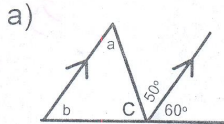Assignment - Angle Properties.pdf

In class Assignment.notebook
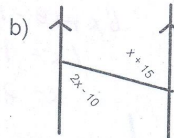
Chapter 7
In class Assignment   Name : ___Key___

1) For each unknown angle, identify the measurement of the angle AND the property you used to solve it:
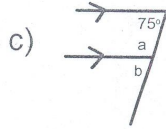
a)

Answers:
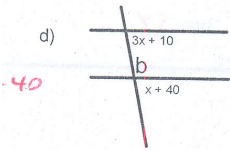c= 70 (SAT)
a= 50° (AIA)
b= 60 (SATT)

b)

Answers:
(AIA)
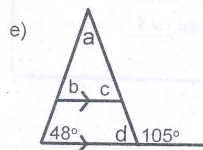x= 25
2x -10 = 40°
x + 15 = 40°

2x-10 = x+15
x = 25

c)

Answers:
a = 105° (CIA)
b = 75° (CA)

d)

3x + 10
b
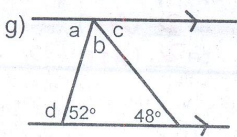x + 40

·40

Answers: (CA)
x= 15
3x + 10 = 55
x + 40 = 55°
b= 125 (CIA)

e)

48°   d   105°
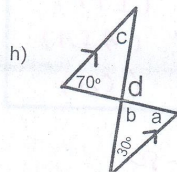
Answers:
d= 75 (SAT)
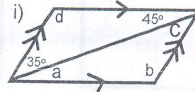c = 75 (CA)
b = 48 (CA)
a = 57° (SATT)

f)
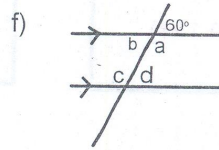
Answers:
a =120° (SAT)
b = 60° (OAT)
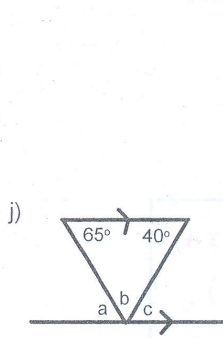c = 120° (AIA)
d = 60° (CA)

g)

d /52°   48°

Answers:
a = 52° (AIA)
b = 80° (SATT)
c = 48° (AIA)
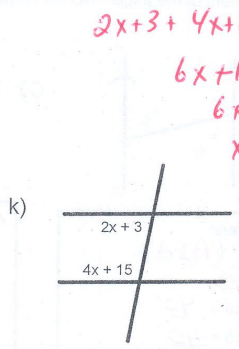d = 128 (SAT)

h)

70°

Answers:
a = 70° (AIA)
b = 80° (SATT)
c = 30° (AIA)
d = 100° (SAT)

i)

45°
35°

Answers:
a = 45° (AIA)
b = 100° (SATT
c = 35° (AIA)
d = 100° (SATT)

$2x+3 + 4x+15 = 180$
$6x + 18 = 180$
$6x = 162$
$x = 27$

$2y + 3y = 90$
$5y = 90$
$y = 18$

j)

65° 40°

a b c

Answers:
$a = 65°$ (AIA)
$b = 75°$ (SATT)
$c = 40°$ (AIA)

k)

2x + 3
4x + 15

Answers: (CIA)
x = 27°
2x + 3 = 57°
4x + 15 = 123°

l)

