2. $= 180°$

5.

$9 = 2n - 1$
$+1 \quad +1$
$10 = 2n$
$5 = n$

$3m = m + 8$
$-m \quad -m$
$2m = 8$
$m = 4$

14. D $6x+y$ C
14
A 25 B $3x+2y$

$(14 = 3x + 2y) -2$ $-28 = -6x - 4y$
$25 = 6x + y$ $25 = 6x + y$

 $-3 = -3y$
 $\dfrac{-3}{-3} = \dfrac{-3y}{-3}$

$14 = 3x + 2$ $1 = y$
$-2 \quad -2$
$12 = 3x$
$4 = x$

12. D 15 C
130 x 35
A   B

$180 = 130 + x + 35$
$-130 \quad -130$
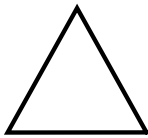$50 = x + 35$
$-35 \quad -35$
$15 = x$

Unit 9 Day 4
Triangles

Name_____Period___
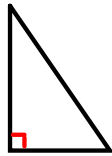
I can __Use characteristics of Triangles to Solve.__
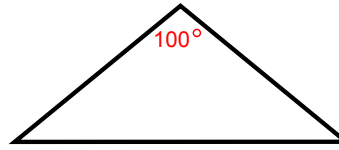
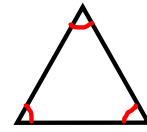## Classifying Triangles by Angles

Acute Triangle   Right Triangle   Obtuse Triangle   Equiangular Triangle

100°

3 acute angles   1 right angle   1 obtuse angle   3 congruent angles

Classifying Triangles by Sides

Scalene Triangle   **Isosceles Triangle**   **Equilateral Triangle**
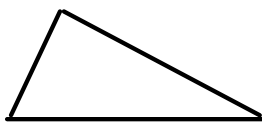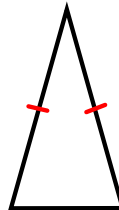
No Congruent Sides   At least 2 congruent sides   3 Congruent Sides
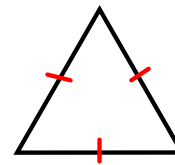
Match the triangle description with the most specific name.

1. Angle measures: 30, 130°, 20° Obtuse Triangle

2. side lengths 4 ft, 6 ft, 8 ft Scalene Triangle

3. Side lengths: 8 m, 5 m, 8 m Isosceles Triangle

4. Angle measures: 60, 60°, 60° Equiangular Triangle

5. Angle measures: 40, 50°, 90° Right Triangle

6. Side lengths: 4 cm, 4 cm, 4 cm Equilateral Triangle

7. Angle measures: 80, 40°, 60° Acute Triangle

Draw a line parallel to one side of a triangle.

What do you know about the angles formed? Name the relationship.

Alt. Int.

$65 + \angle 2 + 55 = 180$
$-65 \qquad -55 -120$

$\angle 2 = 60$

180
-120
60
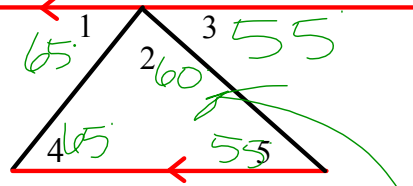
If $m\angle 1 = 65°$ and $m\angle 3 = 55°$

Find the measures of Angles 2, 4, and 5.

Triangle Sum Theorem The sum of the interior angles of any triangle equals 180 degrees.
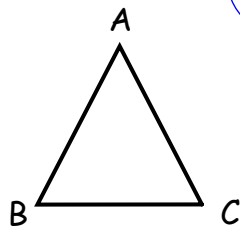
$\angle A + \angle B + \angle C = 180°$
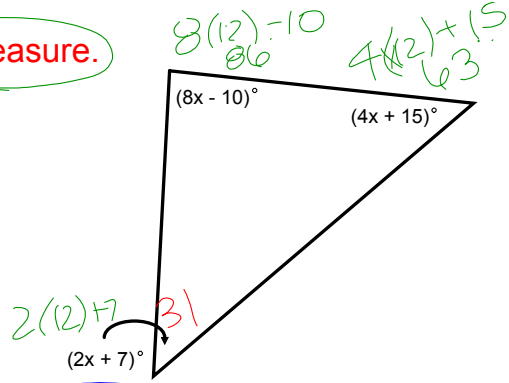
Find the missing angle

$X + 50 + 65 = 180$

$X + 115 = 180$
$-115 \quad -115$

$X = 65$

180
-115
65
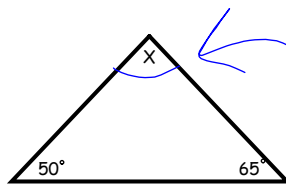
Find each angle measure.

