Trigonometry Chapter 1

Section 2

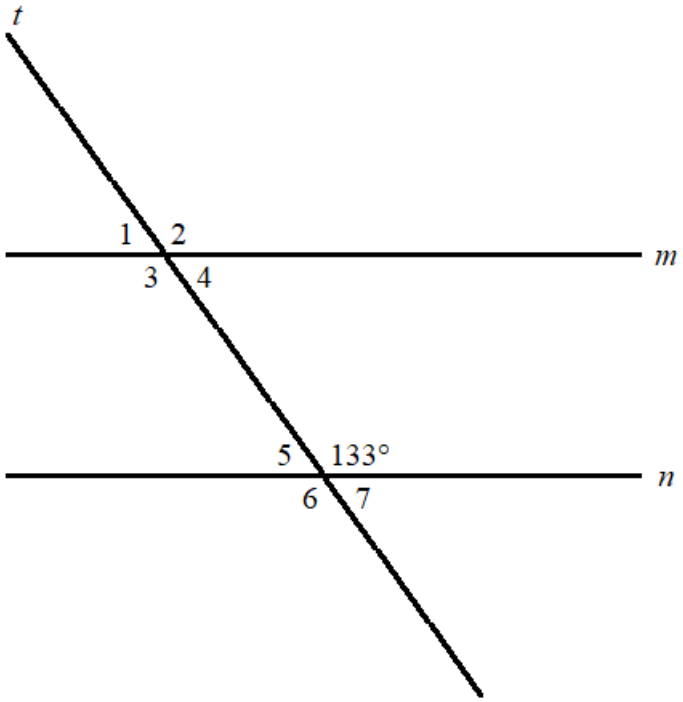
I. Vocabulary

Complete each statement:

1. When two _____ intersect, a pair of vertical angles are formed.
2. VERTICAL ANGLES have _____ measures.
3. Two lines that lie in the same plane and do not intersect are called _____ lines.
4. A line intersecting both of two parallel lines is called a _____.
5. If two parallel lines are crossed by a transversal CORRESPONDING ANGLES are _____.
6. The sum of the measures of the internal angles of any triangle is _____.
7. In any triangle, an external angle is equal to the sum of the measures of the _____ angles.
8. Two triangles are similar if their _____ angles are equal.
9. Two triangles are congruent if their _____ angles are equal and their _____ sides are equal.
10. In an ACUTE TRIANGLE all three angles are _____.
11. A RIGHT TRIANGLE contains one _____ angle.
12. An OBTUSE TRIANGLE contains one _____ angle.
13. An EQUILATERAL TRIANGLE has _____ sides congruent.
14. An ISOSCELES TRIANGLE has _____ sides congruent.
15. A SCALENE TRIANGLE has _____ sides congruent.

II. Given that lines *m* and *n* are parallel, find the measures of all the numbered angles.

Example:



Solution:

$\angle 2$ corresponds to the 133° angle so $\angle 2 = \boxed{133^\circ}$

$\angle 1 = 180 - \angle 2$

$= 180 - 133$

$= \boxed{47^\circ}$

$\angle 3 = \angle 2 = \boxed{133^\circ}$

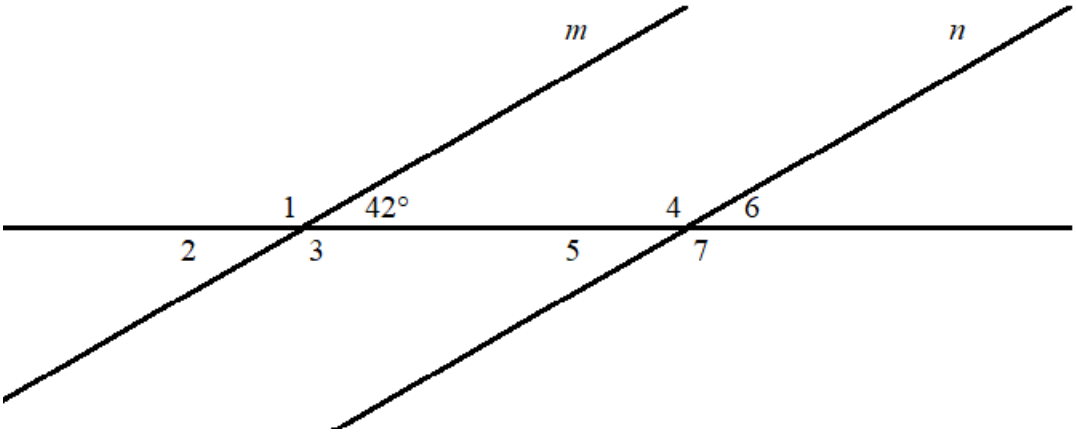
$\angle 4 = \angle 1 = \boxed{47^\circ}$

