Notes - Geometry Theorems.doc

*** Now that the notes are taken care of...

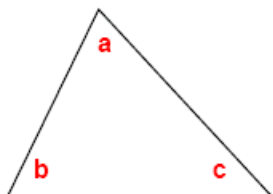## REVIEW??? GMF 10 - Angle Properties

We better do some examples to UNDERSTAND these BIG ideas!!!

Geometry Theorems...

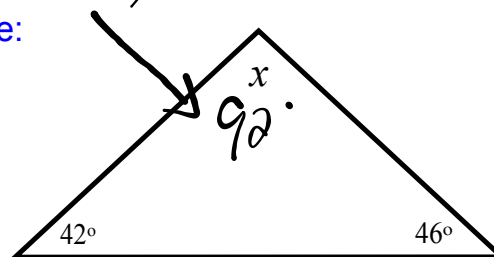$(SATT)$

Triangle Angle Sum Theorem:

The sum of the interior angles of any triangle is 180°.

a

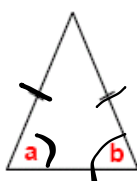$$a + b + c = 180°$$

b   c

Example:

x

$92°$

42°   46°

Isosceles Triangle Theorem:

In an isosceles triangle, the base angles are equal.

The two angles that are opposite to the equal sides.

$\mathcal{ITT}$
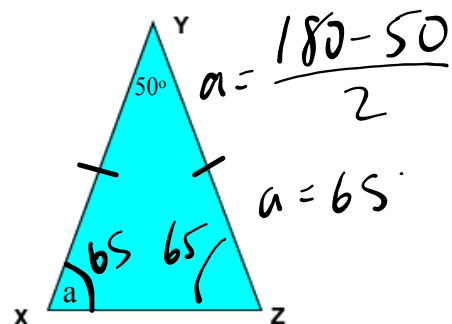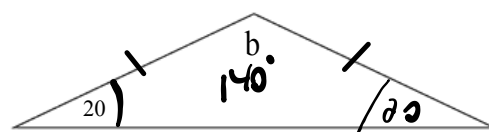
$a = b$

EXAMPLES...

1)

$a = \dfrac{180 - 50}{2}$

$a = 65$

50°

65 65

a

2)

20   140°   b   ðð
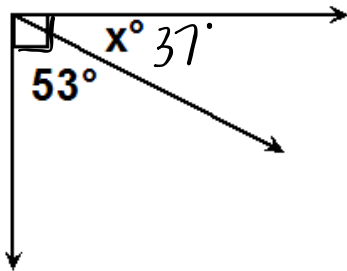
- **Complementary Angles:** CAT
     Two or more angles that have a sum of 90°.
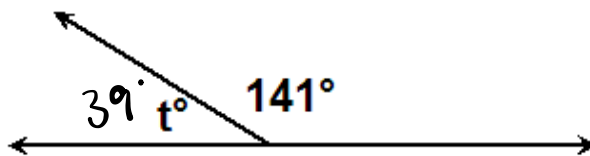
Examples:

(1) What is the complement of a 50° angle? $40^.$

(2) Determine the measure of the missing angle.

x° 37°
53°

- **Supplementary Angles**: SAT
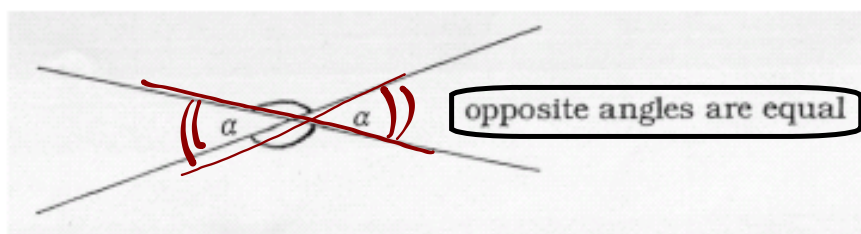   Two or more angles that have a sum of 180°.
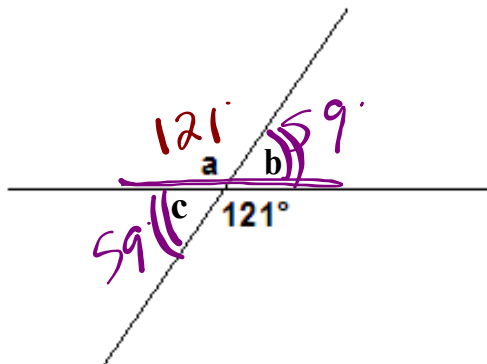
Examples:

