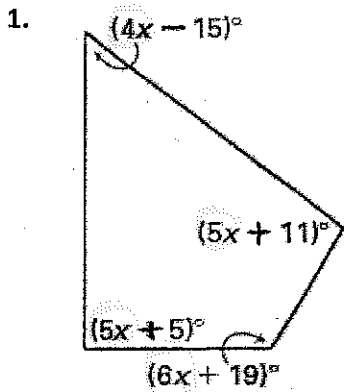
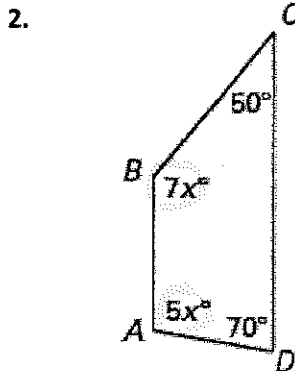


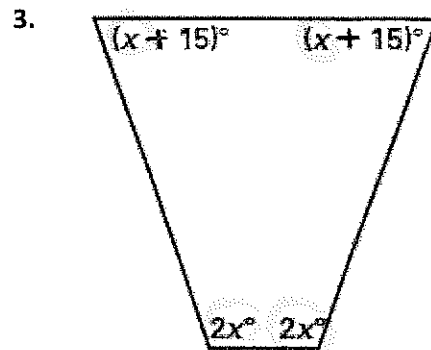
Quadrilaterals – The sum of the measures of the interior angles of a quadrilateral is  $360^\circ$ .



$$\begin{aligned} 20x + 20 &= 360 \\ -20 &\quad -20 \\ \hline 20x &= 340 \\ \frac{20x}{20} &= \frac{340}{20} \\ x &= 17 \end{aligned}$$



$$\begin{aligned} 12x + 120 &= 360 \\ -120 &\quad -120 \\ \hline 12x &= 240 \\ \frac{12x}{12} &= \frac{240}{12} \\ x &= 20 \end{aligned}$$

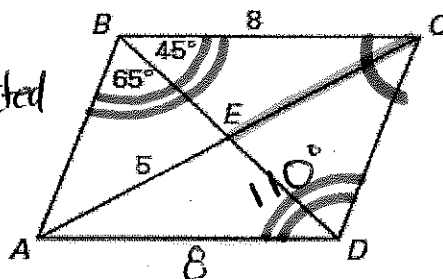


$$\begin{aligned} 6x + 30 &= 360 \\ -30 &\quad -30 \\ \hline 6x &= 330 \\ \frac{6x}{6} &= \frac{330}{6} \\ x &= 55 \end{aligned}$$

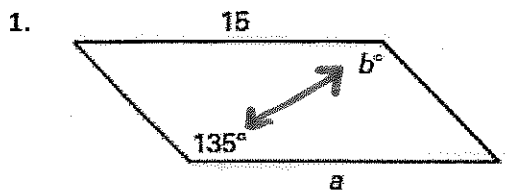
<b>Parallelogram</b>		<ul style="list-style-type: none"> <li>• Opposite sides are parallel</li> <li>• Opposite sides are congruent</li> <li>• Opposite angles are congruent</li> <li>• Consecutive angles are supplementary</li> <li>• Diagonals bisect each other</li> </ul>
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Example: ABCD is a parallelogram. Find the lengths and angle measures:

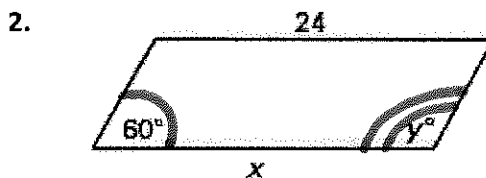
- a. AD 8 opp sides  $\cong$   
 b. EC 5 diagonals are bisected  
 c.  $m\angle ADC$   $110^\circ$   
 opp  $\angle$ s  $\cong$   
 d.  $m\angle BCD$   $70^\circ$   
 consec.  $\angle$ s supp.



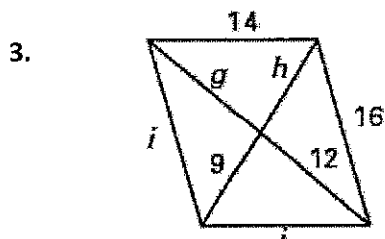
Given the following are parallelograms, find the missing lengths and angle measures:



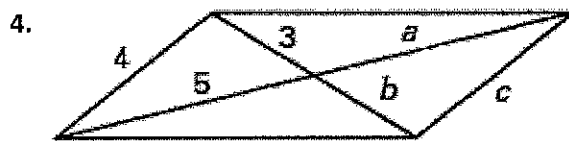
$a = 15$  opp sides  $\cong$   
 $b = 135^\circ$  opp  $\angle$ s  $\cong$



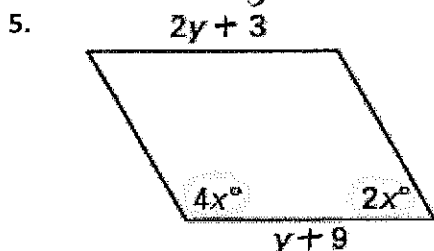
$x = 24$  opp sides  $\cong$   
 $y = 120^\circ$  consec.  $\angle$ s supp.



