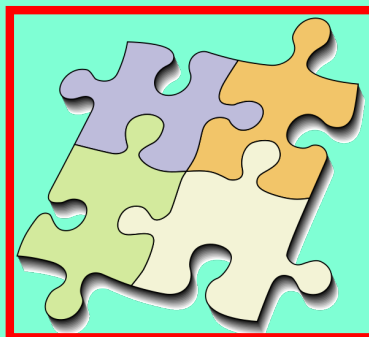


**Math 107**

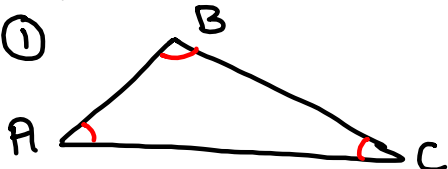
**Fall 2017**

**Lecture 8**



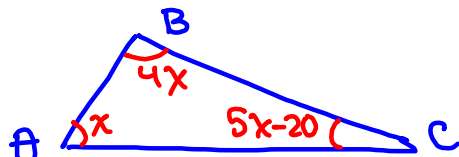
Angles in Triangle

①



$$A + B + C = 180^\circ$$

find  $x$ , then find each angle



we know

$$\boxed{A} + \boxed{B} + \boxed{C} = 180^\circ$$

$$x + 4x + 5x - 20 = 180^\circ$$

$$10x - 20 = 180$$

$$10x = 180 + 20$$

$$10x = 200$$

$$x = \frac{200}{10}$$

$$\boxed{x = 20}$$

$$A \rightarrow 20^\circ$$

$$B \rightarrow 80^\circ$$

$$C \rightarrow 80^\circ$$

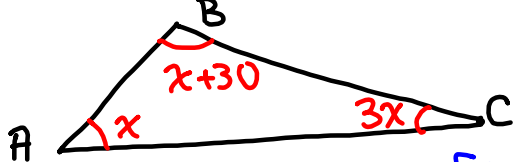
In triangle ABC,

Angle B is  $30^\circ$  more than angle A.

Angle C is 3 times angle A.

Draw & label such triangle

Find the measure of all three angles



we know  $A + B + C = 180^\circ$

$$x + x + 30 + 3x = 180$$

$$5x + 30 = 180$$

$$5x = 180 - 30$$

$$5x = 150$$

$$x = \frac{150}{5}$$

$$x = 30$$

$A \rightarrow 30^\circ$   
 $B \rightarrow 60^\circ$   
 $C \rightarrow 90^\circ$

In triangle ABC, the measure of three angles are **three consecutive even integers**.

Find the largest angle.

we know

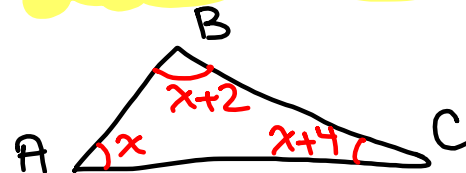
$$A + B + C = 180^\circ$$

$$x + x + 2 + x + 4 = 180$$

$$3x + 6 = 180$$

$$3x = 180 - 6$$

$$3x = 174$$



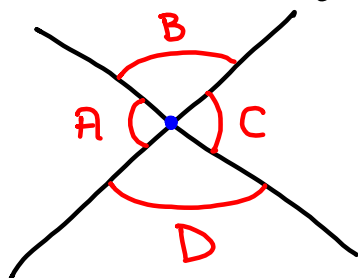
$x$  must be even.

$$x = \frac{174}{3}$$

$$x = 58$$

**62°**

## Vertical Angles



opposite angles are called vertical angles.

$$A = C, B = D$$

Find  $x$ , then the measure of each angle

$$\begin{aligned} 3x-70 &= 3(60)-70 \\ &= 180-70 \\ &= 110^\circ \end{aligned}$$

$$\begin{aligned} x+50 &= 60+50 \\ &= 110^\circ \end{aligned}$$

$110^\circ$  each

we have vertical angles,

they are equal

$$3x-70 = x+50$$

$$3x-x = 50+70$$

$$2x = 120$$

$$x = 60$$

find  $x$ , then find the measure of marked angles

$$\begin{aligned} 3x-100 &= 3(24)-100 \\ &= 72-100 \\ &= -28 \end{aligned}$$

$$\begin{aligned} 20-2x &= 20-2(24) \\ &= 20-48 \\ &= -28 \end{aligned}$$



Angle with - measure at this level.

## Vertical Angles

They must be equal

$$3x-100 = 20-2x$$

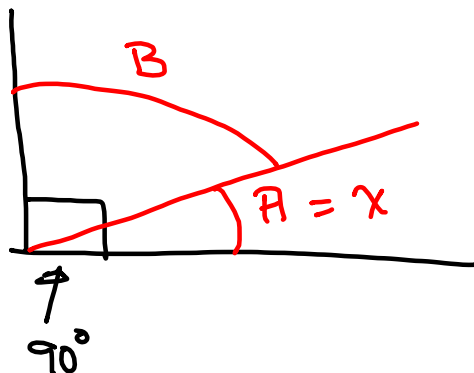
$$3x + 2x = 20 + 100$$

$$5x = 120$$

$$x = \frac{120}{5} \quad x = 24$$

Complementary angles  $\Rightarrow$  Their sum is  $90^\circ$

Type	Angle	Complement
Complementary	$x$	$90 - x$



$$A + B = 90^\circ$$

$$\{x\} + B = 90$$

$$B = 90 - x$$

Find two Complementary angles such that

one of them is 4 times the other one.

$$\rightarrow x \text{ \& } 90 - x$$

$$x = 4 \cdot (90 - x)$$

$$x = 4 \cdot 90 - 4 \cdot x$$

$$x = 360 - 4x$$

$$x + 4x = 360$$

$$5x = 360$$

$$\rightarrow x = \frac{360}{5}$$

$$x = 72$$

$$72^\circ \text{ \& } 90 - 72$$

$$72^\circ \text{ \& } 18^\circ$$

Find two Complementary angles Such that  
 the Sum of 3 times one of them  
 and 4 times the other one is equal to  $135^\circ$

$$x \text{ \& } 90 - x$$

$$3 \cdot x + 4(90 - x) = 135$$

$$3x + 4(90 - x) = 135$$

$$\underline{3x} + 360 \underline{-4x} = 135$$

$$-x + 360 = 135$$

$$-x = 135 - 360$$

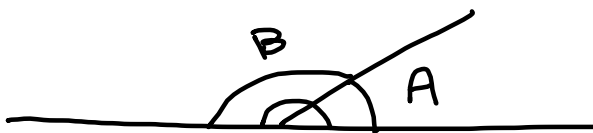
$$-x = -225$$

$$x = \frac{-225}{-1}$$

$$x = 225$$



Supplementary angles: Their sum is  $180^\circ$



$$A + B = 180^\circ$$

Angle  
 $x$

Supplement  
 $180 - x$

Find two Supplementary angles  $x$  &  $180-x$

Such that the Sum of

one of them and twice the other one

is  $260^\circ$ .

$$x + 2(180-x) = 260$$

$$x = 100$$

$$100^\circ \neq 80^\circ$$

$$x + 360 - 2x = 260$$

$$-x + 360 = 260$$

$$-x = 260 - 360$$

$$-x = -100$$

$$x = \frac{-100}{-1}$$