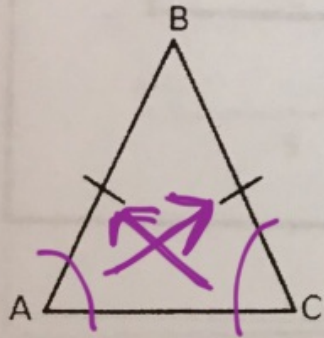# Unit 5
Lesson 3

Triangle Theorems

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Triangle Sum Theorem: The sum of the measures of the angles of a triangle is ___$180°$___.

Remember: An **ISOSCELES TRIANGLE** is a 3-sided polygon with at least 2 congruent sides.

Label the vertex angle, the base angles, the legs and the base of the isosceles trian

$\angle B$ $\angle A$ $\overline{AB}$ $\overline{AC}$

$\angle C$ $\overline{CB}$ or

$\overline{CA}$

If two **sides** of a triangle are congruent, then the **angles** opposite those sides are congruent:

In $\triangle ABC$: if $\overline{AB}$ $\cong$ $\overline{CB}$, then $\angle A$ $\cong$ $\angle C$.

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In $\triangle ABC$: if $\angle A$ $\cong$ $\angle C$, then $\overline{AB}$ $\cong$ $\overline{CB}$.
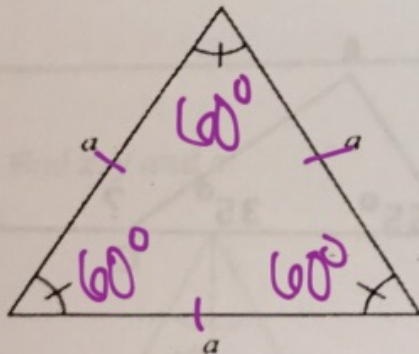
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If two **angles** of a triangle are congruent, then the **sides** opposite those angles are congruent:

In $\triangle ABC$: if _____ $\cong$ _____, then _____ $\cong$ _____.

Remember: An ***EQUILATERAL TRIANGLE*** is a 3-sided polygon with all 3 congruent sides.
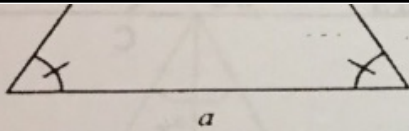
If a triangle is equilateral, then it is _equiangular_.
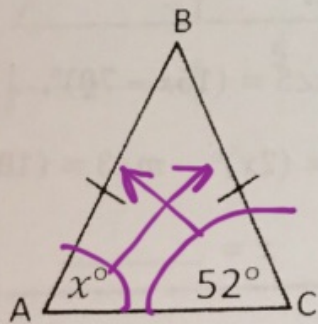
If a triangle is equiangular, then it is _equilateral_.

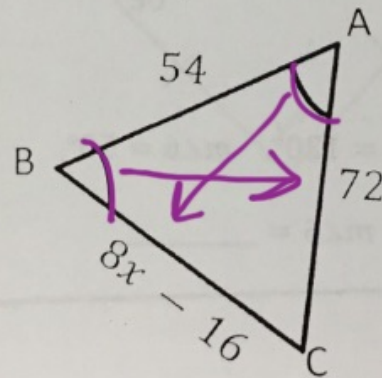Each angle of an equilateral triangle measures _60°_.

1. Find the value of x:

B

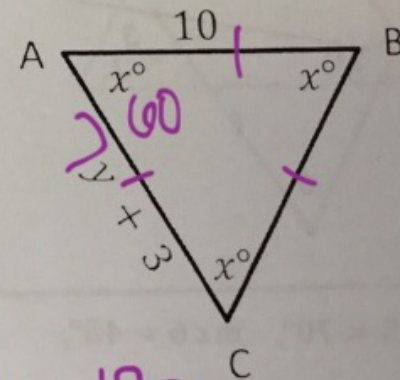$x°$ 52°
A   C

$X = 52$

2. Find the value of x:

A

54

B

72

$8x - 16$

C

$8x - 16 = 72$
$+16 \quad +16$

$\dfrac{8x}{8} = \dfrac{88}{8}$ $x = 11$

3. Find the value of x and y:

10

A $x°$ B
      60    $x°$

$y + 3$ $x°$

C

$\dfrac{3x}{3} = \dfrac{180}{3}$ $y + 3 = 10$
                              $-3 \quad -3$