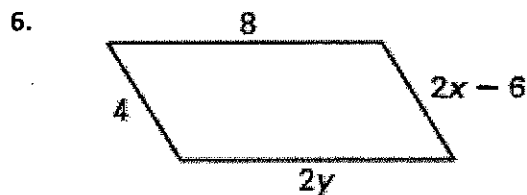
$i = 16$  opp sides  $\cong$   
 $j = 14$  opp sides  $\cong$   
 $g = 12$  diagonals bisected  
 $h = 9$  diagonals bisected



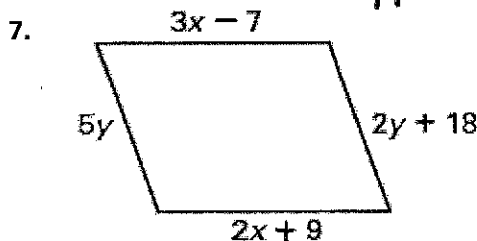
$a = 5$  diagonals bisected  
 $b = 3$  diagonals bisected  
 $c = 4$  opp sides  $\cong$



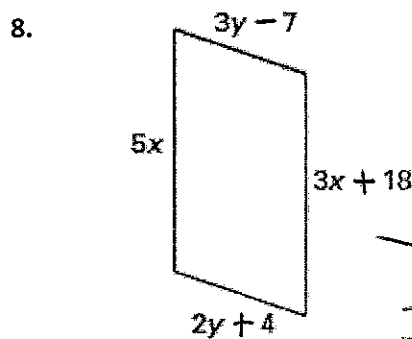
$4x + 2x = 180$   
 $6x = 180$   
 $x = 30$   
 consec.  $\angle$ 's supp.  
 $2y + 3 = y + 9$   
 $-y \quad -y$   
 $y + 3 = 9$   
 $-3 \quad -3$   
 $y = 6$   
 opp sides  $\cong$



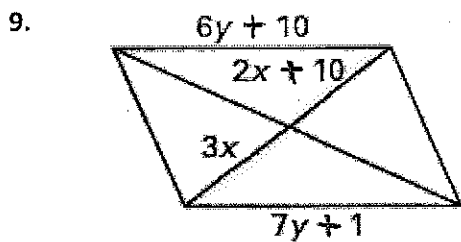
$2x - 6 = 4$   
 $+6 \quad +6$   
 $\frac{2x}{2} = \frac{10}{2}$   
 $x = 5$   
 opp sides  $\cong$   
 $2y = 8$   
 $\frac{2y}{2} = \frac{8}{2}$   
 $y = 4$   
 opp sides  $\cong$



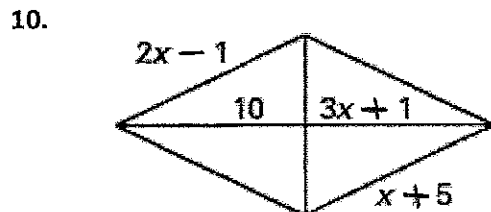
$3x - 7 = 2x + 9$   
 $-2x \quad -2x$   
 $x - 7 = 9$   
 $+7 \quad +7$   
 $x = 16$   
 opp sides  $\cong$   
 $5y = 2y + 18$   
 $-2y \quad -2y$   
 $3y = 18$   
 $\frac{3y}{3} = \frac{18}{3}$   
 $y = 6$   
 opp sides  $\cong$



$5x = 3x + 18$   
 $-3x \quad -3x$   
 $\frac{2x}{2} = \frac{18}{2}$   
 $x = 9$   
 opp sides  $\cong$   
 $3y - 7 = 2y + 4$   
 $-2y \quad -2y$   
 $y - 7 = 4$   
 $+7 \quad +7$   
 $y = 11$   
 opp sides  $\cong$



$3x = 2x + 10$   
 $-2x \quad -2x$   
 $x = 10$   
 diagonals are bisected  
 $6y + 10 = 7y + 1$   
 $-6y \quad -6y$   
 $10 = y + 1$   
 $-1 \quad -1$   
 $9 = y$   
 opp sides  $\cong$



$3x + 1 = 10$   
 $-1 \quad -1$   
 $\frac{3x}{3} = \frac{9}{3}$   
 $x = 3$   
 diagonals are bisected  
 $2x - 1 = x + 5$   
 $-x \quad -x$   
 $x - 1 = 5$   
 $+1 \quad +1$   
 $x = 6$   
 opp sides  $\cong$

<b>Rectangle</b>		<ul style="list-style-type: none"> <li>• Parallelogram</li> <li>• 4 right angles</li> <li>• Diagonals are congruent</li> </ul>
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The following figures are rectangles. What is the value of x?

