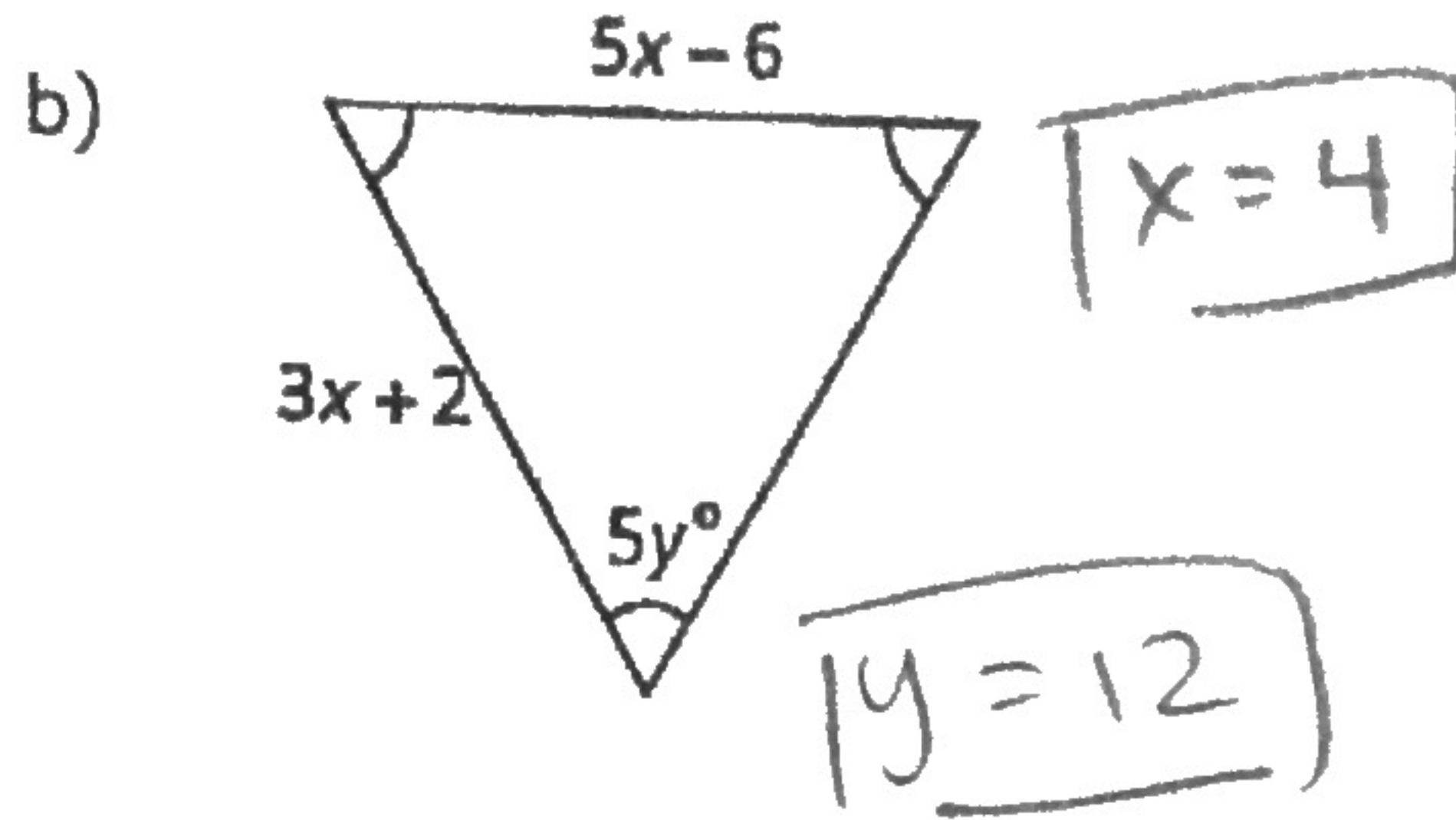
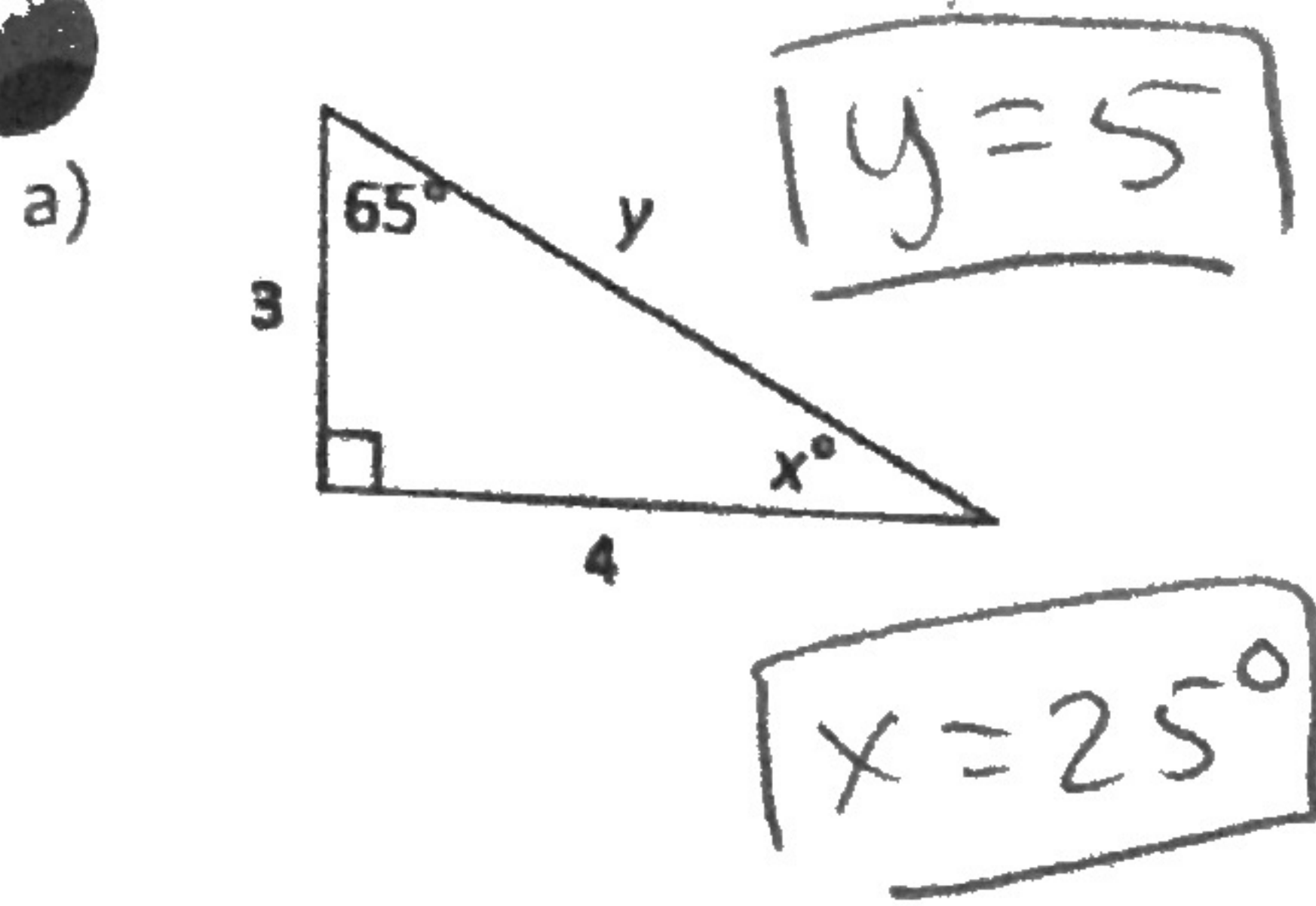
5. Find the measure of the missing angle.