2y

3y
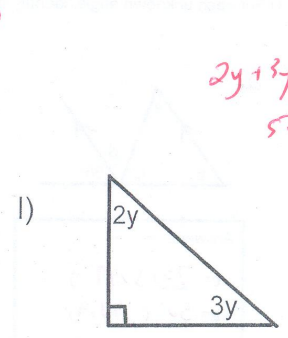
Answers: (CAT)
y = 18°
2y = 36°
3y = 54°

m)

z y
w x 48°
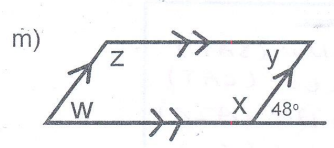
Answers:
$x = 132°$ (SAT)
$y = 48°$ (CIA)
$w = 48°$ (CA)
$z = 132°$ (CIA)

n)

x
w 80° y z
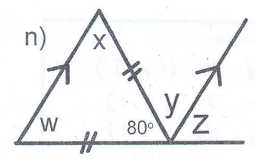
Answers:
$w = 50°$ (ITT)
$x = 50°$ (ITT)
$y = 50°$ (AIA)
$z = 50°$ (CA)

$\dfrac{180 - 80}{2}$

o)

a
5x + 3   3x + 17
70°   b
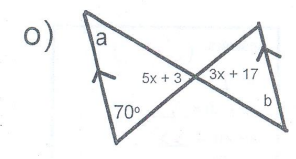
$5x + 3 = 3x + 17$
$2x = 14$
$x = 7$

Answers:
x = 7 (OAT)
5x + 3 = 38°
3x + 17 = 38°
a = 72° (SATT)
b = 72° (SATT)

2

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EXAMPLE 2 | Using reasoning to determine unknown angles

Determine the measures of a, b, c, and d.

$a = 110°\ (CA)$

$b = 110°\ (OAT)$

$110°$

$a\ 110°$

$110°$

$70°$

$c = 70°\ (CIA)$

$d = 70°\ (AIA)$

Kebeh's Solution

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

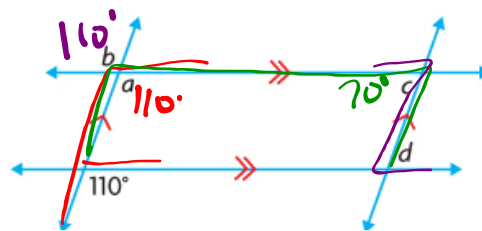$\angle a = \angle b$ -------------------- Vertically opposite angles are equal.
$\angle b = 110°$

$\angle c + \angle a = 180°$ $b = 110°$

$\angle c + 110° = 180°$ $a = 110°$ $c = 70°$

$\angle c = 70°$ $110°$ d
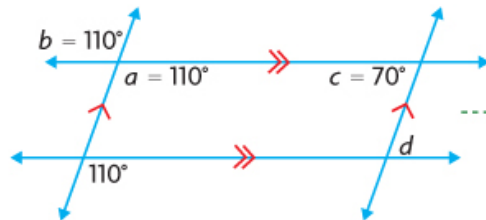
$\angle c$ and $\angle a$ are interior angles on the same side of a transversal. Since the lines are parallel, $\angle c$ and $\angle a$ are supplementary.

I updated the diagram.

$\angle c = \angle d$
$\angle d = 70°$ ----------------- $\angle c$ 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:
$\angle a = 110°; \angle b = 110°;$
$\angle c = 70°; \angle d = 70°.$

3

| EXAMPLE 3 | Using reasoning to solve problems | **JUSTIFY!!!** |

Determine the measures of
$\angle NMO$, $\angle MNO$, and $\angle QMO$.

$\angle MNO = 47°\ (AIA)$

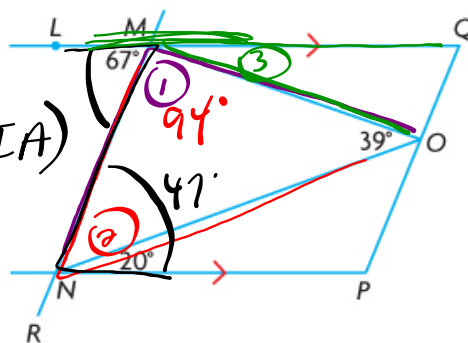$\angle NMO = 94°\ (SATT)$

$\angle QMO = 19°\ (SAT)$

Tyler's Solution

MN is a transversal of parallel lines LQ and NP. ------- MN intersects parallel lines LQ and NP.