$\angle 5$ corresponds to $\angle 1$ so $\angle 5 = \boxed{47^\circ}$

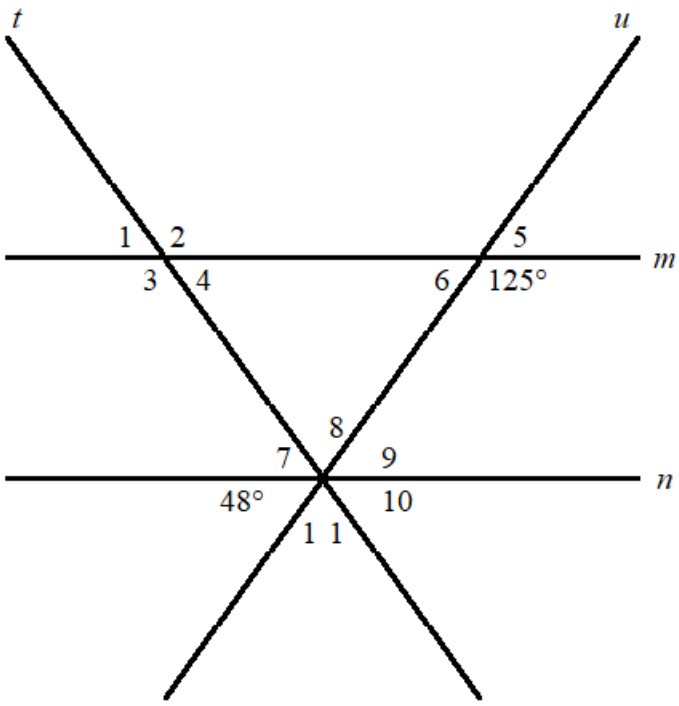
$\angle 6$ corresponds to $\angle 3$ so $\angle 6 = \boxed{133^\circ}$

$\angle 7$ is vertical to $\angle 5$ so $\angle 7 = \boxed{47^\circ}$

16.

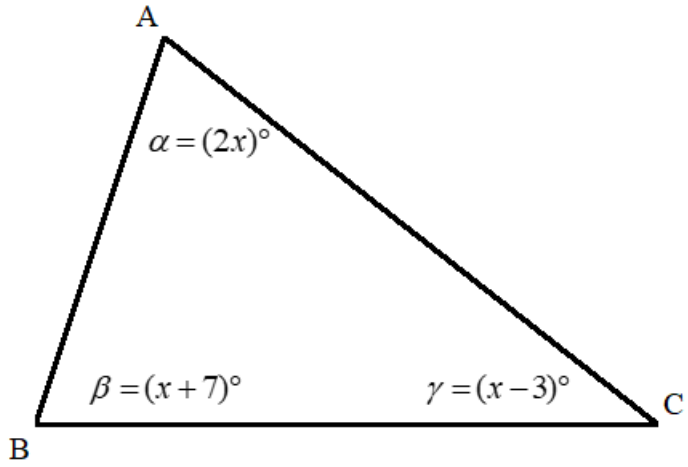


17.



III. For items #3 thru #16, find the measures of all the angles indicated with a Greek letter.

Example:



Solution:

$\alpha + \beta + \gamma = 180$

$\Rightarrow 2x + x + 7 + x - 3 = 180$

$\Rightarrow 4x + 4 = 180$

$\Rightarrow 4x = 176$

$\Rightarrow x = 44$

So we have

$\alpha = 2(44)$

$= \boxed{88°}$

$\beta = (44) + 7$

$\beta = \boxed{51}$

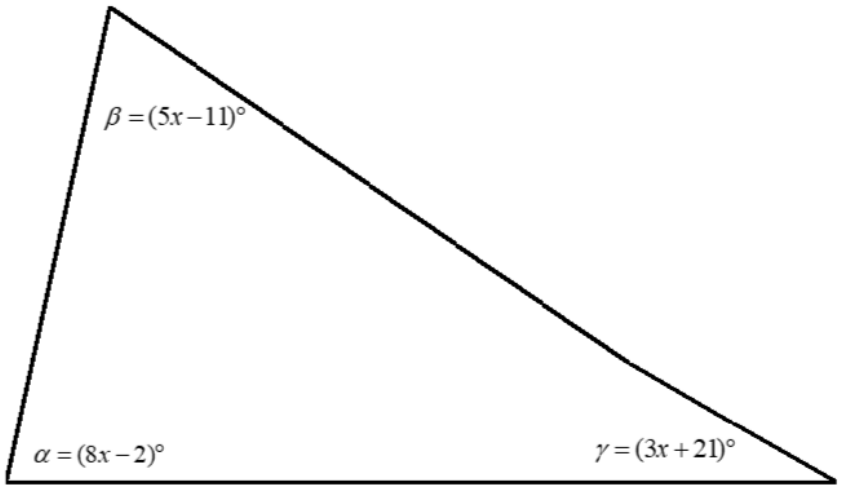
$\gamma = (44) - 3$

$\gamma = \boxed{41}$

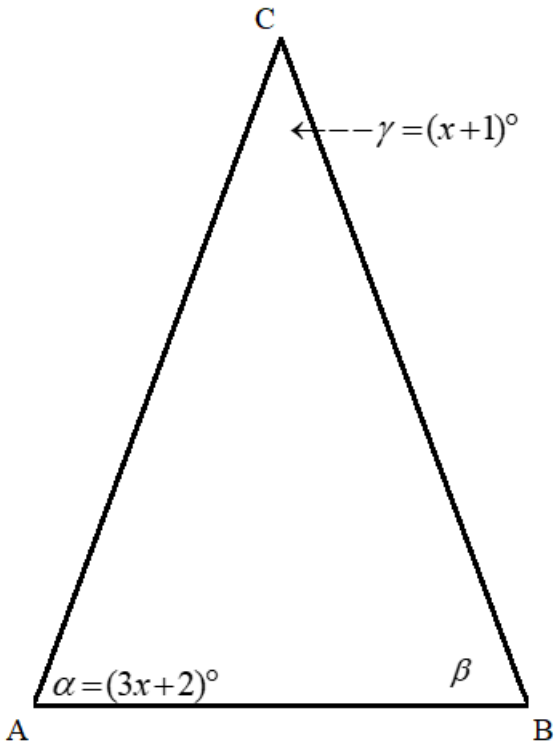
Check:

$88 + 51 + 41 = 180$ √

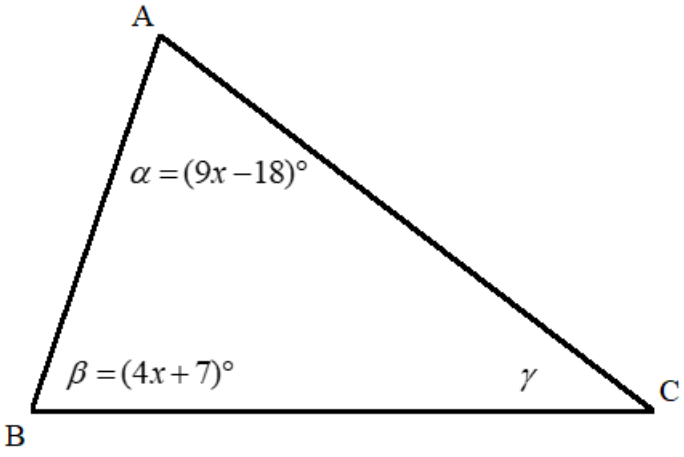
18.



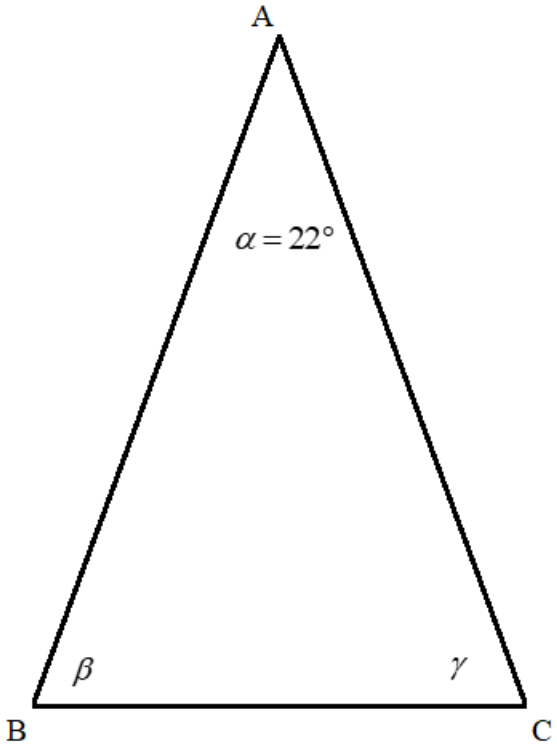
19. In ΔABC assume that $AC = BC$.