6. Solve for each of the variables:

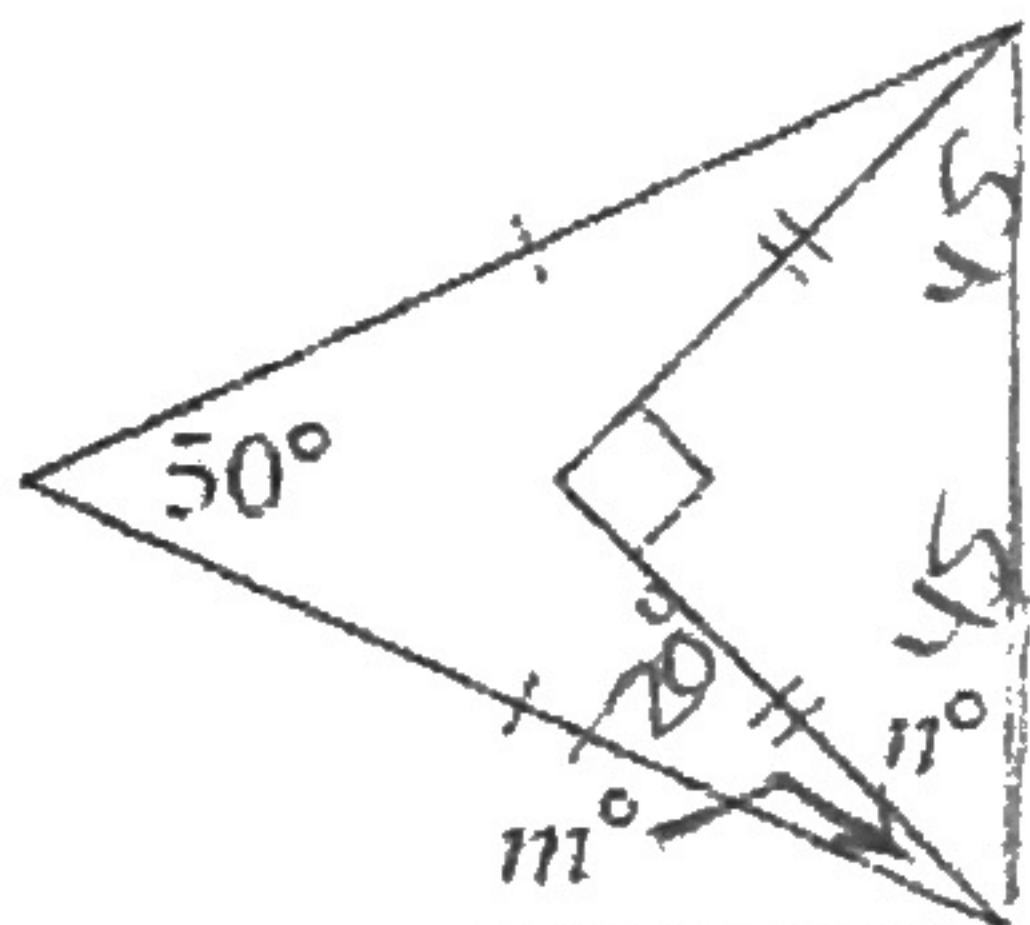
$$3x + 2 = 5x - 6$$

$$8 = 2x$$

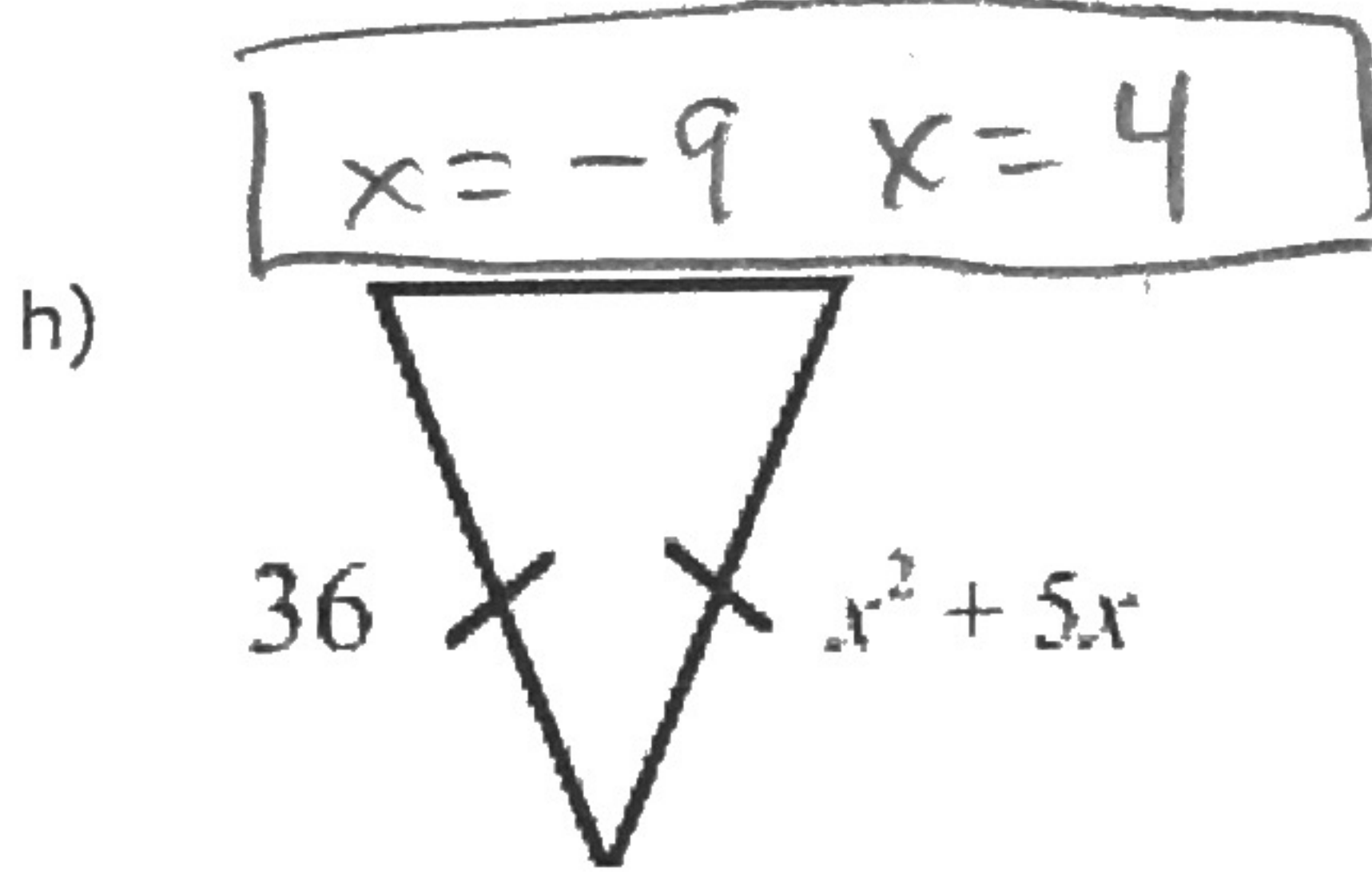


$$3x + 8 = 4x - 4$$

$$12 = x$$

