Warm-up

Name the included Angle.

1. JK and KL

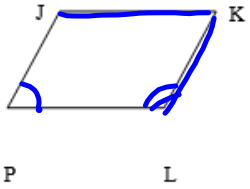
∠JKL ∠K

2. KL and LP

∠KLP ∠L

3. JP and JK

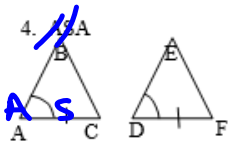
∠PJK ∠J



$\overline{PL}$

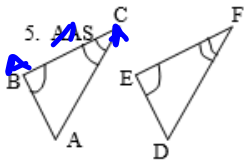
State the third congruence to prove the two triangles congruent.

4. ASA



∠C ≅ ∠F

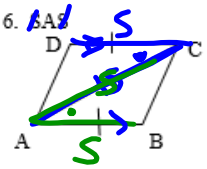
5. AAS



$\overline{BA} \cong \overline{ED}$

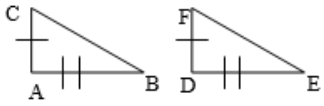
$\overline{AC} \cong \overline{FD}$

6. AAS

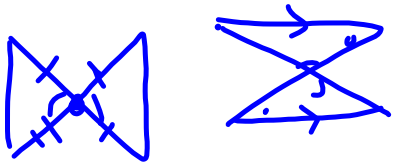


∠DCA ≅ ∠BAC

7. SSS



$\overline{CB} \cong \overline{FE}$



Quiz!!!

You have 30 minutes to complete your quiz.

NO CELLPHONES at any time during the class. Place phone in the holder.

Triangle Inequality Theorem

In order for a triangle to be constructed, the sum of any 2 sides must be greater than the 3rd side.

EXAMPLES: Determine if the following sides will make a triangle.

1. 8, 9, 10 — yes or no — $8+9>10$ ✓ $9+10>8$ ✓ $8+10>9$ ✓
2. 1, 1, 2 — yes or no — $1+1>2$
3. 6, 6, 10 — yes or no — $6+6>10$ ✓ $6+10>6$ ✓ $6+10>6$ ✓
4. 3, 5, 7 — yes or no — $3+5>7$ ✓ $5+7>3$ ✓ $3+7>5$ ✓
5. 4, 4, 4 — yes or no — $4+4>4$ ✓

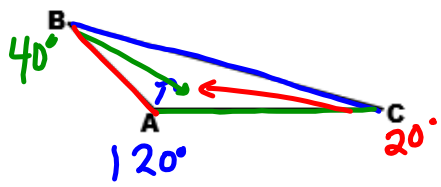
Given the sides of 3 and 7, what is the range for the third side?

$3+7=10$

$7-3=4$ $\quad 4<x<10$

*****In a triangle the longest side is opposite the largest angle, and the shortest side is opposite the smallest angle.

EXAMPLE 6: ∠A = 120°, ∠B = 40°, ∠C = 20°

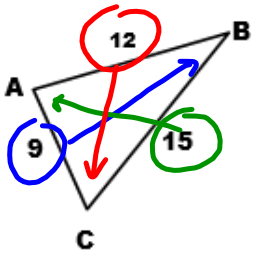


Largest side: $\overline{BC}$

Smallest side: $\overline{BA}$

EXAMPLE 7

List the angles from small to large.



Angles: $\angle B$, $\angle C$, $\angle A$

Homework Answers:

Be ready with a question if you have one.

Answers to Assignment (ID: 1)

1) Yes	2) Yes	3) Yes	4) Yes
5) Yes	6) $3 < x < 15$	7) $4 < x < 20$	8) $1 < x < 13$
9) $5 < x < 19$	10) $6 < x < 18$	11) $\overline{VW}, \overline{WX}, \overline{VX}$	12) $\overline{LM}, \overline{KL}, \overline{KM}$
13) $\overline{XW}, \overline{XV}, \overline{WV}$	14) $\overline{UW}, \overline{VW}, \overline{UV}$	15) $\overline{TU}, \overline{UV}, \overline{TV}$	16) $\angle D, \angle B, \angle C$
17) $\angle W, \angle V, \angle U$	18) $\angle F, \angle G, \angle H$	19) $\angle G, \angle F, \angle E$	20) $\angle H, \angle F, \angle G$

(9) 7, 12

7 + 12 = 19

12 - 7 = 5

Relationships In Triangles

A **midsegment** of a triangle is a segment that joins the midpoints of two sides of the triangle. Every triangle has three midsegments, which forms the midsegment triangle.