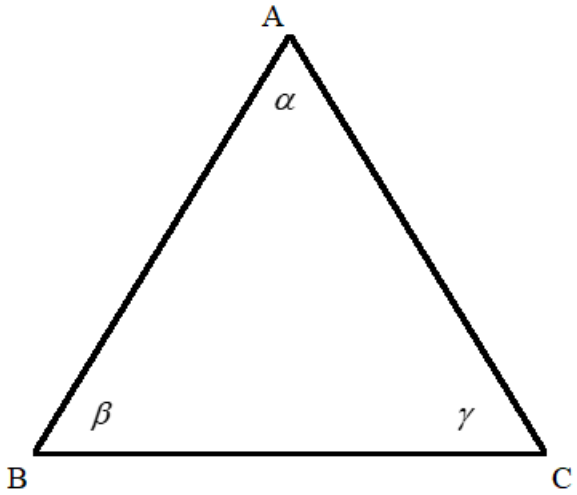
20. In ΔABC assume that $AC = BC$.



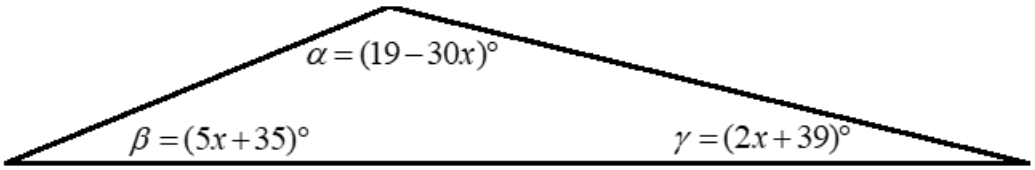
21. In ΔABC assume that $AC = BC$.



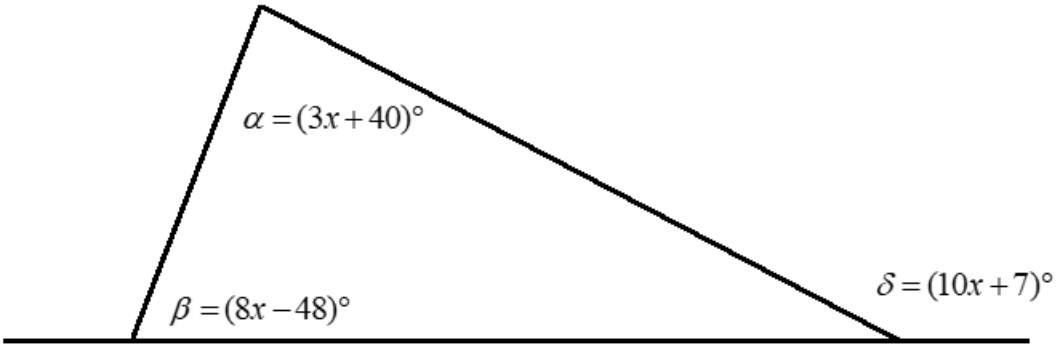
22. Assume ΔABC is an equilateral triangle.



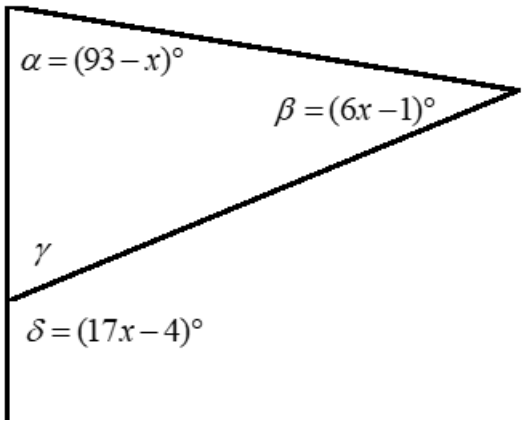
23.