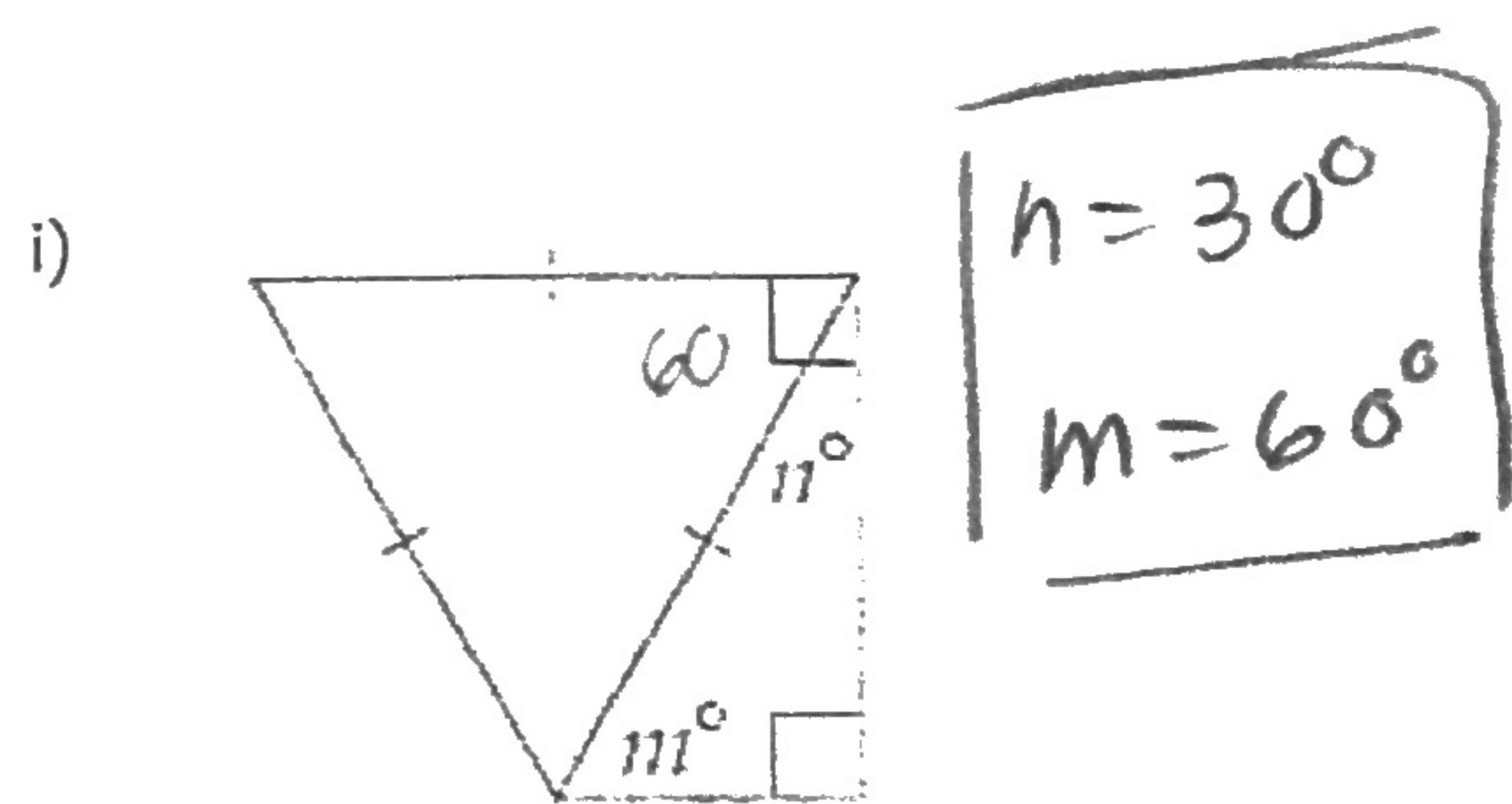


$$n = 45^\circ \quad m = 20^\circ$$



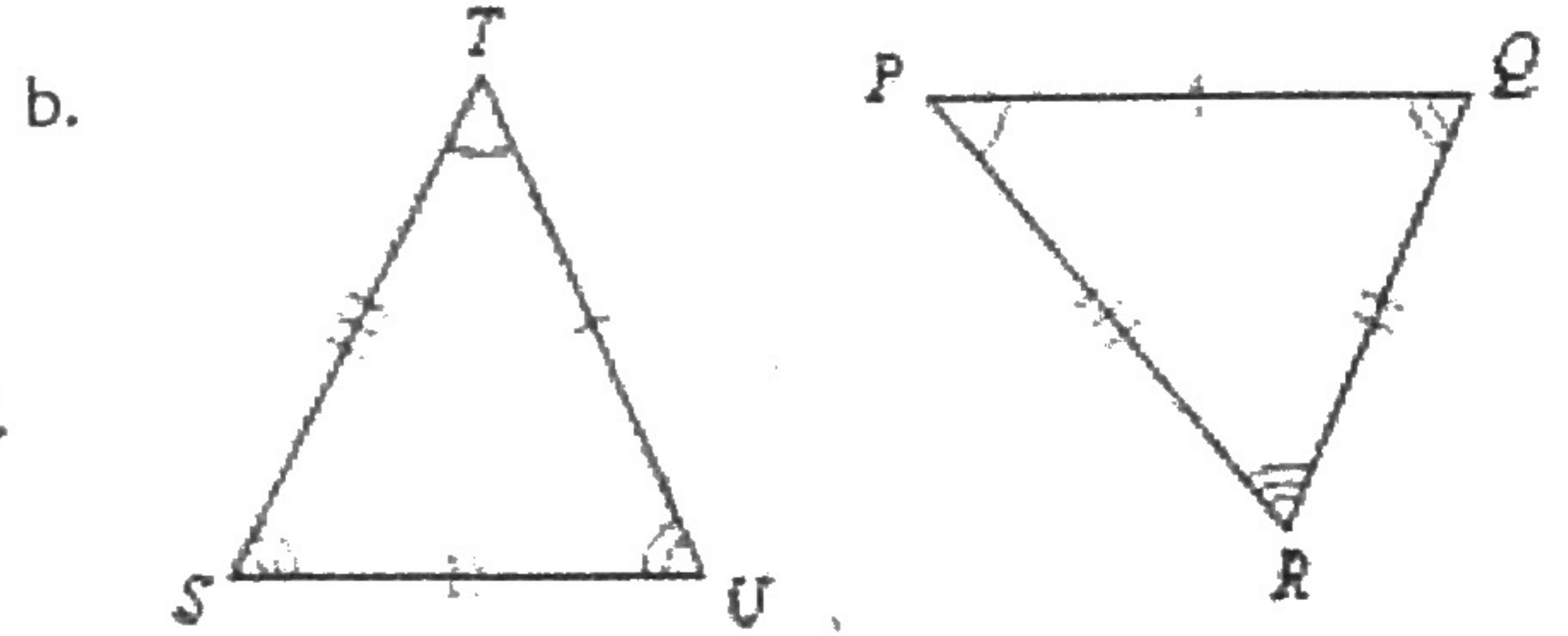
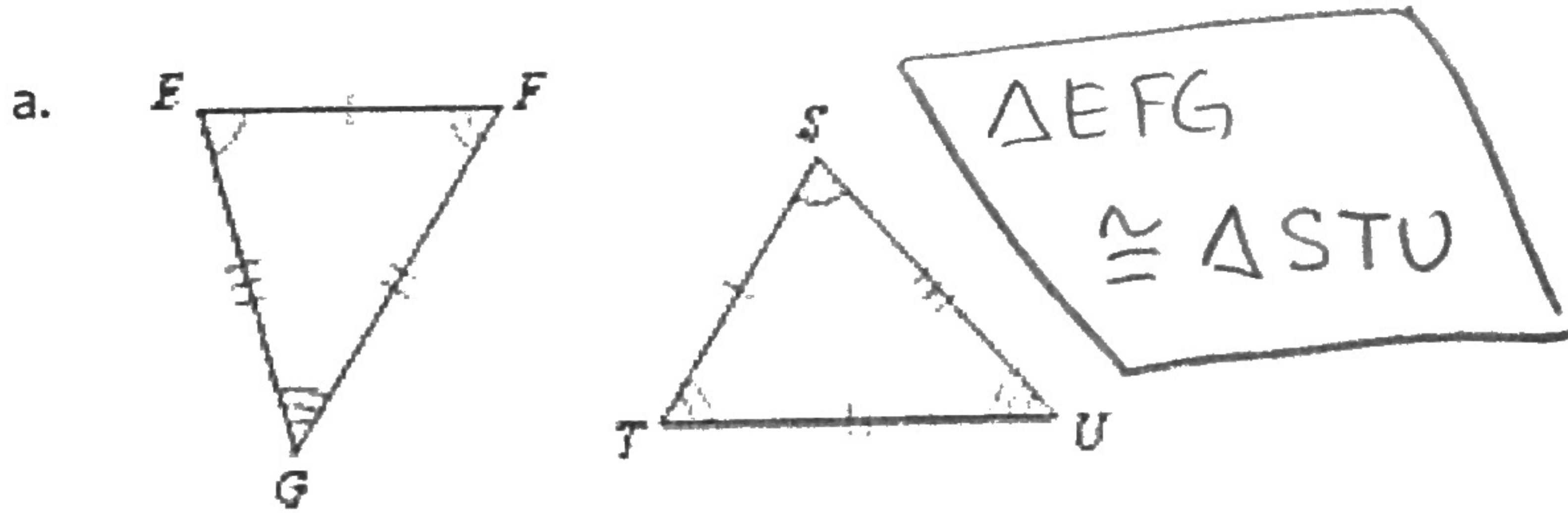
$$x^2 + 5x - 36 = 0$$