39° t°   **141°**

Opposite Angle Theorem...   *O A T*

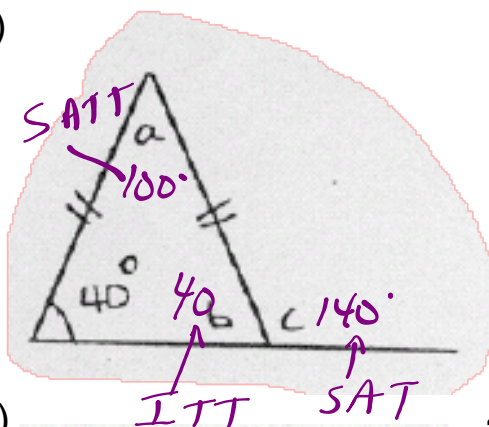When 2 straight lines cross, 2 pairs of opposite angles are formed. Opposite angles are equal in size

opposite angles are equal

In geometry, angles or lines marked with the same symbol are the same size.
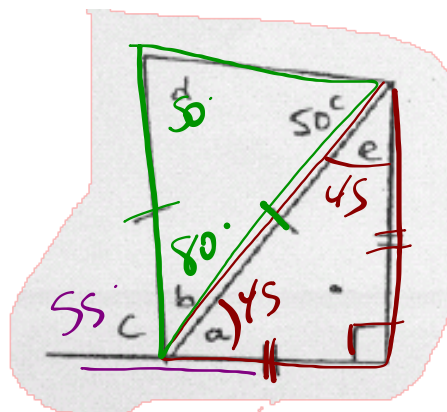
Example:

121°   59°
a   b
59°   c   121°

EXERCISE: Use geometry theroems to determine the measure of missing angles...

1)

S ATT

a
100°

40° 40 b   c 140°

ITT   SAT

2)

d 50°   50 c

e

80°   45

55° c   b 45
      a 45

3)

a = 15

b = 30°

x°   c

2x

3x   c   c = 45

$$X + 2X + 3X = 90°$$

$$\frac{6X = 90}{6} \quad \frac{}{6}$$

$$X = 15$$

4)

62°

28°   c   152°   137

28   + a 43°   15
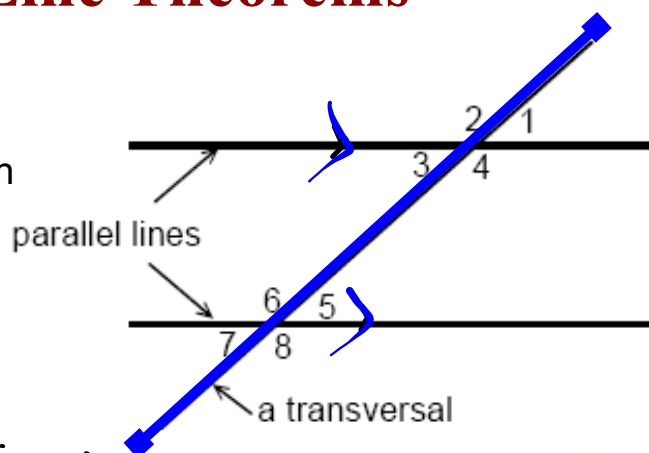
165
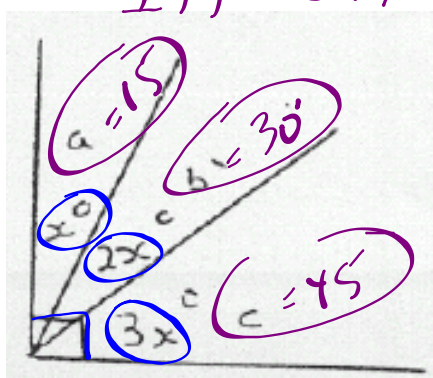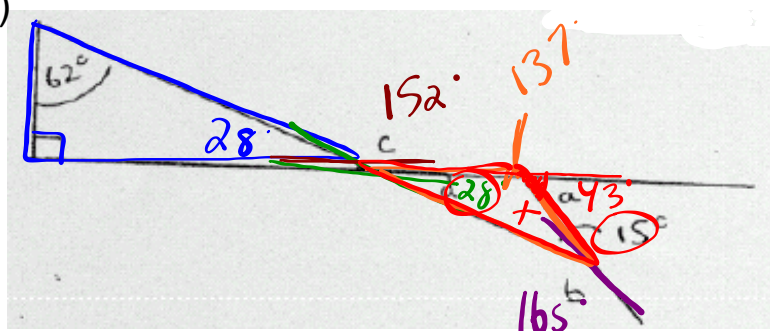
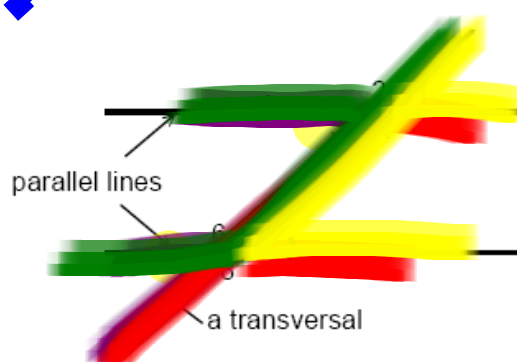# Parallel Line Theorems