$8(12)-10$
86

$4(12)+15$
63

$(8x - 10)°$ $(4x + 15)°$

86
$+63$
$+31$
$\overline{180}$ ✓

$2(12)+7$ 31

$(2x + 7)°$

$\boxed{2x+7} + \boxed{8x-10} + \boxed{4x+15} = 180$

$$14x + 12 = 180$$
$$\underline{ -12 \quad -12}$$
$$14x = 168$$

$$\boxed{x = 12}$$

△ ABC is a right △.

What is true about ∠ A and ∠ B?

$$\underline{∠A + ∠B = 90}$$
$$Comp.$$

A

If $m∠ A = 50$ what is $m∠ B$?

$$∠B = 90 - 50 = 40$$

C   *B*

If $m∠ A = 2x + 8$ and $m∠ B$ 3x + 2?

$$2x + 8 + 3x + 2 = 90$$
$$5x + 10 = 90$$
$$\underline{ -10 \quad -10}$$
$$5x = 80$$

$$\boxed{x = 16}$$

4
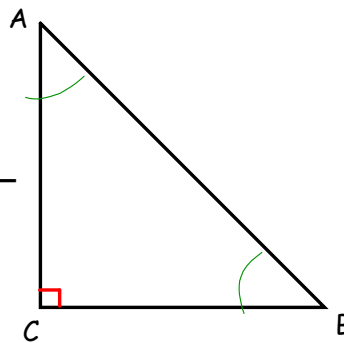
Find the values of x, y and z.

25°

x^o 85

95

$65 = y^o$

z^o

20°

$z = 25$

$$\begin{array}{r} 8\cancel{9}\cancel{0} \\ -25 \\ \hline 65 \end{array}$$
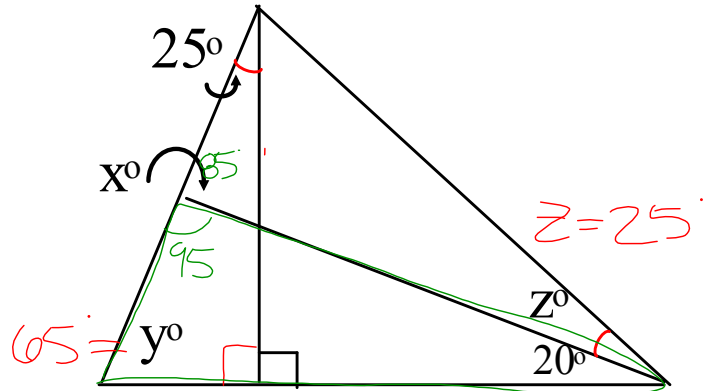
$$\begin{array}{r} 180 \\ -\boxed{85} \\ \hline 95 \end{array}$$

△CAT is an isos. triangle with vertex angle C.

$(3(10)+8=38$

1. If AC = 3x + 8 and CT = 5x - 12 , find AC.

$5X - 12 = 3X + 8$
$-3X \qquad -3X$

$2X - 12 = 8 \rightarrow X = 10$
$\qquad +12 \quad +12 \qquad 2X = 20$

$5X - 12$

2. If $m\angle T = 2x + 7$, and $m\angle C = 5x +22$, find $m\angle A$

C   5x+22

3X+8

2X+7

T   A
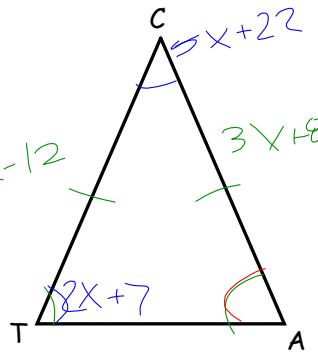
$\boxed{2X+7} + \boxed{5X+22} + \boxed{2X+7} = 180$

$9X + 36 = 180$
$\qquad -36 \quad -36$

$\dfrac{9X}{9} = \dfrac{144}{9}$

$\boxed{X = 16}$ $M\angle A = 2X + 7 = 2(16) + 7 = 39^\circ$

Isosceles Triangle Theorem

If — .

If — .