$X = 60°$ $y = 7$

Exterior Angle Theorem: The measure of an exterior angle of a triangle is equal to the sum of the measures of the two remote interior angles.
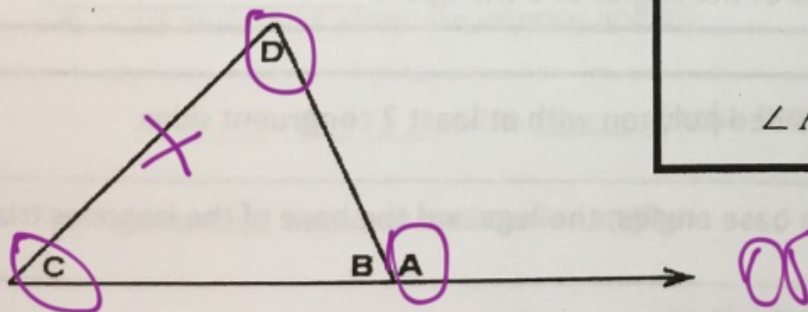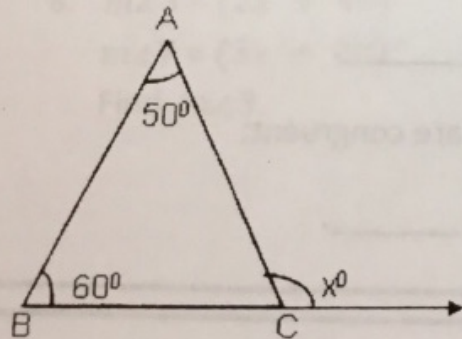
$$m\angle A = m\angle C + m\angle D$$

$\angle A$ & $\angle B$ are supplementary

α

$$180 - B = A$$

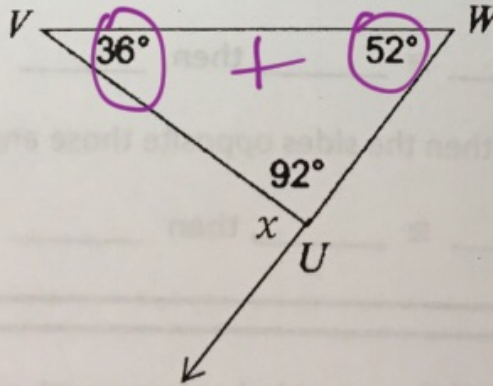| 1. Find the measure of x:	2. Find the measure of x:	3. Find the value of x:

1. Find the measure of x:

Triangle ABC with angle $A = 50^0$, angle $B = 60^0$, exterior angle at $C = x^0$