$\alpha = (19 - 30x)°$
$\beta = (5x + 35)°$
$\gamma = (2x + 39)°$

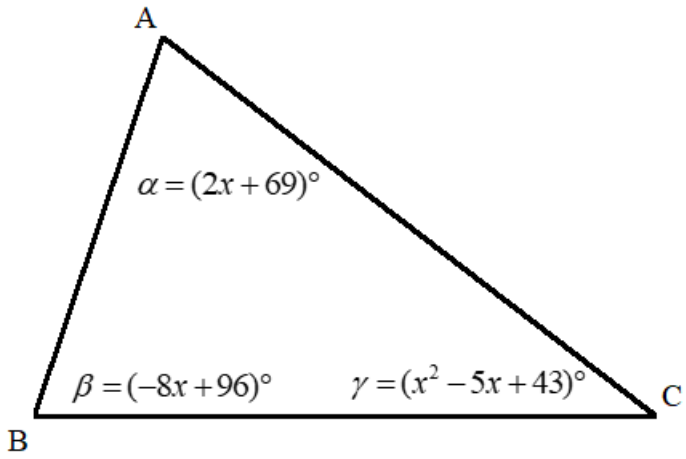
24.


$\alpha = (3x + 40)°$
$\beta = (8x - 48)°$
$\delta = (10x + 7)°$

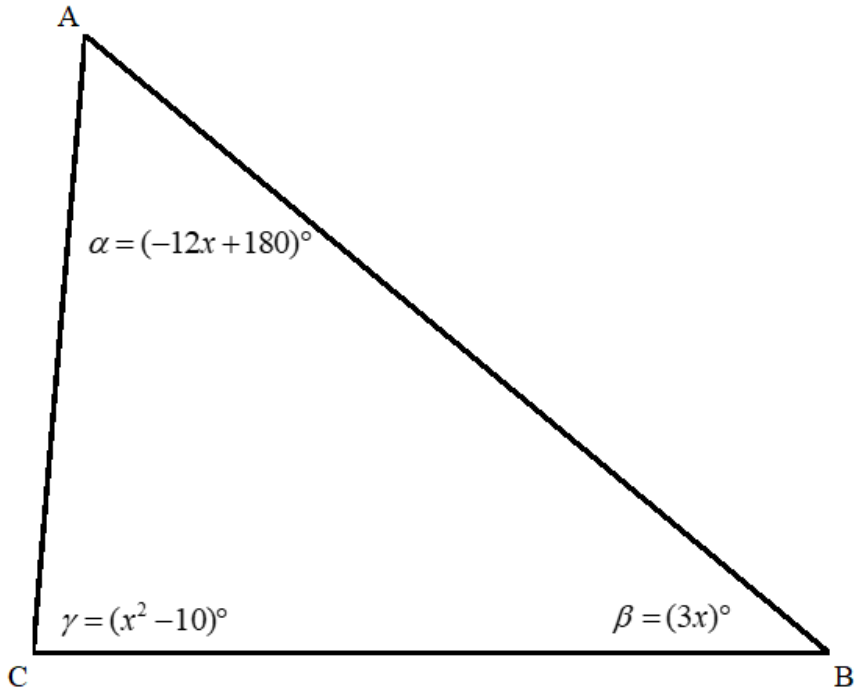
25.


$\alpha = (93 - x)°$
$\beta = (6x - 1)°$
γ
$\delta = (17x - 4)°$

26. For this item there are TWO solutions. List both of them.

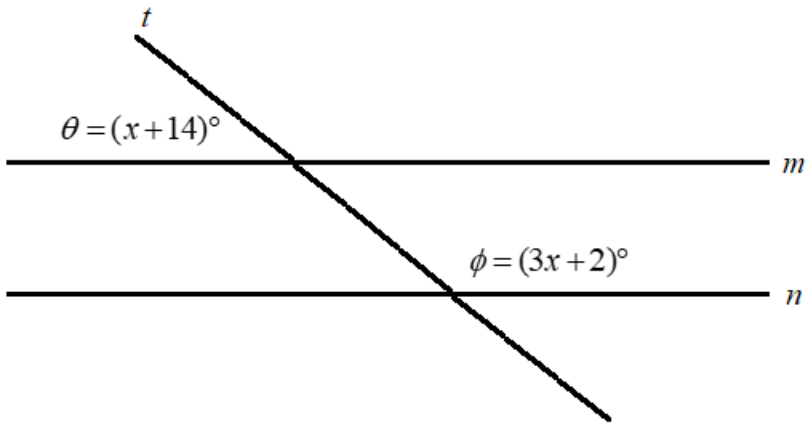


27. Note that for this item there is exactly one valid solution.



In items #28 thru #31 assume $m \parallel n$.

28.



