

4

$\angle g = \underline{\hspace{2cm}}$

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5

$\angle h = \underline{100^\circ}$

$180 + 82$

$180 - 98 = 82$

$180 - 162 = 18$

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6

$\angle i = \underline{63 + 51 = 114^\circ}$

$117^\circ$

$129^\circ$

$63^\circ$

$51^\circ$

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7

$\angle j = \underline{92^\circ}$

$\angle k = \underline{42^\circ}$

$\angle m = \underline{46^\circ}$

$92 + k + 46 = 180$

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8

$n = \underline{180 - 99 = 81^\circ}$

$44^\circ$

$37^\circ$

$n$

$44^\circ$

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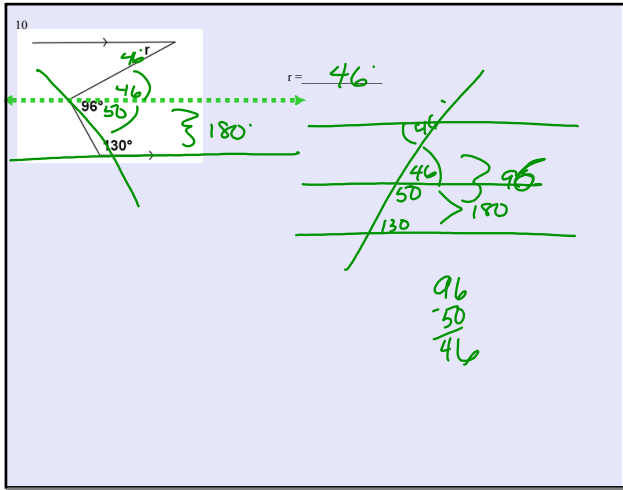
9

$p = \underline{18^\circ}$

$q = \underline{94^\circ}$

$94 + p + 68 = 180$

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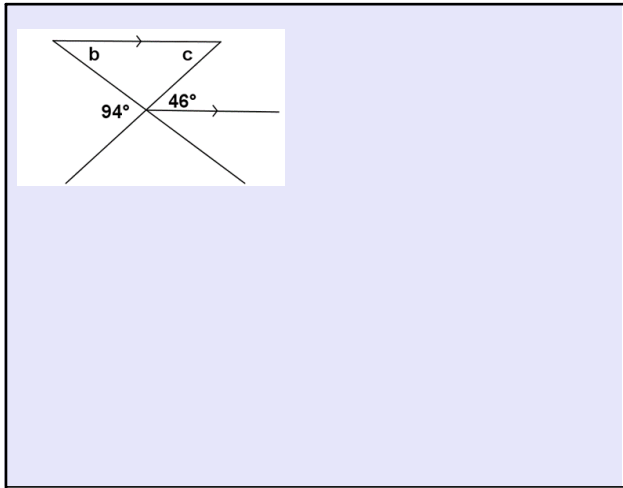


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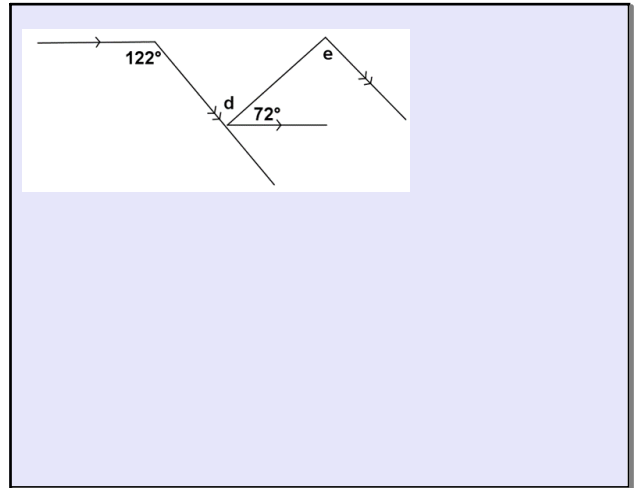
**Problem Set**  
 Find the unknown (labeled) angles. Give reasons for your solutions.

Diagram for Problem Set showing a zigzag line between three parallel horizontal lines. The top-left angle is  $110^\circ$ , the top-right angle is  $80^\circ$ , and the bottom-left angle is  $a$ . A large arc indicates a  $310^\circ$  angle.