The Midsegment is:

- Parallel to one side of the triangle
- Is half the length of the parallel side
- Connects to the midpoint

midseg = $\frac{1}{2}$ // side

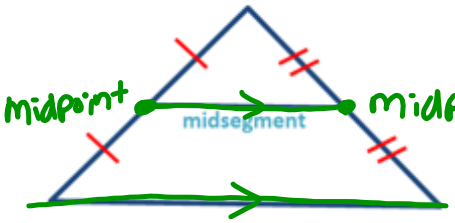
Triangle Midsegment Theorem: A midsegment of a triangle is parallel to a side of the triangle, and its length is half the length of that side.

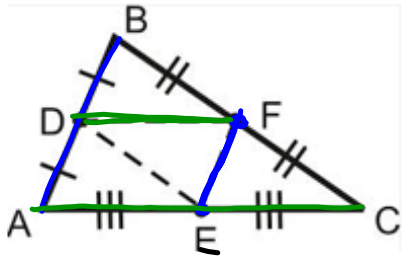
$\overline{AB} = 2 \cdot \overline{EF}$

$\overline{DF} = \frac{1}{2} \cdot \overline{AC}$

$\triangle ABC = 2 \cdot \triangle DEF$

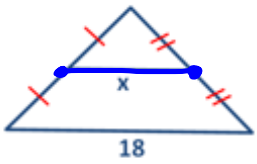
$\triangle DFE = \frac{1}{2} \cdot \triangle ABC$





Practice:

A. Solve for x:

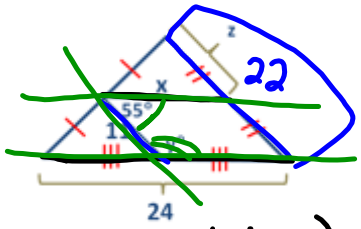


midseg = $\frac{1}{2}$ // side

$x = \frac{1}{2}(18)$

$x = 9$

B. Solve for x, y, and z:



$x = \frac{1}{2}(24)$

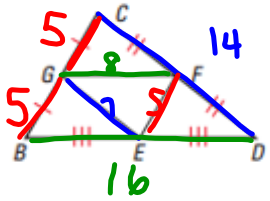
$x = 12$

$z = 11$

$55 + y = 180$

$y = 125°$

C. Given CD = 14, GF = 8, and GC = 5, the perimeter of ΔBCD.

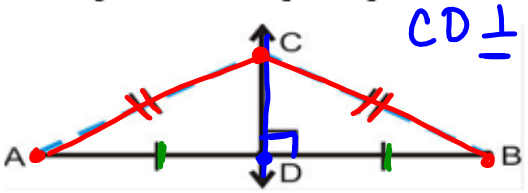


Perimeter $\Delta BCD = 40$

$5 + 5 + 14 + 16$

Per. of $\Delta GFE = 20$

If you remember from Day 1, perpendicular bisectors are lines, line segments, or rays that intersect at the midpoint of a line segment at a 90 degree angle.



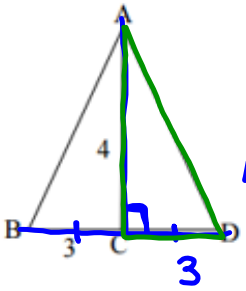
$CD \perp$ bis of $\overline{AB}$

Perpendicular Bisector Theorem: If a point is on the perpendicular bisector of a segment, then it is equidistant from the endpoints of the segment.

$\overline{AC} \cong \overline{BC}$

Converse of the Perpendicular Bisector Theorem: If a point is equidistant from the endpoints of the segment, then it is on the perpendicular bisector of the segment.

A. Find AD if AC is the perpendicular bisector to BD.



$a^2+b^2=c^2$

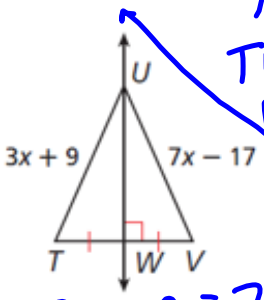
$4^2+3^2=AD^2$

$16+9=AD^2$

$\sqrt{25}=\sqrt{AD^2}$

$5=AD$

B. Find TU



$TU = 3x+9$

$TU = 3(6.5)+9$

$TU = 28.5$

$3x+9=7x-17$

$-3x \quad -3x$

$9=4x-17$

$+17 \quad +17$

$26=4x$

$\frac{26}{4} \quad \frac{4x}{4}$

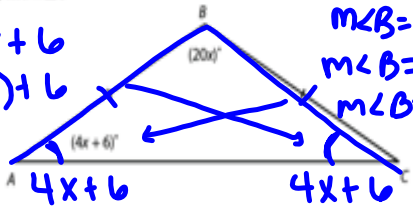
$x=6.5$

Triangle Sum Theorem-The sum of the interior of a triangle is 180 degrees

Exterior Angle Theorem: The measure of an exterior angle of a triangle is equal to the sum of the measures of its remote interior angles.