$$(x + 9)(x - 4) = 0$$



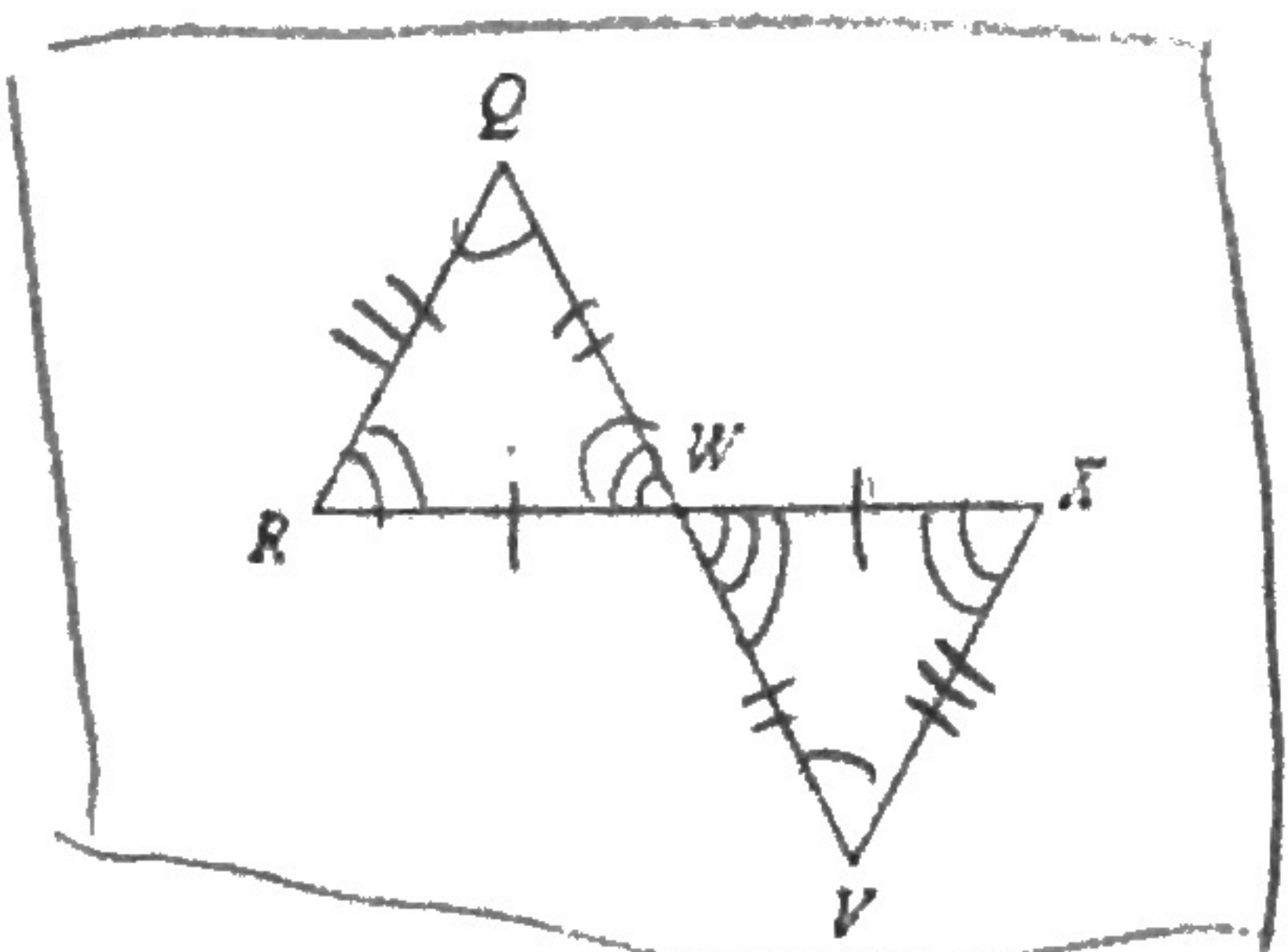
7. Congruent triangles:

Write a congruence statement for the triangles below:

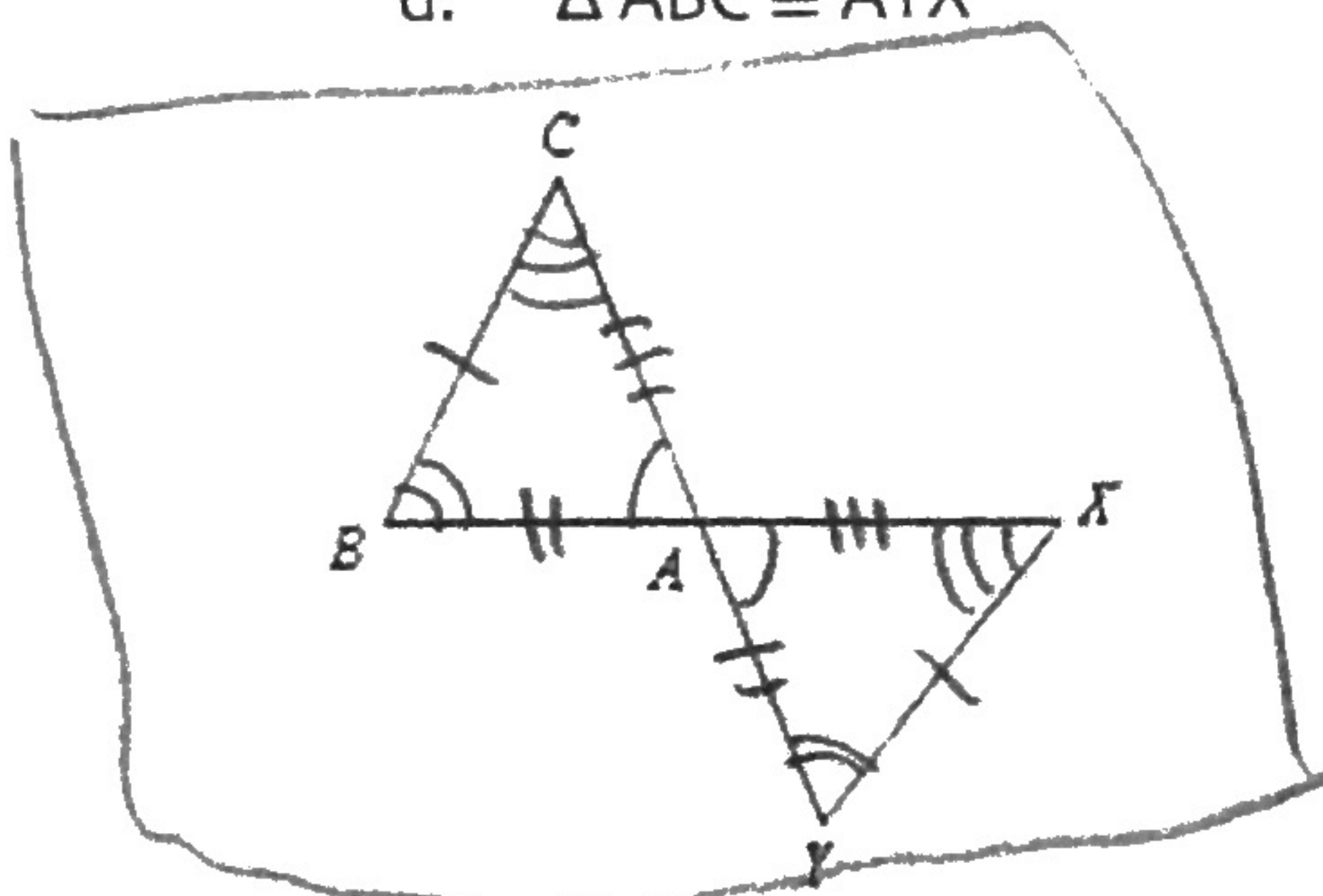


Mark the triangles (angles and sides) so they are congruent, as stated.

c. $\Delta QRW \cong \Delta VWX$



d. $\Delta ABC \cong \Delta AYX$



8. Translate that point!

a. $(5, 2)$ 2 up $(5, 4)$

b. $(6, -3)$ 3 left $(3, -3)$

c. $(5, 7)$ 9 down $(5, -2)$

d. $(4, -2)$ 3 right, 1 down $(7, -3)$

e. $(5, 4)$ 2 left, 5 up $(3, 9)$

f. $(-7, 6)$ 4 right $(-3, 6)$

9. Name that line of reflection! Write the equation of the line. If it's an axis, name that axis.

a. $(5, 2) \rightarrow (2, 5)$ $y = x$

b. $(6, -3) \rightarrow (-6, -3)$ $x = 0$ (y-axis)

c. $(-3, 1) \rightarrow (3, -1)$ $y = -x$

d. $(2, 0) \rightarrow (2, 2)$ $y = 1$

e. $(5, 7) \rightarrow (9, 7)$ $x = 7$

f. $(-10, 2) \rightarrow (-2, 10)$ $y = -x$

g. $(4, -2) \rightarrow (4, 2)$ $y = 0$ (x-axis)

h. $(5, 4) \rightarrow (3, 4)$ $x = 4$

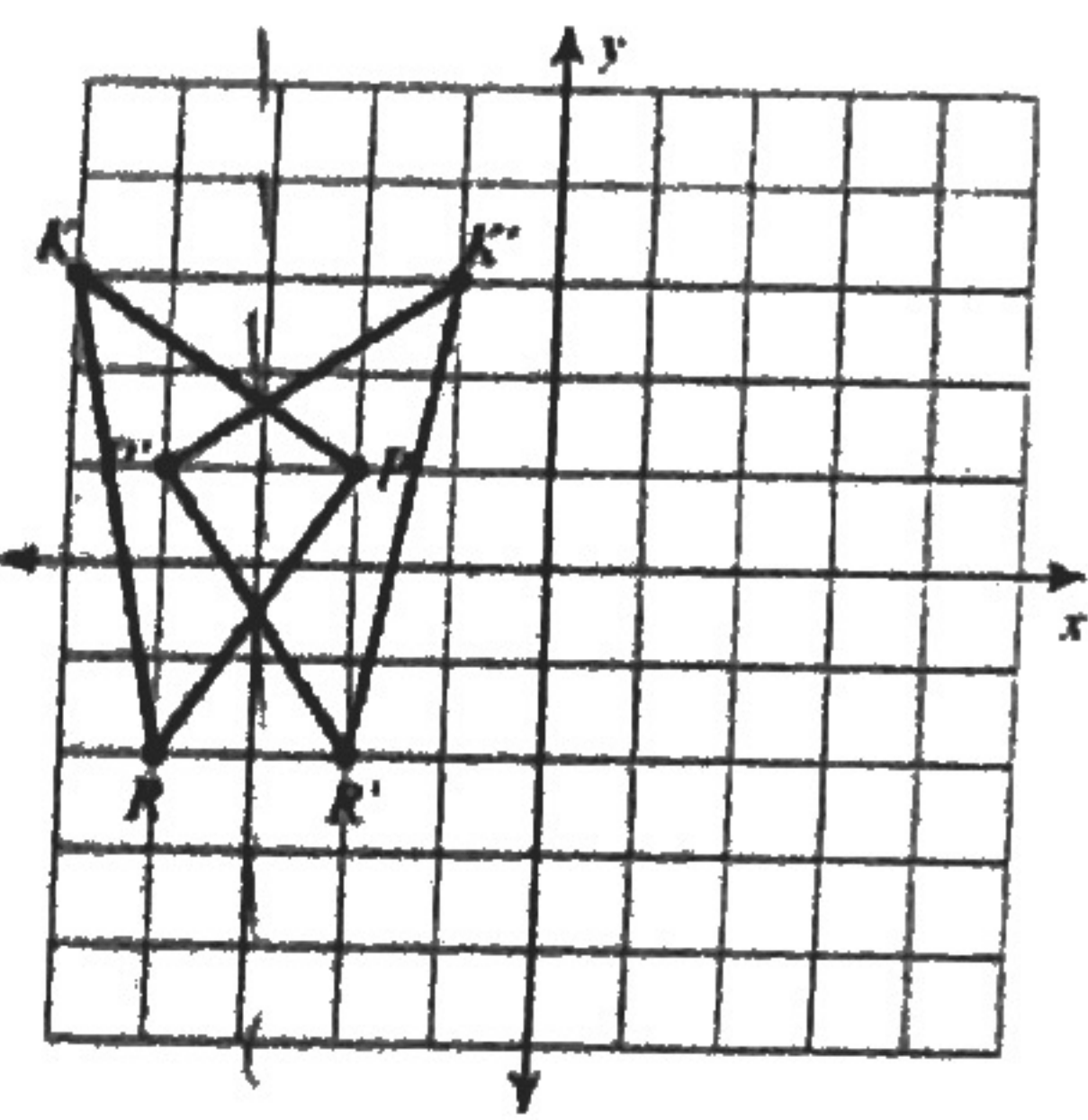
i. $(5, 0) \rightarrow (0, -5)$ $y = -x$

