Q and P are midpoints.

R

x + 50

$2(x\cancel{85}) = 3x + 46$
$x = 124$

P

x + 85

Q

$x + 50$

x

S

T

3x + 46

1. Find the length of RS. 248

2. Find the length of TQ

174

3. Find the length of TS. 418

W

C

140°

K

40

N

75
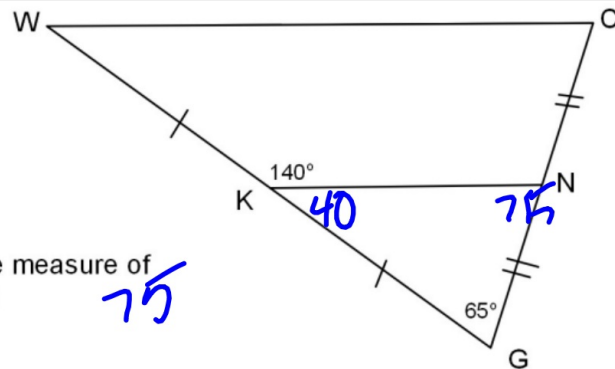
4. Find the measure of
∠ WCG   75

65°

G

5. Find the measure of ∠ CWG 40

$\overrightarrow{PM}$ bisects $\angle QPR$

6. Find the length of $\overline{PM}$.

$x^2 = 7^2 + 13^2$
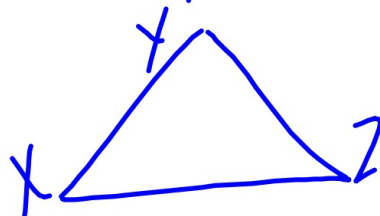
$x = 14.8$

7. Find the length of $\overline{QM}$.

$= 7$

13

Q

P

x

7

M

7

R
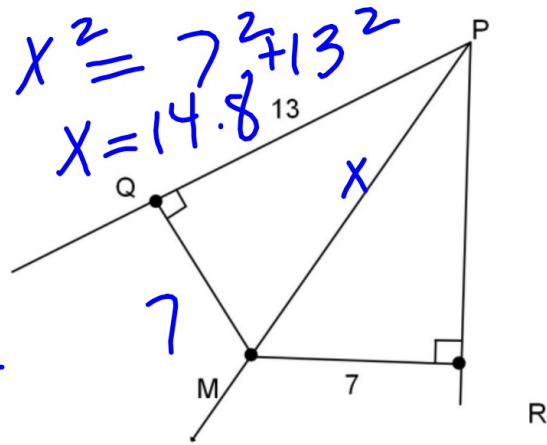
In this section, we will learn several theorems about the side lengths and angles of triangles and how they are "arranged".

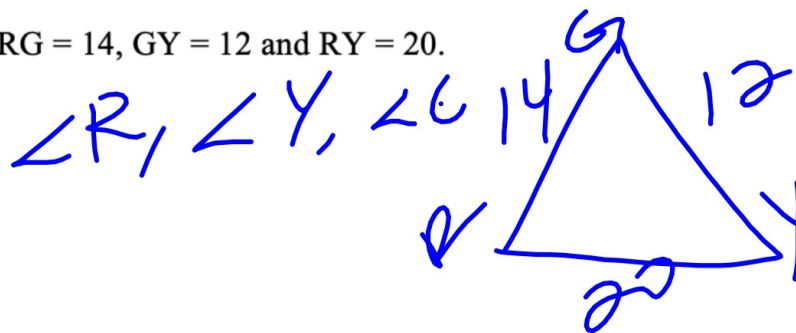**Theorem 5-10:** If two sides of a triangle are not congruent, then the larger angle lies opp largest side

If $XZ > XY$ then $m\angle Y > m\angle Z$

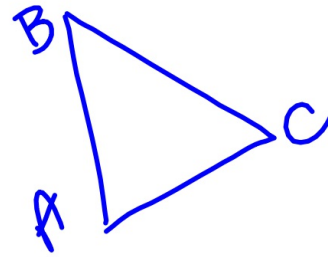Ex 1: Using the triangle below, list the angles in order from least to greatest.

In $\triangle RGY$, RG = 14, GY = 12 and RY = 20.

$\angle R, \angle Y, \angle G$

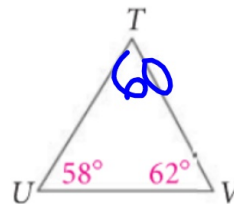**Theorem 5-11:** If two angles of a triangle are not congruent, then the longest side lies opp. the larger angle.
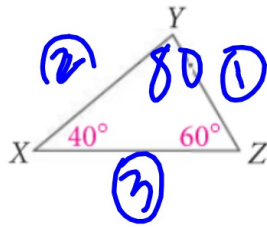
If $m\angle A > m\angle B$
then $BC > AC$

Ex 2: Which choice shows the sides of $\triangle TUV$ in order from shortest to longest?

[A] $\overline{TV}, \overline{UV}, \overline{UT}$
[B] $\overline{UT}, \overline{UV}, \overline{TV}$
[C] $\overline{UV}, \overline{UT}, \overline{TV}$
[D] $\overline{TV}, \overline{UT}, \overline{UV}$

<u>Ex 3</u>: List the sides of $\triangle XYZ$ in order from shortest to longest. Explain your reasoning.

Y

② 80 ①

40°   60°

X   Z

③

YZ, XY, XZ

In order to be able to form a triangle, there is a special relationship among the sides. The next theorem tells us when a triangle can exist if we know the lengths of its sides.

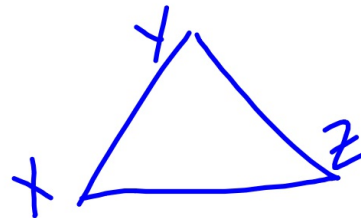**Theorem 5-12: Triangle Inequality Theorem**
The sum of the lengths of any two sides of a triangle is $greater\ than$ $the\ length\ of\ the\ third\ side$

$XY + YZ > XZ$
$XZ + XY > YZ$
$XZ + YZ > XY$

Y

X   Z

Ex 4: Can a triangle have sides with the given lengths? Explain.

A. 2 cm, 7 cm, 9 cm

$$2 + 7 \not> 9$$

NO.

B. 4 yd, 6 yd, 9 yd

$$6 + 4 > 9 \checkmark$$
$$6 + 9 > 4 \checkmark$$
$$9 + 4 > 6 \checkmark$$

yes.

Ex 5: A triangle has sides of lengths 3 in. and 12 in. Describe the lengths possible for the third side.

$x = $ third side

$$X + 3 > 12$$
$$X > 9$$

$$X + 12 > 3$$
$$X > -9$$

$$3 + 12 > X$$
$$15 > X$$
$$X < 15$$

HW #29 -

Sec. 5-5

Pages: 293-294

Problems: 4, 8, 10, 13, 16, 17, 25, 26, 37

IXL #17 - M.4 & M.5 due Friday at 4pm!

(LAST IXLs OF THE SEMESTER