1. 
$$\begin{array}{r}
 5x-13 = 2x+17 \\
 -2x+13 \quad -2x+13 \\
 \hline
 3x = 30 \quad x = 10
 \end{array}$$

2. 
$$\begin{array}{r}
 8x-13 = 7x+11 \\
 -7x+13 \quad -7x+13 \\
 \hline
 x = 24
 \end{array}$$

3. 
$$\begin{array}{r}
 x+40 = 90 \\
 -40 \quad -40 \\
 \hline
 x = 50
 \end{array}$$

4. 
$$\begin{array}{r}
 3x = 90 \\
 \frac{3x}{3} = \frac{90}{3} \\
 x = 30
 \end{array}$$

5. 
$$\begin{array}{r}
 5x-7 = 2x+14 \\
 -2x \quad -2x \\
 \hline
 3x-7 = 14 \\
 +7 \quad +7 \\
 \hline
 3x = 21 \\
 \frac{3x}{3} = \frac{21}{3} \quad x = 7
 \end{array}$$

6. 
$$\begin{array}{r}
 2x+5 = 4x-13 \\
 -2x+13 \quad -2x+13 \\
 \hline
 18 = 2x \\
 \frac{18}{2} = \frac{2x}{2} \\
 9 = x
 \end{array}$$

<b>Rhombus</b>		<ul style="list-style-type: none"> <li>• Parallelogram</li> <li>• 4 congruent sides</li> <li>• Diagonals are perpendicular <math>\perp</math></li> <li>• Diagonals bisect opposite angles</li> </ul>
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The following figures are a rhombus. What is the value of x?

1. 
$$\begin{array}{r}
 4x-5 = 2x+17 \\
 -2x+5 \quad -2x+5 \\
 \hline
 2x = 22 \\
 \frac{2x}{2} = \frac{22}{2} \\
 x = 11
 \end{array}$$

2. 
$$\begin{array}{r}
 3x = 90 \\
 \frac{3x}{3} = \frac{90}{3} \\
 x = 30
 \end{array}$$

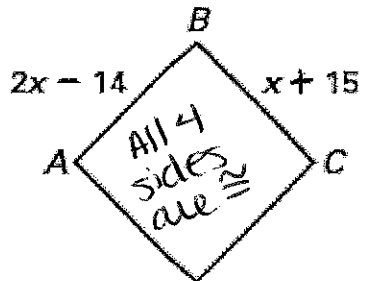
diagonals are  $\perp$

3. 
$$\begin{array}{r}
 x+2 = 3x \\
 -x \quad -x \\
 \hline
 2 = 2x \\
 \frac{2}{2} = \frac{2x}{2} \\
 1 = x
 \end{array}$$

<b>Square</b>		<ul style="list-style-type: none"> <li>• Parallelogram</li> <li>• 4 congruent sides</li> <li>• 4 congruent angles (right angles)</li> <li>• Diagonals bisect opposite angles</li> <li>• Diagonals are perpendicular</li> <li>• Diagonals are congruent</li> </ul>
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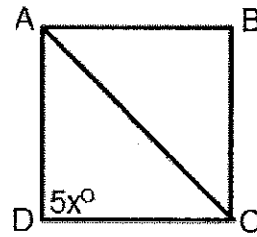
The following figures are squares. What is the value of  $x$ ?

1.



$$\begin{array}{r}
 2x - 14 = x + 15 \\
 -x \quad \quad -x \\
 \hline
 x - 14 = 15 \\
 +14 \quad +14 \\
 \hline
 x = 29
 \end{array}$$

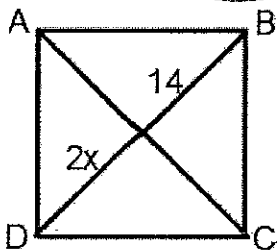
2.



All 4 angles are  $90^\circ$

$$\begin{array}{r}
 5x = 90 \\
 \frac{5x}{5} = \frac{90}{5} \\
 x = 18
 \end{array}$$

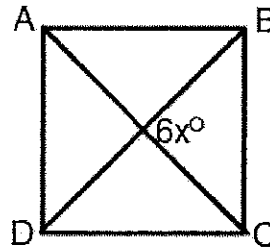
3.



diagonals are bisected.

$$\begin{array}{r}
 2x = 14 \\
 \frac{2x}{2} = \frac{14}{2} \\
 x = 7
 \end{array}$$

4.



diagonals are  $\perp$ .

$$\begin{array}{r}
 6x = 90 \\
 \frac{6x}{6} = \frac{90}{6} \\
 x = 15
 \end{array}$$