j. $(1, 6) \rightarrow (-1, 6)$ $x = 0$ (y-axis)

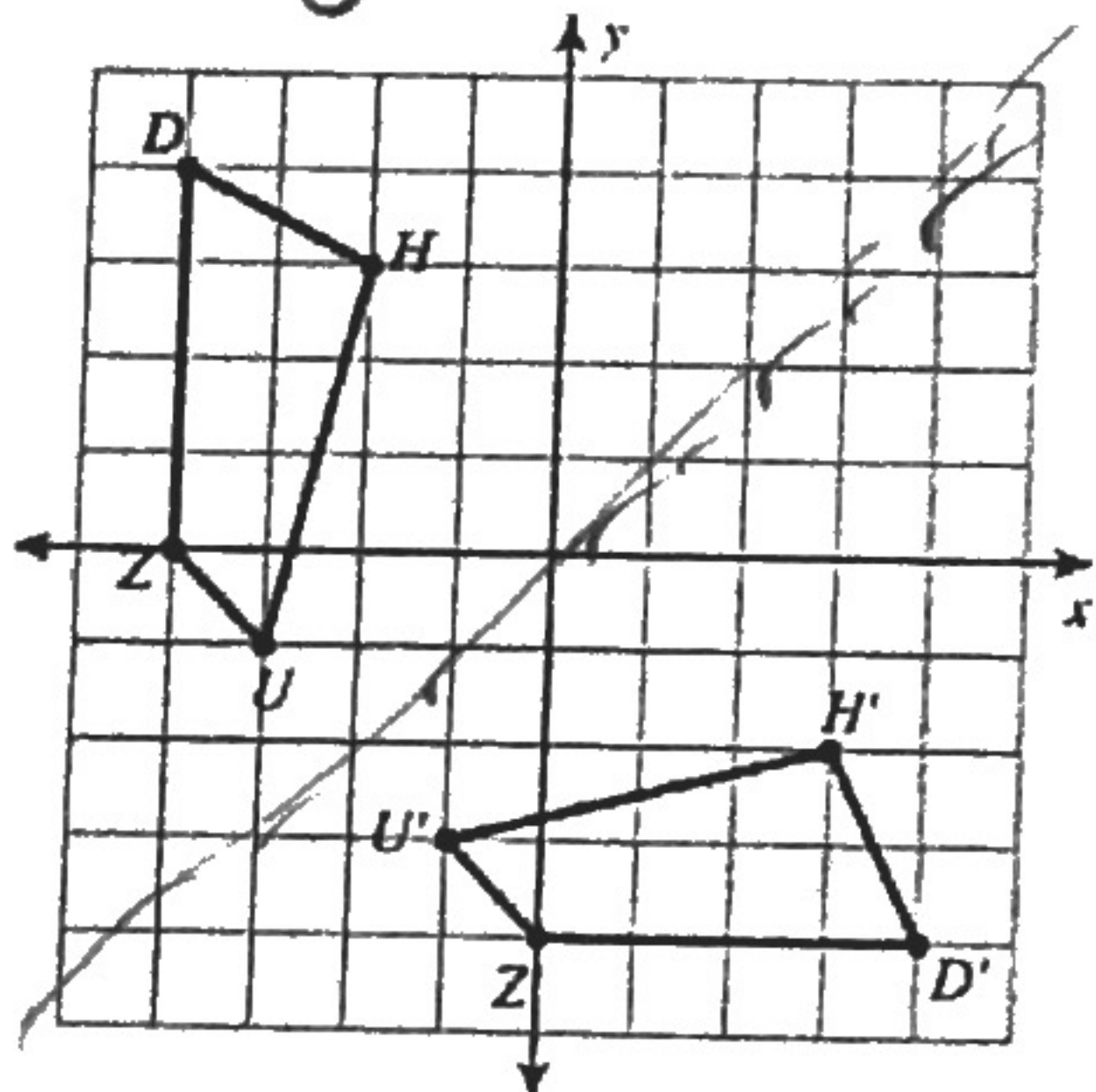
k. $(-2, 6) \rightarrow (-2, 8)$ $y = 7$

l. $(0, -4) \rightarrow (0, 4)$ $y = 0$ (x-axis)