Examples:

Find: $m\angle A$, $m\angle B$, and $m\angle C$



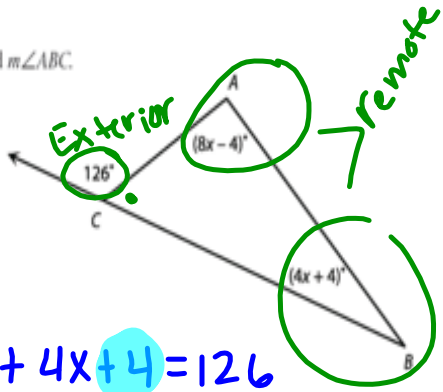
$m\angle A = 4x + 6$
$m\angle A = 4(6) + 6$
$m\angle A = 30°$
$m\angle C = 30$

$m\angle B = 20x$
$m\angle B = 20(6)$
$m\angle B = 120$

$4x+6$ $4x+6$

$20x + 4x + 6 + 4x + 6 = 180$
$28x + 12 = 180$
$28x = 168$
$x = 6$

Find $m\angle CAB$ and $m\angle ABC$.



$8x - 4 + 4x + 4 = 126$

$\frac{12x}{12} = \frac{126}{12}$

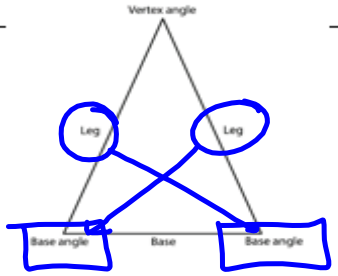
$x = 10.5$

$m\angle CAB = 8x - 4$
$m\angle CAB = 8(10.5) - 4$
$m\angle CAB = 80$

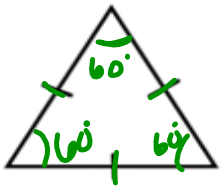
$m\angle ABC = 4x + 4$
$m\angle ABC = 4(10.5) + 4$
$m\angle ABC = 46$

Exterior Angle Inequality Theorem: If an angle is an exterior angle of a triangle, then its measure is greater that the measure of either of its corresponding remote interior angles.

Isosceles Triangle Theorem: If two sides of a triangle are congruent, then the angles opposite the congruent sides are congruent



Equilateral Triangle Theorem: The measure of each angle in an equilateral/equiangular triangle is 60°



Examples

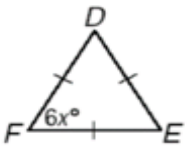
Find x and y

$46+46+y=180$

$92+y=180$

$y=88°$

Find x



$6x=60$

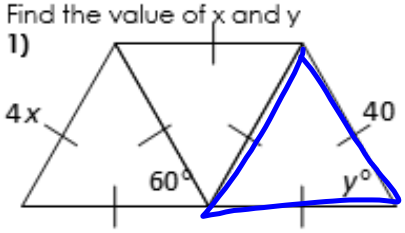
$x=10$

Date:_____ Block:_____

Isosceles and Equilateral Triangles Worksheet

Find the value of x and y

1)



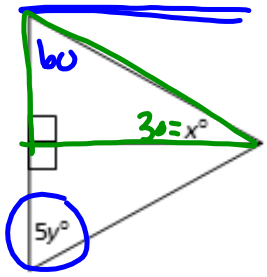
$4x = 40$

$\frac{4x}{4} = \frac{40}{4}$

$x = 10$

$y = 60°$

2) Equilateral Triangle



$5y = 60$

$y = 12$

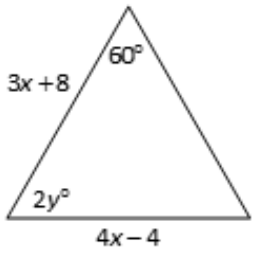
$60 + 90 + x = 180$

$150 + x = 180$

$x = 30$

10

3) Equilateral



$3x + 8 = 4x - 4$

$+4 \quad +4$

$3x + 12 = 4x$

$-3x \quad -3x$

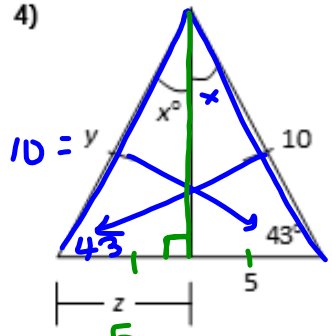
$12 = x$

$2y = 60$

$y = 30$

Find x, y and z

4)