A transversal is a third line that crosses two or more lines, as shown in the illustration to the right.

parallel lines

a transversal
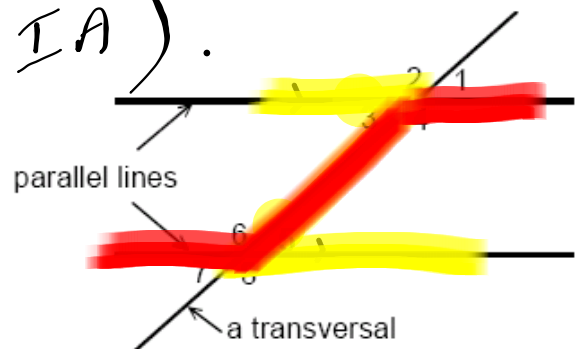
Corresponding Angles: $\left(\left(A\right)\right)$

Pairs of angles on the same side of a transversal and the same side of the parallel lines

parallel lines

a transversal

CORRESPONDING ANGLES ARE EQUAL

Alternate Interior Angles: $\left(A\,I\,A\,\right)$.

Pairs of angles on the opposite
sides of a transversal and between
the parallel lines
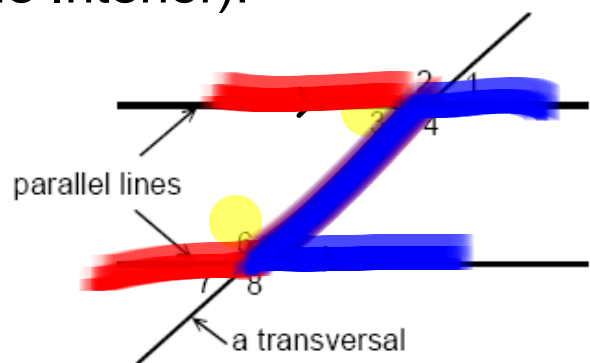
parallel lines

a transversal

ALTERNATE INTERIOR ANGLES ARE EQUAL

Co-Interior Angles (Same-side Interior):

((C I n))

Pairs of angles on the same
side of a transversal and between
the parallel lines

parallel lines

a transversal
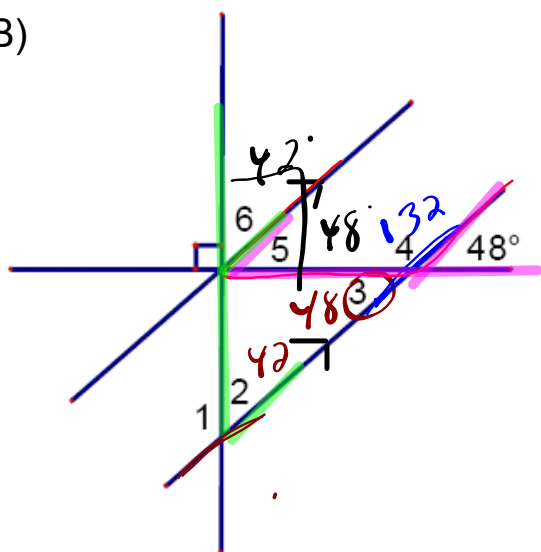
CO-INTERIOR ANGLES ARE SUPPLEMENTARY

EXERCISE: Practice...

A)
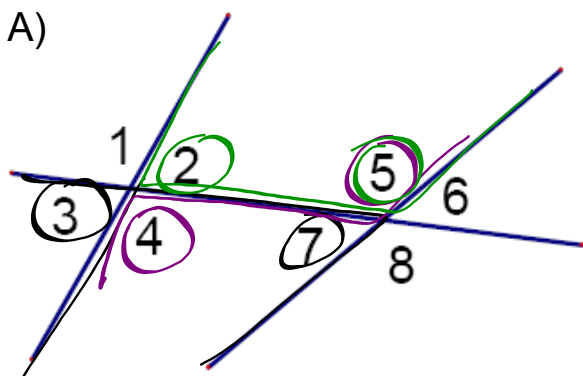
1. <3 and < __7__ are corresponding angles.