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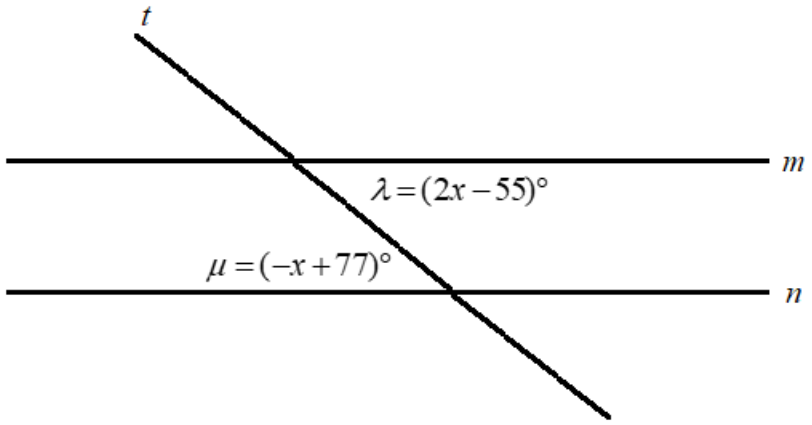
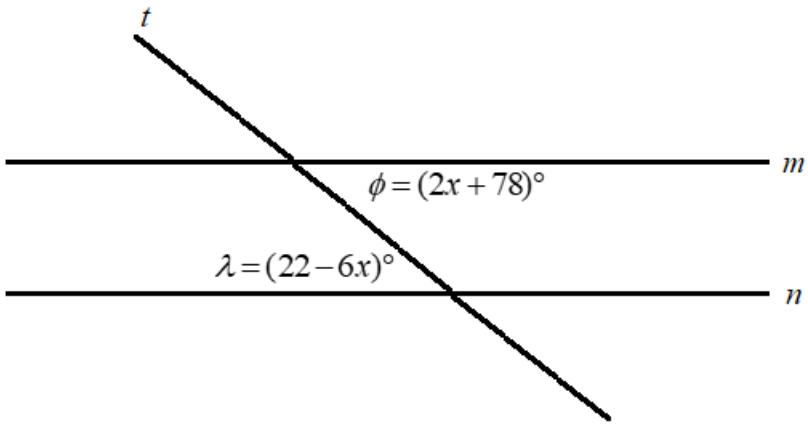
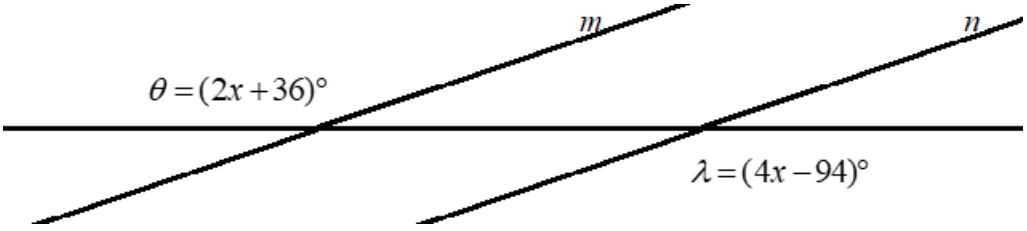

t
m
$\lambda = (2x - 55)°$
$\mu = (-x + 77)°$
n

30.

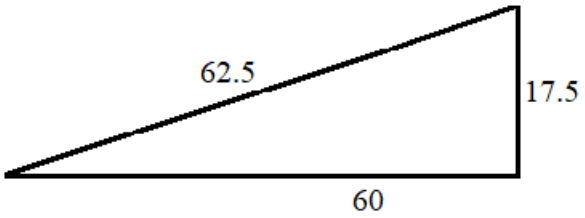

t
m
$\phi = (2x + 78)°$
$\lambda = (22 - 6x)°$
n

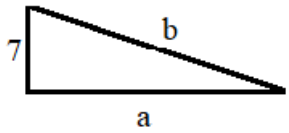
31.


m
n
$\theta = (2x + 36)°$
$\lambda = (4x - 94)°$

IIII. In items #32 thru #35 assume the given triangles are similar. Find the values of the sides indicated by the variables.