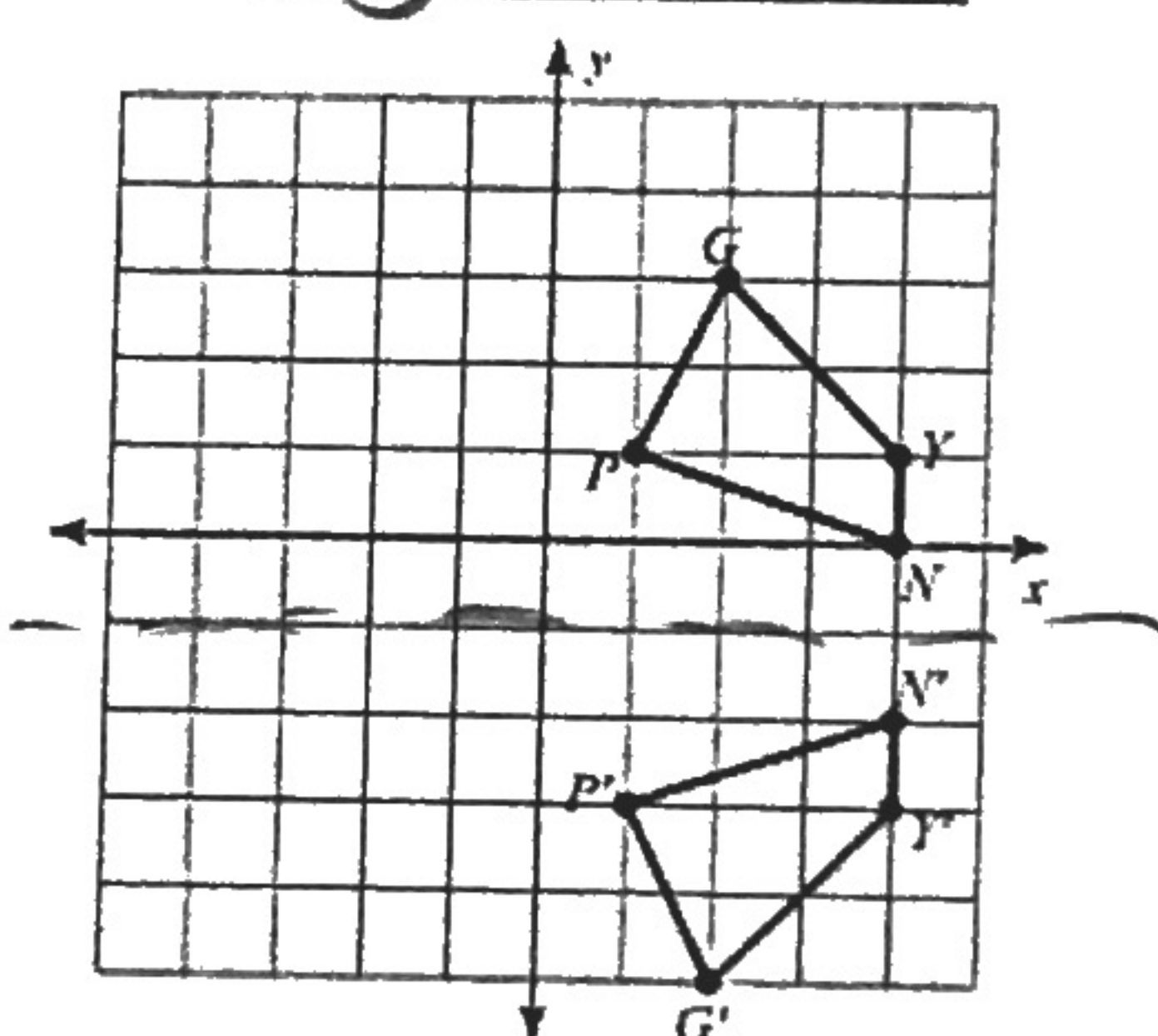
m. $x = -3$



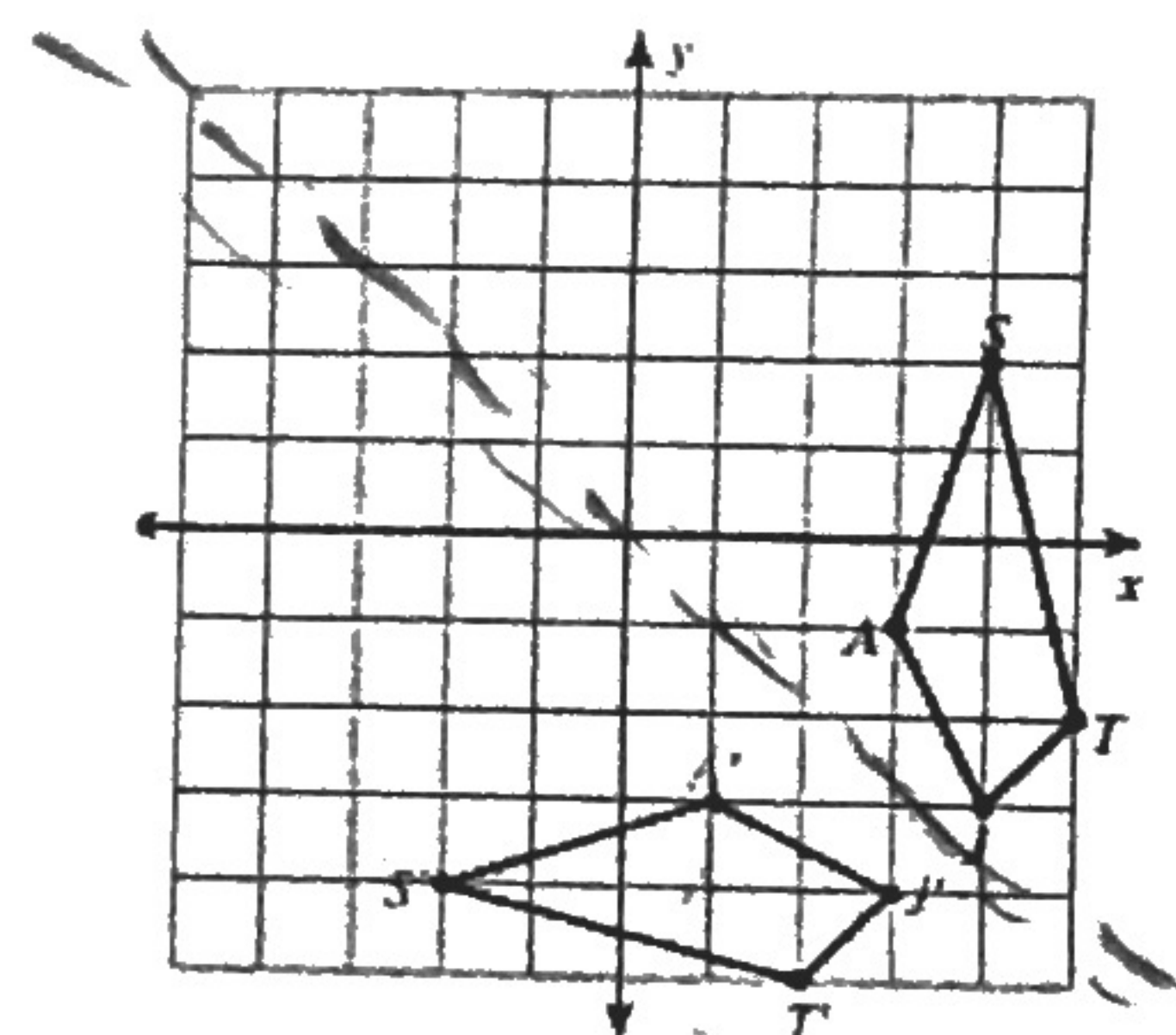
n. $y = x$



q. $y = -1$



p. $y = -x$



10. Reflect that point!! Write the equation of the line. If it's an axis, name that axis.

a. $(5, 2)$ in y-axis $(-5, 2)$
 $x = 0$

b. $(6, -3)$ in $y = -x$ $(3, -6)$

c. $(-3, 1)$ in $y = 2$ $(-3, 3)$

d. $(2, 0)$ in x-axis $(-2, 0)$
 $y = 0$

e. $(5, 7)$ in $x = 2$ $(-1, 7)$

f. $(4, -2)$ in $y = -x$ $(2, -4)$

g. $(5, 4)$ in $y = -1$ $(5, -6)$

h. $(5, 0)$ in $x = 7$ $(9, 0)$

i. $(1, 6)$ in $y = x$ $(6, 1)$

j. $(5, 5)$ in $y = x$ $(5, 5)$

11. Transform the preimage point as directed, then use that point in the next transformation.

Preimage Point
 $A(6, -2)$

Reflect over y-axis $x=0$
 $(-6, -2)$

Shift 5 left, 6 up
 $(-11, 4)$

Reflect over $x = -2$
 $(7, 4)$

Reflect over $y = x$
 $(4, 7)$

Shift down 3, right 1
 $(5, 3)$

IMAGE POINT:
 $A'(5, 3)$

Preimage Point
 $B(-2, 0)$

Reflect over $x = 0$
 $(2, 0)$

Shift right 10
 $(12, 0)$

Reflect over $y = 2$
 $(12, 4)$

Reflect over $y = -x$
 $(-4, -12)$

Shift up 2
 $(-4, -10)$

IMAGE POINT:
 $B'(-4, -10)$

Preimage Point
 $C(3, 1)$

Reflect over x-axis
 $(3, -1)$

Shift 10 right, 4 down
 $(13, -5)$

Reflect over $x = 3$
 $(-7, -5)$

Reflect over $y = -x$
 $(5, 7)$

Left 4
 $(1, 7)$

IMAGE POINT:
 $C'(1, 7)$

Check your answers before continuing!