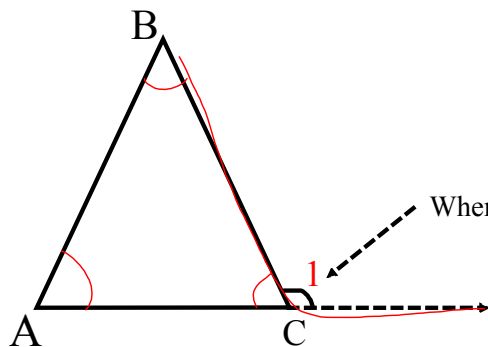Vertex angle

Leg   Leg

Base angles

Base
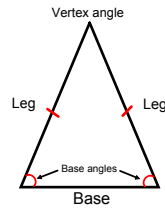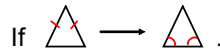
Find the value of x.
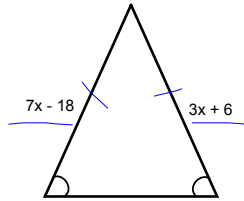
$7x - 18$ $3x + 6$

$(4x - 12)°$ $(3x + 8)°$

$7x - 18 = 3x + 6$
$-3x \qquad -3x$
$4x - 18 = 6$
$+18 +18$
$4x = 24$
$\boxed{x = 6}$
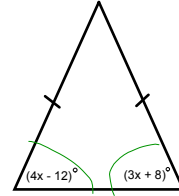
$4x - 12 = 3x + 8$
$-3x \qquad -3x$
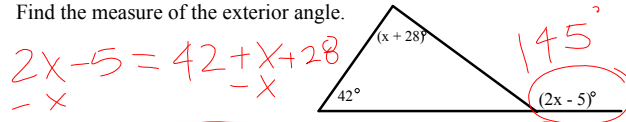$x - 12 = 8$
$+12 +12$
$\boxed{x = 20}$

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

B

When a side is extended it creates an exterior angle.

1

A   C

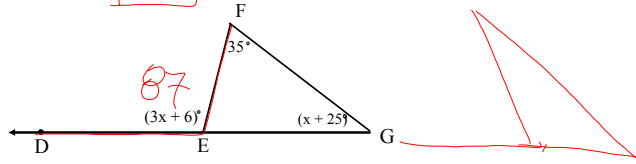$$m\angle 1 = m\angle A + m\angle B$$

Find the measure of the exterior angle.

$(x + 28)$
$42°$ $(2x - 5)°$ $145°$

$2x - 5 = 42 + x + 28$
$\underline{ - x - x}$
$x - 5 = 70$
$\underline{+5 + 5} \;\rightarrow\; \boxed{x = 75}$

Find the m ∠DEF

F
35°
87
$(3x + 6)°$ $(x + 25)°$
D   E   G

$3x + 6 = 35 + x + 25$
$\underline{-x -x}$
$2x + 6 = 60$
$\underline{ -6 - 6}$
$2x = 54$

$\boxed{x = 27}$ $3x + 6 = 3(27) + 6$
$= 87$

Midsegment Theorem: The segment connecting the midpoints of two sides

of a triangle is parallel to the third side and is half the length.

x
$2x$

Find x and y.

20
y
$2x°$ $(2x + 36)°$
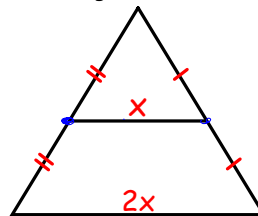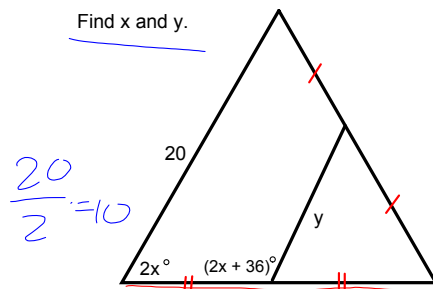
$\dfrac{20}{2} = 10$

$y = 10$

$2y = 20$

$2x + 2x + 36 = 180$
$4x + 36 = 180$
$\underline{ -36 \cdot 36}$
$4x = 144$
$\boxed{x = 36}$

$\overline{DE}$ is a midsegment of $\triangle ABC$.
Find x and y.

$y + 3 = 2y - 4$

$-y \quad - y$

$3 = y - 4$

$+4 \qquad +4$

$\boxed{7 = y}$

$5x - 8 = 3x + 2$

$-3x \qquad -3x$

$2x - 8 = 2$

$+8 \quad +8$

$2x = 10$

$\boxed{x = 5}$

Triangle diagram with vertices B (top), A (bottom left), C (bottom right). Point D on AB, point E on AC.

- $(3x + 2)$ near D–B
- $(5x - 8)$ near A–D
- $(4y - 8)$ over 2 near B–C side
- $(y + 3)$ near D–E
- B, D, A, E, C labeled