$X = 60 + 50$

$X = 110^0$

2. Find the measure of x:

V ... 36° ... $+$ ... 52° ... W, 92°, x, U

$180 - 92 = 88$

$X = 36 + 52 = 88$

3. Find the value of x:
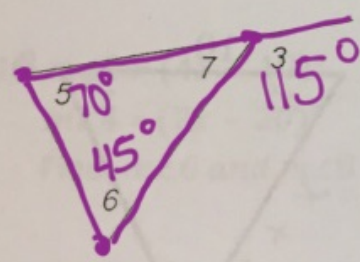
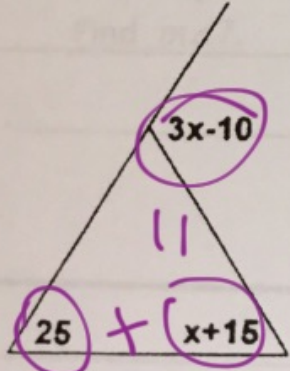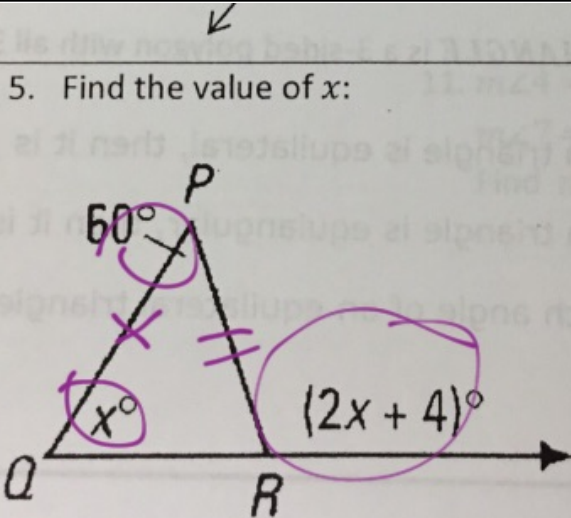A with $5x$, x, angle $B = 2x$, exterior angle at $C = 105^\circ$, point D
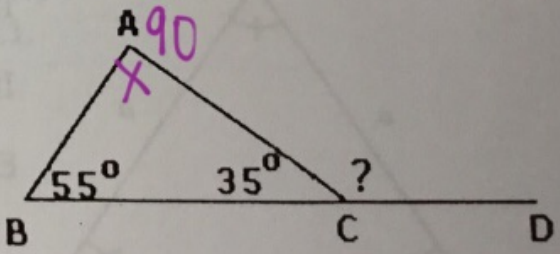
$105 = 5x + 2x$

$\dfrac{105}{7} = \dfrac{7x}{7}$

$X = 15$

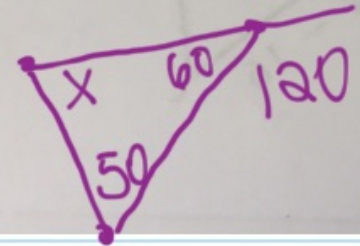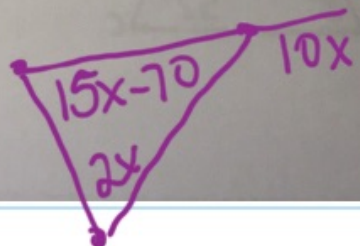**4.** Find the value of x:

$3x-10$

$25 + (x+15)$

5. Find the value of x:

$60°$

P

$x°$

$(2x + 4)°$

Q   R

6. Find the $m\angle ACD$:

A 90

x

$55°$ $35°$?

B   C   D

$180 - 35 = 145°$

$25+x+15=3x-10$

$x+40=3x-10$

$-x +10 -x +10$

$\dfrac{50}{2}=\dfrac{2x}{2}$ $x=25$

$x+60=2x+4$

$-x-4 \quad -x-4$

$56=x$

$180-35-55=90$

$55+90=145°$

7.

$70°$ 7 3 $115°$

$45°$

6

$m\angle5 = 70°$, $m\angle6 = 45°$,

$m\angle7 = \underline{65°}$, $m\angle3 = \underline{115°}$

$m\angle3 = 70 + 45$

$m\angle3 = 115$

$180 - 115 = 65°$

8. Use #7 Figure

$m\angle3 = 120°$, $m\angle6 = 50°$,

$m\angle5 = \underline{70°}$

X 60 120

50

$120 = 50 + X$

$-50 \quad -50$

$70 = X$

9. Use #7 Figure

$m\angle5 = (15x - 70)°$,

$m\angle6 = (2x)°$, $m\angle3 = (10x)°$,

$x = \underline{}$

$15x-70$ $10x$

$2x$

$15x - 70 + 2x = 10x$

$17x - 70 = 10x$

$-17x \qquad -17x$

$-70 = -7x$

$\underline{-7} \quad \underline{-7}$

$\boxed{10 = X}$

HW: Page 14-15