10 = y

5

$43+43+x+x=180$

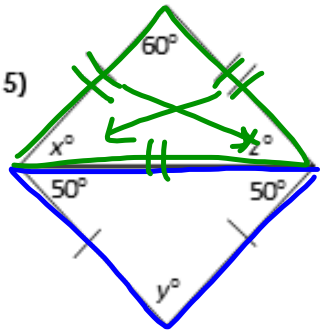
$86+2x=180$

$-86 \quad -86$

$\frac{2x}{2}=\frac{94}{2}$

$x=47$

5)



$50+50+y=180$

$100+y=180$

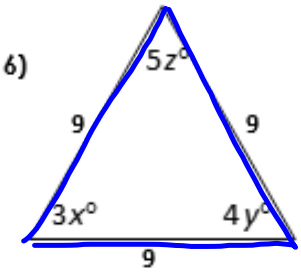
$y=80$

$60+x+x=180$

$2x=120$

$x=60°$ $z=60°$

6)



$3x=60$

$x=20$

$5z=60$

$z=12$

$4y=60$

$y=15$

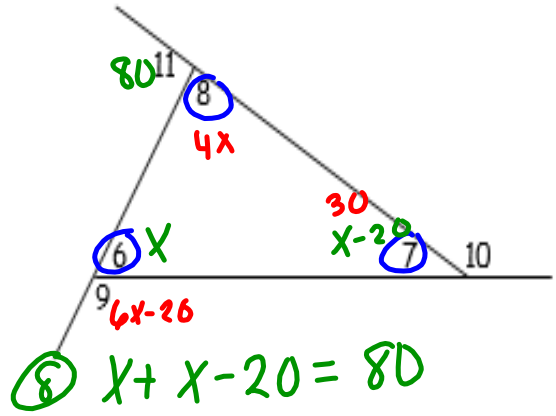
Exterior Angles
Use the figure at the right for problems 7-10.

7. $m\angle 6 + m\angle 7 + m\angle 8 =$ 180.

8. If $m\angle 6 = x$, $m\angle 7 = x - 20$, and $m\angle 11 = 80$, then $x =$ 50.

9. If $m\angle 8 = 4x$, $m\angle 7 = 30$, and $m\angle 9 = 6x - 20$, then $x =$ 25.

10. $m\angle 9 + m\angle 10 + m\angle 11 =$ 360°.

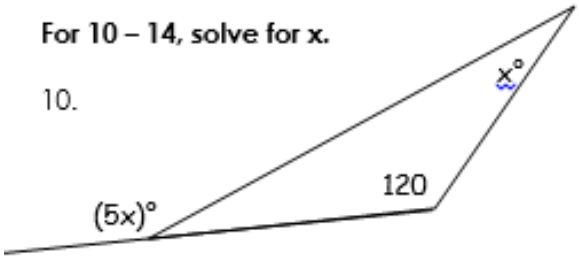


(8) $X + X - 20 = 80$

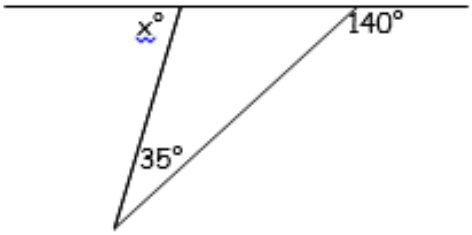
(9) $4X + 30 = 6X - 20$

For 10 – 14, solve for x.

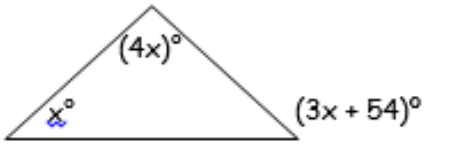
10.



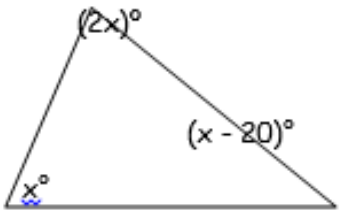
11.