2. <4 and < __5__ are alternate interior angles.

3. <5 and < __2__ are same-side interior angles.   *CIA*

B)

1. m<1 = __138° (SAT)__

2. m<2 = __42° (CA)__

3. m<3 = __48° (OAT)__

4. m<4 = __132° (SAT)__

5. m<5 = __48° (CIA)__

6. m<6 = __42° (CAT)__

measure   ∠6

C)

A · E

55

40°

D

$x°$ · 75·

$60°$ $y°$

B
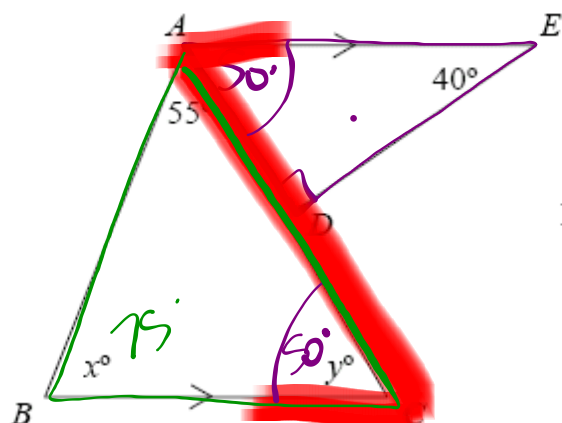
Find $x°$ and $y°$.

D)
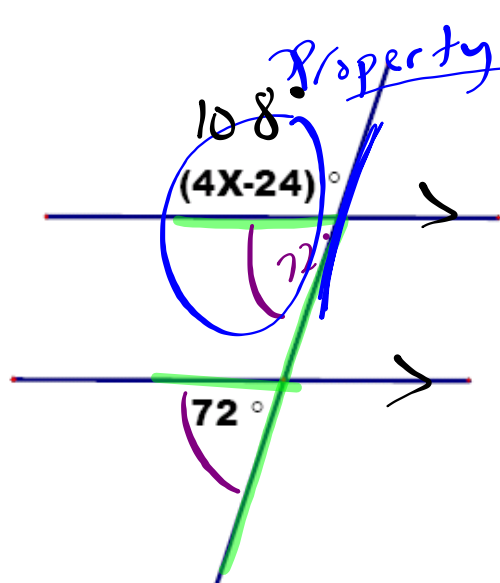
Property → $(4x-24) + 72 = 180 - 72$

108·

(4X-24)°

72

72 °

$4x - 24 = 108$

$4x = 108 + 24$

$x =$ ___33·___

$\dfrac{4x}{4} = \dfrac{132}{4}$

$x = 33·$

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EXAMPLE 2 | Using reasoning to determine unknown angles

Determine the measures of a, b, c, and d.
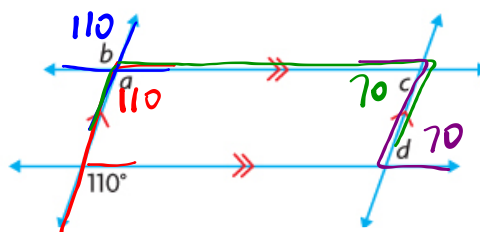
Kebeh's Solution

$\angle a = 110°$

$\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots$ The 110° angle and $\angle a$ are corresponding. Since the lines are parallel, the 110° angle and $\angle a$ are equal.

$\angle a = \angle b$

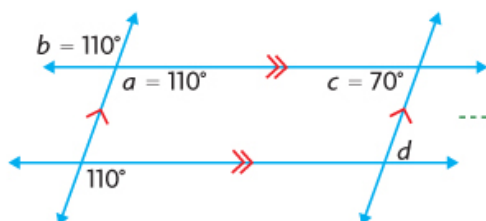$\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots$ Vertically opposite angles are equal.

$\angle b = 110°$

$\angle c + \angle a = 180°$

$\angle c + 110° = 180°$

$\angle c = 70°$

$\angle c$ and $\angle a$ are interior angles on the same side of a transversal. Since the lines are parallel, $\angle c$ and $\angle a$ are supplementary.

I updated the diagram.

$\angle c = \angle d$

$\angle d = 70°$

$\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots$ $\angle c$ and $\angle d$ are alternate interior angles. Since the lines are parallel, $\angle c$ and $\angle d$ are equal.

The measures of the angles are:

$\angle a = 110°$; $\angle b = 110°$;

$\angle c = 70°$; $\angle d = 70°$.

Homework...

p. 72: #2

Assignment - Angle Properties.pdf

p. 78: #1, 4, 15

Attachments

Notes - Geometry Theorems.doc

Assignment - Angle Properties.pdf