Example:





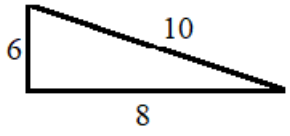
Solution:
Corresponding sides are proportional, so we have

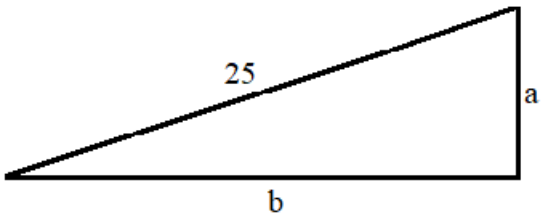
$$\frac{62.5}{b}=\frac{17.5}{7}$$
$$\Rightarrow 17.5b=(62.5)(7)$$
$$\Rightarrow 17.5b=437.5$$
$$\Rightarrow b=\frac{437.5}{17.5}$$
$$\Rightarrow b=\boxed{25}$$

Similarly

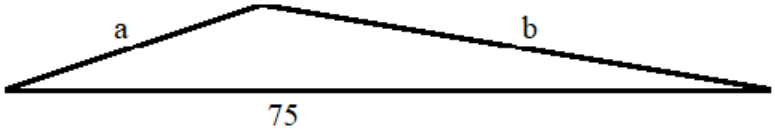
$$\frac{60}{a}=\frac{17.5}{7}$$
$$\Rightarrow 17.5a=(60)(7)$$
$$\Rightarrow 17.5a=420$$
$$\Rightarrow a=\frac{420}{17.5}$$
$$\Rightarrow a=\boxed{24}$$

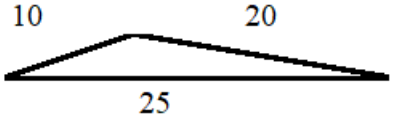
32.



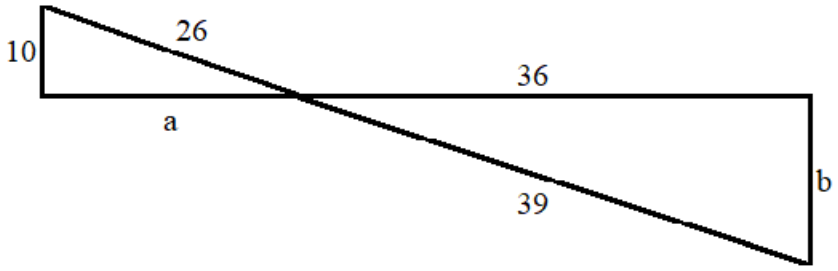


33.

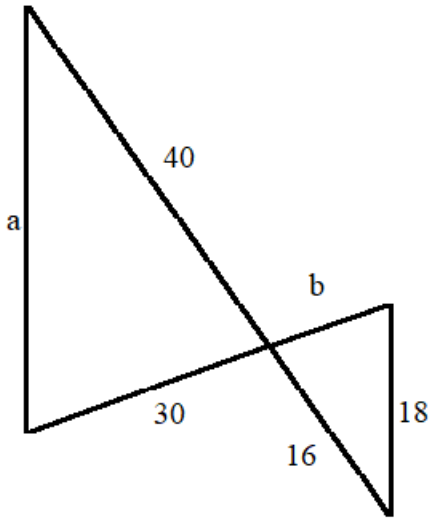




34.



35.



V. Example:

Assume that $\Delta ABC \sim \Delta PQR$ and $AC = 35\ ft$, $BC = 42\ ft$, $PR = 20\ ft$, $PQ = 36\ ft$.

Find the values of the remaining sides of both triangles.

Solution: (Other solutions are possible.)

Corresponding sides are proportional, so

Find AB:

$$\frac{AB}{AC} = \frac{PQ}{PR}$$

$$\Rightarrow \frac{AB}{35} = \frac{36}{20}$$

$$\Rightarrow AB(20) = (36)(35)$$

$$\Rightarrow AB = \frac{(36)(35)}{20}$$

$$\Rightarrow AB = \boxed{63}$$

Find QR:

$$\frac{QR}{PR} = \frac{BC}{AC}$$

$$\Rightarrow \frac{QR}{20} = \frac{42}{35}$$

$$\Rightarrow QR(35) = (42)(20)$$

$$\Rightarrow QR = \frac{(42)(20)}{35}$$

$$\Rightarrow QR = \boxed{24}$$

36. Assume that $\Delta ABC \sim \Delta PQR$ and $AB = 90\,in$, $QR = 24\,in$, $PR = 40\,in$, $PQ = 45\,in$.

Find the values of the remaining sides of both triangles.

37. Assume that triangles $\Delta ABC \,\&\, \Delta PQR$ are both isosceles ($JK = JL$ and $WX = WY$) and that they are similar to each other. Assume also that $XY = 15\,cm$, $JL = 30\,cm$, and $WX = 45.5\,cm$.
Find the values of the remaining sides of both triangles.

38. Assume that triangles $\Delta ABC \,\&\, \Delta DEF$ are both equilateral and that $BC = 83.4\,m$. Assume also that side DE is 4.5 times longer than side CA.
Find the values of the remaining sides of both triangles.