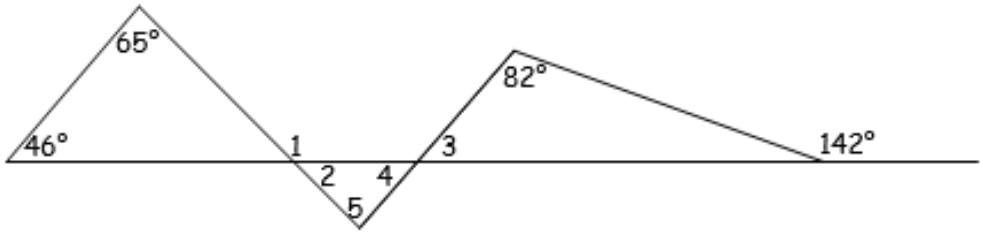
12.



13.



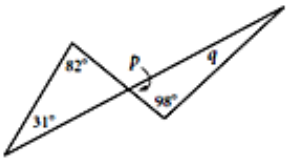
14. Find m∠1, m∠2, m∠3, m∠4, and m∠5.



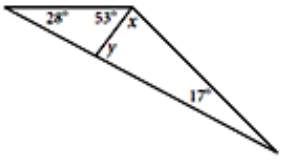
Triangle sum

In Exercises 1–9, determine the angle measures.

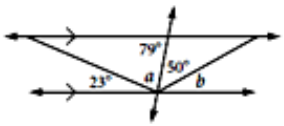
1. $p =$ _____, $q =$ _____



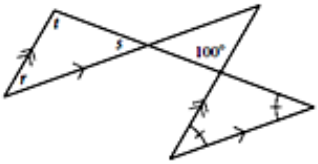
2. $x =$ _____, $y =$ _____



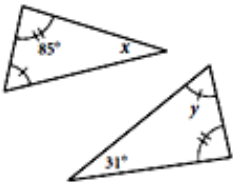
3. $a =$ _____, $b =$ _____



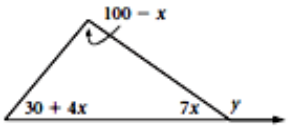
4. $r =$ _____, $s =$ _____, $t =$ _____



5. $x =$ _____, $y =$ _____

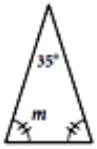


6. $y =$ _____

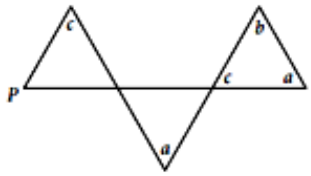


7. $s =$ _____

8. $m =$ _____

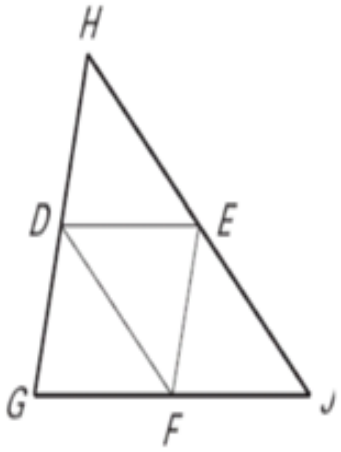


9. $m\angle P =$ _____



Midsegment of a Triangle:
Use ΔGHJ where D, E, and F are midpoints of the sides.

1. If DE = 8 and GJ = 3x, find GJ.



2. If EF = 2x and GH = 12, find EF.

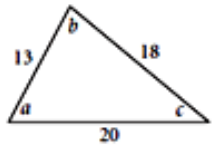
3.
a) If HJ = 8x − 2 and DF = 2x + 11, find HE.

b) If HD = 3x + 29 and DG = 14 x + 7, find EF.

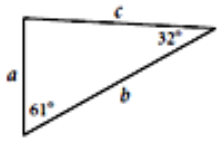
Ordering triangle sides

In Exercises 4–6, arrange the unknown measures in order from greatest to least.

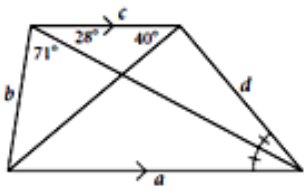
4.



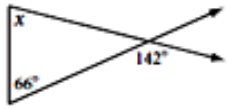
5.



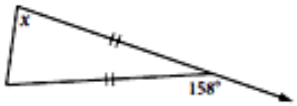
6.



7. $x =$ _____



8. $x =$ _____



9. What's wrong with this picture?