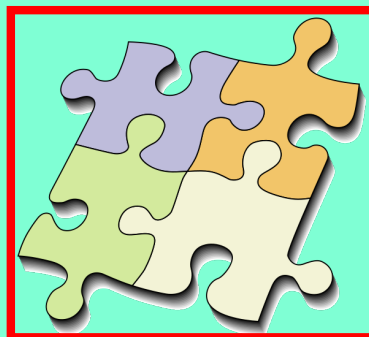**Math 107**

Fall 2017

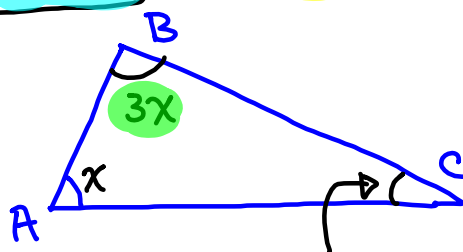**Lecture 9**

In triangle ABC, Angle B is 3 times Angle A.

Angle C is 20° more than the sum of angles A and B.

find all three angles.

$$A + B + C = 180°$$

$$x + 3x + 4x + 20 = 180$$

$$8x + 20 = 180$$

$$8x = 180 - 20$$

$x + 3x + 20$

$$8x = 160$$

$$x = \frac{160}{8} \qquad \boxed{x = 20}$$

$$20°, 60°, 100°$$

In triangle ABC,
angle A is 10° more than angle B.
Angle C is ⟨10° less than⟩ 3 times angle A.
1) Draw & label such triangle

B
x
$3(x+10)-10$
A $x+10$ C
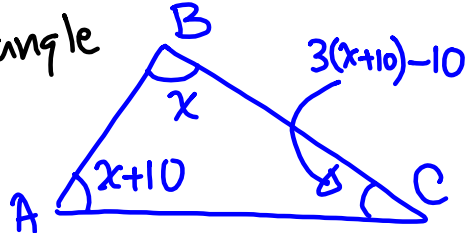
2) find all three angles.

$\boxed{A} + \boxed{B} + \boxed{C} = 180°$

$\boxed{x+10} + \boxed{x} + \boxed{3(x+10)-10} = 180°$

$x + \cancel{10} + x + 3x + 30 \cancel{-10} = 180$

$5x + 30 = 180$

$5x = 180 - 30$

$5x = 150$

$\boxed{x = 30}$

$\boxed{30°, 40°, 110°}$

Two angles are Complementary.   Sum = 90°

One of them is twice the other one.

find both angles.

Angle	Complement
x	$90-x$

$x = 2(90-x)$

$x = 180 - 2x$

$x + 2x = 180$

$3x = 180$

$x = 60$

$60°$ & $30°$

$$90(-x) = 2x$$
$$90 = 2x + x$$
$$90 = 3x$$
$$\frac{90}{3} = x$$
$$30 = x$$

$30° \ \& \ 60°$

Two angles are complementary.   Sum = 90°

The sum of 3 times one of them

and 4 times the other one is 345°

find both angles.

Angle	Comp.
x	$90 - x$

$$3x + 4(90 - x) = 345$$
$$3x + 360 - 4x = 345$$
$$-x + 360 = 345$$

$$-x = 345 - 360$$
$$-x = -15$$
$$x = 15$$

$15° \ \& \ 75°$

find two complementary angles such that the difference of 5 times one of them and twice the other one is 310°.

Two Comp. angles $\Rightarrow x$ & $90-x$

$$5x - 2(90-x) = 310$$

$$5x - 180 + 2x = 310$$

$$7x = 310 + 180$$

$$7x = 490$$

$$\boxed{x = 70}$$

$70°$ & $20°$

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find two Supplementary angles such that one of them is 20° more than the other one.

Angle	Supplement
x	$180-x$

Angle   other angle

$$\boxed{x} = \boxed{180-x} + 20$$

$$x = 180 -x + 20$$

$$x + x = 200$$

$$2x = 200$$

$$x = 100$$

$100°$ & $80°$

find two supplementary angles such that the difference of 4 times one of them and the other one is 195°.

Two supplementary angles $\Rightarrow$ x & $180-x$

$$4x - (180 - x) = 195$$

$$4x - 180 + x = 195$$

$$5x - 180 = 195$$

$$5x = 195 + 180$$

$$5x = 375$$

$$\boxed{x = 75}$$

$$75° \text{ & } 105°$$

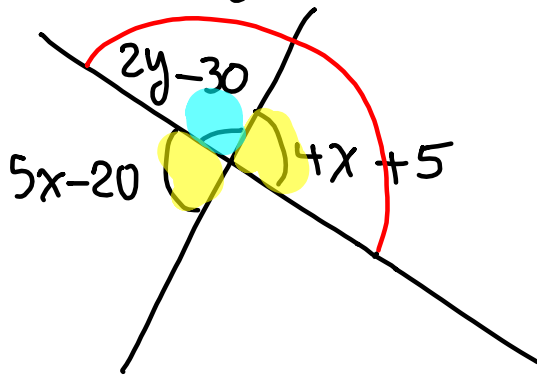
Difference of A and B $A - B$

Difference of 4 times one of them and the other one

$$4x - (180 - x) = 195$$

4 times the difference $4(\quad - \quad)$

find x & y:

2y-30

5x-20   +x +5

$5x - 20 = 4x + 5$

Vertical angles
are equal.

$5x - 4x = 5 + 20$

$$\boxed{x = 25}$$

Adjacent angles have a sum of $180°$.

$2y - 30 + 4x + 5 = 180°$

$2y - 30 + 4(25) + 5 = 180$

$2y - 30 + 100 + 5 = 180$

$2y + 75 = 180$

$2y = 180 - 75$

$\boxed{y = 52.5}$ $2y = 105$