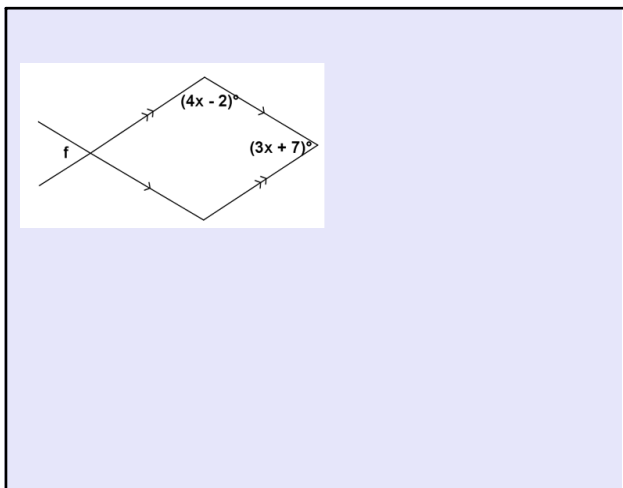
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homework

$x = \underline{\hspace{2cm}}$   
 $y = \underline{\hspace{2cm}}$   
 $z = \underline{\hspace{2cm}}$

Diagram for homework showing a zigzag line between three parallel horizontal lines. The top-left angle is  $(\frac{6}{5}x + 10)$ , the middle angle is  $y$ , the bottom angle is  $z$ , and the bottom-right angle is  $(2x - 14)$ .

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12/1 Aim: Angle in a triangle  
 Do now: Opening exercise and answer the questions in the discussion  
 Homework: Exit ticket  
 Quiz in Lab Thursday or Friday

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Opening Exercise  
 Find the measure of angle  $x$  in the figure to the right.  
 Explain your calculations.  
 (Hint: Draw an auxiliary line segment.)

$x = 37^\circ$

$$\begin{array}{r} 72 \\ - 35 \\ \hline 37 \end{array}$$

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Discussion  
 The sum of the 3 angle measures of any triangle is 180°.

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Interior of a Triangle: A point lies in the *interior* of a triangle if it lies in the interior of each of the angles of the triangle.

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**very important**  
 In any triangle, the measure of the exterior angle is equal to the sum of the measures of the opposite interior angles.  
 These are sometimes also known as remote interior angles.

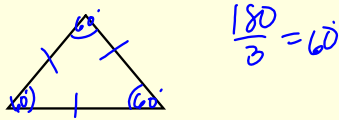
$1 = 2 + 3$

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Base angles of an isosceles triangle are equal in measure.

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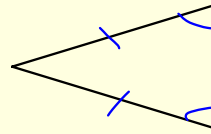
Each angle of an equilateral triangle has a measure equal to  $60^\circ$ .



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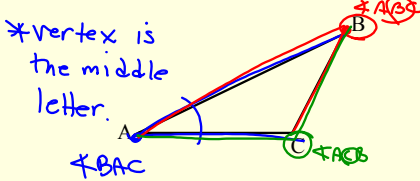
**Relevant Vocabulary**

**Isosceles Triangle:** An *isosceles triangle* is a triangle with at least two sides of equal length.



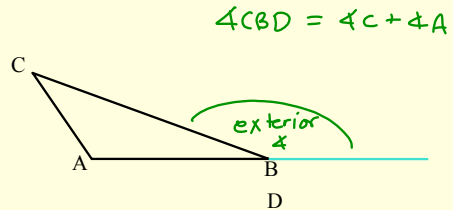
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**Angles of a Triangle:** Every triangle  $\triangle ABC$  determines three angles, namely,  $\angle BAC$ ,  $\angle ABC$ , and  $\angle ACB$ . These are called the *angles of  $\triangle ABC$* .



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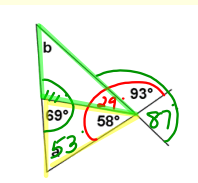
**Exterior Angle of a Triangle:** Let  $\angle ABC$  be an interior angle of a triangle  $\triangle ABC$ , and let  $D$  be a point on  $AB$  such that  $B$  is between  $A$  and  $D$ . Then  $\angle CBD$  is an *exterior angle of the triangle  $\triangle ABC$* .