39. Assume that $\Delta ABC \sim \Delta LMN$, and that $\angle C = \angle N = 90°$. If $AB = 365\,cm$, $LM = 18.25\,cm$, and $NM = 13.75\,cm$.
Find the values of the remaining sides of both triangles.

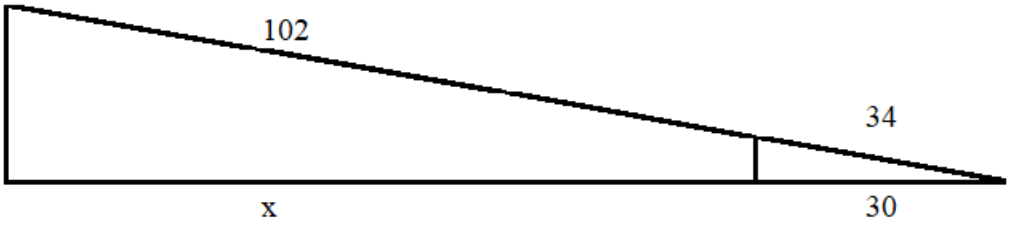
40. At 2PM, a flagpole casts a shadow $45\,ft$ long while a Dalmatian dog which is $2\,ft$ tall casts a $3\,ft$ long. How tall is the flagpole?

41. While standing nest to a lighthouse on the beach, Kelly (who is 5.5 feet tall) casts a shadow which is $23.1\,ft$ long. If the lighthouse is $81\,ft$ high, how long is its shadow?

42. A barn casts a shadow $11.12\,m$. At the same time a cow standing next to the barn casts a $1.36\,m$ shadow. If the cow is $1.7\,m$ high, how tall is the barn?

VI. In each figure there are two similar triangles and various measurements are given. Find the length of the unknown value, rounding your results to the nearest tenth of a unit.

Example:

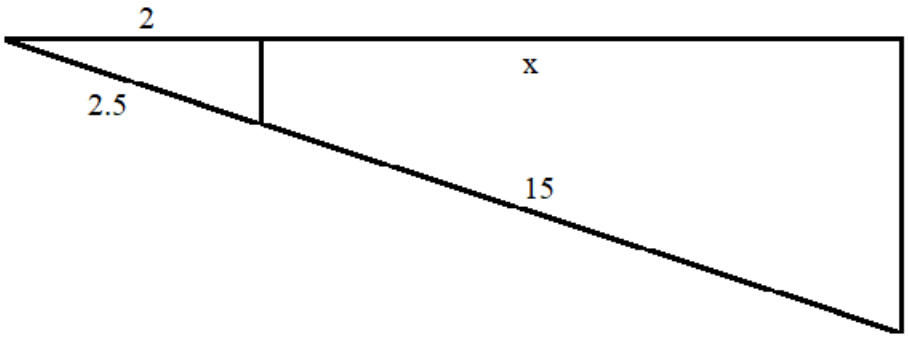


Solution: (Other solutions are possible.)
The sides are proportional so we have

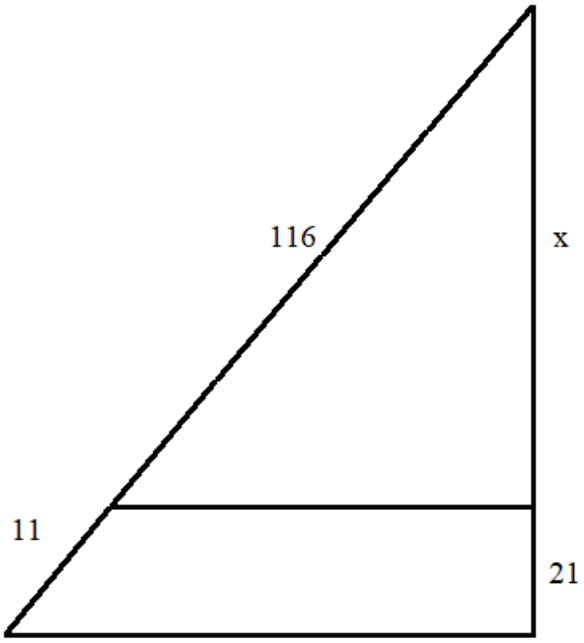
$$\frac{102}{34} = \frac{x}{30} \qquad \Rightarrow 34x = 3060$$

$$\Rightarrow 34x = (102)(30) \qquad \Rightarrow x = \frac{3060}{30} = \boxed{102}$$

43.



44.



* * *answers will be listed here* * *