Classify ΔABC .

$$AB = \sqrt{8^2 + 2^2}$$

$$= \sqrt{64 + 4}$$

$$= \sqrt{68}$$

$$BC = \sqrt{5^2 + 1^2}$$

$$= \sqrt{25 + 1}$$

$$= \sqrt{26}$$

$$CA = \sqrt{3^2 + 3^2}$$

$$= \sqrt{9 + 9}$$

$$= \sqrt{18}$$

$$68 \neq 26 + 18$$

$$68 > 44$$

scalene obtuse

Classify $\Delta A'B'C'$.

$$A'B' = \sqrt{9^2 + 13^2}$$

$$= \sqrt{81 + 169}$$

$$= \sqrt{250}$$

$$B'C' = \sqrt{5^2 + 17^2}$$

$$= \sqrt{314}$$

$$C'A' = \sqrt{4^2 + 4^2}$$

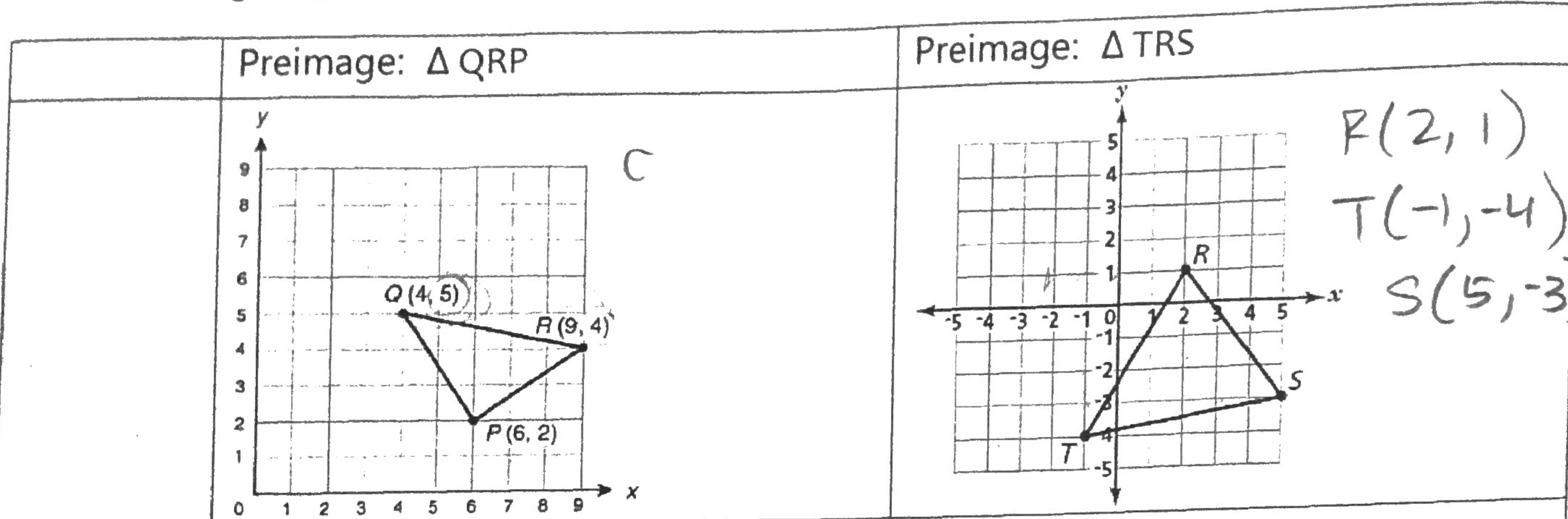
$$= \sqrt{32}$$

$$250 \neq 314 + 32$$

scalene acute

* Extra Practice!!

12. Transforming Triangles



Classify: Classify the triangles by its sides and angles.

Sides	$QR = \sqrt{12 + 52} = \sqrt{26}$ $RP = \sqrt{32 + 27} = \sqrt{13}$ $PQ = \sqrt{22 + 32} = \sqrt{13}$ ISOS.	$TR = \sqrt{52 + 32} = \sqrt{34}$ $RS = \sqrt{42 + 32} = \sqrt{25}$ $ST = \sqrt{12 + 62} = \sqrt{37}$ scalene
Angles	$26 \neq 13 + 13$ right	$37 \neq 25 + 34$ acute

Reflect: Write the coordinates of the vertices of the image after reflecting in the given line * Always use original

	$Q'(-4, 5)$ $R'(-9, 4)$ $P'(-6, 2)$	$T'(1, -4)$ $R'(-2, 1)$ $S'(-5, -3)$
y-axis		
$x = -2$	$Q'(-8, 5)$ $R'(-13, 4)$ $P'(-10, 2)$	$T'(-3, -4)$ $R'(-6, 1)$ $S'(-9, -3)$
$y = 0$	$Q'(4, -5)$ $R'(9, -4)$ $P'(6, -2)$	$T'(-1, 4)$ $R'(2, -1)$ $S'(5, 3)$
$y = x$	$Q'(5, 4)$ $R'(4, 9)$ $P'(2, 6)$	$T'(-4, -1)$ $R'(1, 2)$ $S'(-3, 5)$
$y = 6$	$Q'(5, 7)$ $R'(4, 8)$ $P'(2, 10)$	$T'(-4, 16)$ $R'(1, 11)$ $S'(-3, 15)$
$y = -2$	$Q'(5, -9)$ $R'(4, -8)$ $P'(2, -6)$	$T'(-4, 0)$ $R'(1, -5)$ $S'(-3, -1)$
$y = -x$	$Q'(-9, 4)$ $R'(-4, -9)$ $P'(-2, -6)$	$T'(4, 1)$ $R'(-1, -2)$ $S'(3, -5)$

Translations: Write the coordinates of the vertices of the image after translating as instructed: Always use original

$(x, y) \rightarrow (x - 1, y + 6)$	$Q'(3, 11)$ $R'(8, 10)$ $P'(5, 8)$	$T'(-2, 2)$ $R'(1, 7)$ $S'(4, 3)$
$(x, y) \rightarrow (x, y - 2)$	$Q'(4, 3)$ $R'(9, 2)$ $P'(6, 0)$	$T'(-1, -6)$ $R'(2, -1)$ $S'(5, -5)$
Right 5 units	$Q'(9, 5)$ $R'(14, 4)$ $P'(11, 2)$	$T'(4, -4)$ $R'(7, 1)$ $S'(10, -3)$
Left 4 units, up 7	$Q'(0, 12)$ $R'(5, 11)$ $P'(2, 9)$	$T'(-5, 3)$ $R'(-2, 8)$ $S'(1, 4)$