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**Exercises**

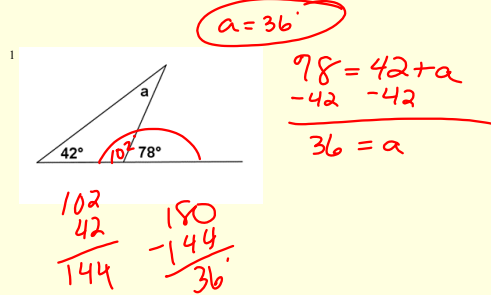
1. Find the measures of  $a$  and  $b$  in the figure to the right. Justify your results.



$$\begin{array}{r} 69 \\ 58 \\ \hline 127 \end{array} \quad \begin{array}{r} 180 \\ -127 \\ \hline 53 \end{array} \quad \begin{array}{r} \angle a = 53^\circ \\ \angle b = 40^\circ \\ 111 \\ 29 \quad 180 \\ \hline 140 \quad -140 \\ \hline 40 \end{array}$$

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In each figure, determine the measures of the unknown (labeled) angles. Give reasons for your calculations.



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2

$180 - 136 = 44$   
 $180 - 44 = 136$   
 $\angle b = 68 + 68 = 136$   
 $\angle b = 136$

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3

$180 - 95 = 85$   
 $180 - 85 = 95$   
 $180 - 64 = 116$   
 $116 - 85 = 31$   
 $90 - 64 = 26$   
 $180 - 154 = 26$   
 $\angle c = 26$   
 $\angle d = 31$

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4

$180 - 115 = 65$   
 $\angle e = 51$   
 $180 - 81 = 99$   
 $180 - 99 = 81$   
 $180 - 30 = 150$   
 $150 - 99 = 51$

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5

$180 - 102 = 78$   
 $102 - 48 = 54$   
 $180 - 78 = 102$   
 $102 - 78 = 24$   
 $102 - 48 = 54$   
 $54 + 48 = 102$   
 $f = 30$

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6

$180 - 37 = 143$   
 $\angle g = 143$   
 $94 - 57 = 37$

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7

$h = 180 - 53 = 127$

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8

$125^\circ$   
 $i$   
 $115^\circ$   
 $125$   
 $55$   
 $60$   
 $i = 60$

$\frac{55}{65}$   
 $\frac{120}{120}$   
 $180$   
 $-120$   
 $i = 60$

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9

$5x - 3$   
 $4x - 2$   
 $j$   
 $10x - 20$   
 $10(15) - 20$   
 $130$   
 $30$

$10x - 20 = 5x - 3 + 4x - 2$   
 $10x - 20 = 9x - 5$   
 $x = 15$

$j = 180$   
 $-130$   
 $\frac{50}{50}$

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10

$56^\circ$   
 $62$   
 $62$   
 $56$   
 $62$

$180$   
 $-56$   
 $\frac{124}{2} = 62$   
 $180$   
 $-124$

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**Problem Set**

Find the unknown (labeled) angle in each figure. Justify your calculations.

1

$95^\circ$   
 $39^\circ$   
 $a$

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2

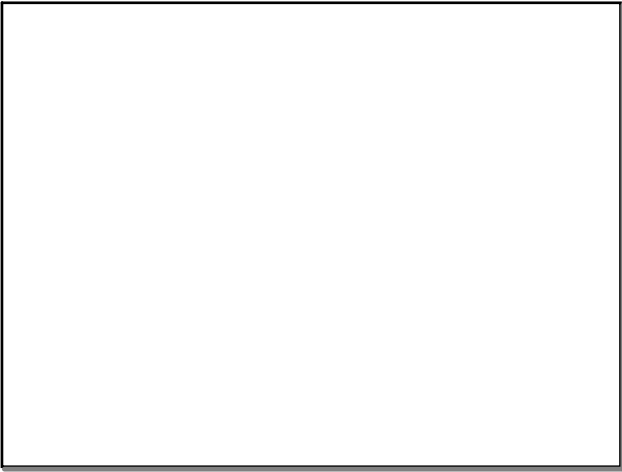
$58^\circ$   
 $b$

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3

$2x + 9$   
 $3x - 1$   
 $c$   
 $42^\circ$   
 $x + 12$

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Nov 20-2:00 PM