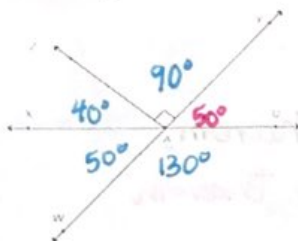
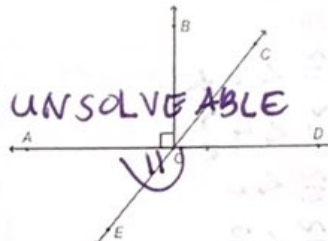


**Warm-up 1:** Find all angle measures. Note that these two figures are not related.

a)



b)



**Warm-up 2:** What do you know about a triangle?

Triangle classification by angle measure			Triangle classification by number of congruent sides		
<b>Acute Triangle:</b> All interior angles of the triangle are less than $90^\circ$	<b>Obtuse Triangle:</b> One interior angle of the triangle is greater than $90^\circ$	<b>Right Triangle:</b> One interior angle of the triangle is equal to $90^\circ$	<b>Scalene Triangle:</b> None of the sides of the triangle are congruent	<b>Isosceles Triangle:</b> Two sides of the triangle are congruent	<b>Equilateral Triangle:</b> All three sides of the triangle are congruent

**Proof of the Angle Sum Theorem:**

The sum of the angle measures of a triangle is $180^\circ$	
Statement	Reason
1. $\triangle ABC$	1. Given
2. Construct line $l \parallel \overline{AB}$	2. Parallel Postulate
3. $\angle 1 + \angle 2 + \angle 3 = 180^\circ$	3. Linear
4. $\angle 1 \cong \angle A$ , $\angle 3 \cong \angle B$	4. Alternate Interior Angle
5. $\angle A + \angle B + \angle C = 180^\circ$	5. Substitution

Given:

**Angle Sum Theorem:**

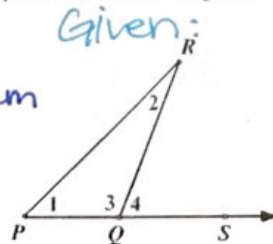
<p><b>Group:</b> Write an equation to solve for x.</p> $7x - 1 + 8x + 6 + 55 = 180$ $15x + 60 = 180$ $\quad -60 \quad -60$ $\frac{15x}{15} = \frac{120}{15} \quad \boxed{x = 8}$	<p><b>Individual:</b> Write an equation to solve for x, then find the measure of angle A.</p> $4x + 1 + 7 + 5x + 82 = 180$ $9x + 90 = 180$ $9x = 90$ $\boxed{x = 10}$ $4(10) + 1 = \boxed{41^\circ} = \angle A$
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**Proof of the Exterior Angle Theorem:**

The measure of an exterior angle of a triangle is equal to the sum of the two opposite interior angles.

Statement	Reason
1. $\angle 4$ is an exterior angle	1. Given
2. $\angle 1 + \angle 2 + \angle 3 = 180^\circ$	2. Triangle Angle Sum theorem
3. $\angle 3 + \angle 4 = 180^\circ$	3. Linear Pair
4. $\angle 1 + \angle 2 + \angle 3 = \angle 3 + \angle 4$	4. Substitution
5. $\angle 1 + \angle 2 = \angle 4$	5. subtraction

Statement	Reason
1. Given	1. Given
2. Triangle Angle Sum theorem	2. Triangle Angle Sum theorem
3. Linear Pair	3. Linear Pair
4. Substitution	4. Substitution
5. subtraction	5. subtraction



**Exterior Angle Theorem:**

**Examples:**

$110 = 61 + ?$   
 $-61 -61$   
 $49 = ?$

$? = 32 + 110$   
 $? = 142^\circ$

**Group:** Write an equation and solve for x.

$23x + 3 = 10x + 55$   
 $-10x -3 -10x -3$

$13x = 52$   
 $\frac{13x}{13} = \frac{52}{13}$   
 $x = 4$

**Individual:** Write an equation and solve for x, then find the measure of angle P.

$134 = 14x + 12x + 4$   
 $134 = 26x + 4$   
 $-4 -4$   
 $130 = 26x$   
 $\frac{130}{26} = \frac{26x}{26}$   
 $x = 5$

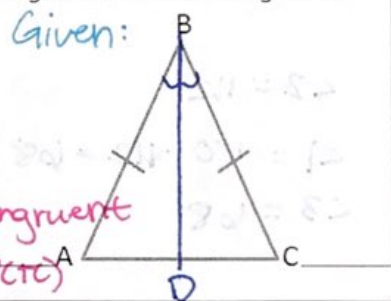
$12(5) + 4 =$   
 $\angle P = 64^\circ$

**Proof of the Isosceles Triangle Theorem:**

If two sides of a triangle are congruent, then the angles opposite the congruent sides are congruent.

Statement	Reason
1. $AB \cong CB$	1. Given
2. Bisect $\angle B$	2. Construction
3. $\triangle ABD \cong \triangle CBD$	3. SAS (Side Angle side)
4. $\angle A \cong \angle C$	4. Corresponding Parts of congruent Triangles are congruent (CPCTC)

Statement	Reason
1. Given	1. Given
2. Construction	2. Construction
3. SAS (Side Angle side)	3. SAS (Side Angle side)
4. Corresponding Parts of congruent Triangles are congruent (CPCTC)	4. Corresponding Parts of congruent Triangles are congruent (CPCTC)



**Isosceles Triangle Theorem:**

**Group:** Write an equation and solve for x.

$2(4x+6) + 20x = 180$   
 $8x+12 + 20x = 180$   
 $28x+12 = 180$   
 $-12 -12$   
 $28x = 168$   
 $\frac{28x}{28} = \frac{168}{28}$   
 $x = 6$

**Individual:** What is the measure of angle x?

$180 - 109 = 71$   
 $180 - 71(2) = 38^\circ$   
 $90 - 38 = 52^\circ$   
 $x = 52^\circ$

**Midsegment Theorem:**

**Midsegment of a Triangle:**  
 A segment whose endpoints are the midpoints of two sides of a triangle

LOOK AT REFERENCE SHEET!

**Triangle Midsegment Theorem:**  
 If a segment intersects the midpoints of two sides of a triangle, then this segment, known as the midsegment, is parallel to the third side and is half as long.

**Examples:**

**Group:** Write an equation and solve for x

$2(x+2) = 3x-8$   
 $2x+4 = 3x-8$   
 $-2x+8 -2x+8$   
 $12 = x$