$\angle MNO + 20° = 67°$ ---------------------------- Since $\angle LMN$ and $\angle MNP$ are alternate interior
$\qquad \angle MNO = 47°$ angles between parallel lines, they are equal.

$\angle NMO + \angle MNO + 39° = 180°$ ----------- The measures of the angles in a triangle add
$\quad \angle NMO + (47°) + 39° = 180°$ to 180°.
$\qquad\quad \angle NMO + 86° = 180°$
$\qquad\qquad\quad \angle NMO = 94°$

$\angle NMO + \angle QMO + 67° = 180°$ ----------- $\angle LMN$, $\angle NMO$, and $\angle QMO$ form a straight line, so
$\quad (94°) + \angle QMO + 67° = 180°$ their measures must add to 180°.
$\qquad 161° + \angle QMO = 180°$
$\qquad\qquad \angle QMO = 19°$

The measures of the angles are:
$\angle MNO = 47°$; $\angle NMO = 94°$; $\angle QMO = 19°$.

4

Geometric Proofs... The 'Two-Column Proof'

Key Terms (in your notes)...

deductive reasoning

Drawing a specific conclusion through logical reasoning by starting with general assumptions that are known to be valid.

proof

A mathematical argument showing that a statement is valid in all cases, or that no counterexample exists.

transitive property

If two quantities are equal to the same quantity, then they are equal to each other.
If $a = b$ and $b = c$, then $a = c$.

two-column proof

A presentation of a logical argument involving deductive reasoning in which the statements of the argument are written in one column and the justifications for the statements are written in the other column.

STATEMENT | JUSTIFICATION
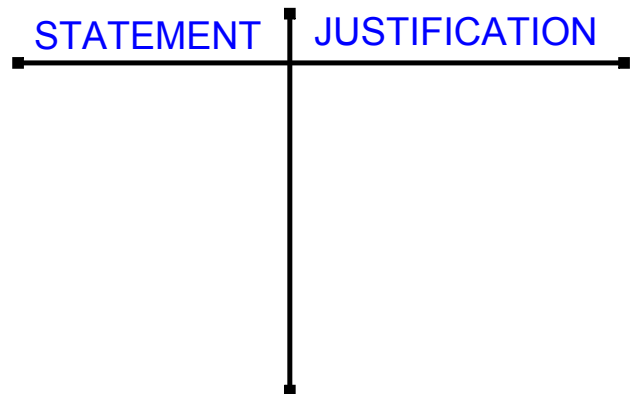
***ADD this one to your notes...

> **converse**
>
> A statement that is formed by switching the premise and the conclusion of another statement.

EXAMPLES...

Conjecture: If it is raining outside, then the grass is wet.

CONVERSE: If the grass is wet, then it is raining.

THEOREM: If you have parallel lines, then the corresponding angles are equal.

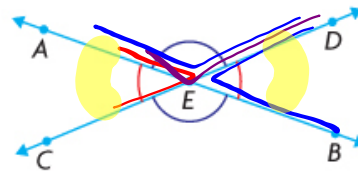**CONVERSE:** If the corresponding angles are equal, then the lines are parallel.

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| EXAMPLE **4** | Using deductive reasoning to prove a geometric conjecture |

Prove that when two straight lines intersect, the vertically opposite angles are equal.

Jose's Solution: Reasoning in a two-column proof

Statement	Justification	
$\angle AEC + \angle AED = 180°$	Supplementary angles	SAT
$\angle AEC = 180° - \angle AED$	Subtraction property	
$\angle BED + \angle AED = 180°$	Supplementary angles	SAT
$\angle BED = 180° - \angle AED$	Subtraction property	
$\angle AEC = \angle BED$	**Transitive property**	

Example #2:

2 equal

parallel

In $\triangle EFG$, GI bisects $\angle FGH$

a) If $\angle E = \angle y$, then prove that $EF \parallel GI$
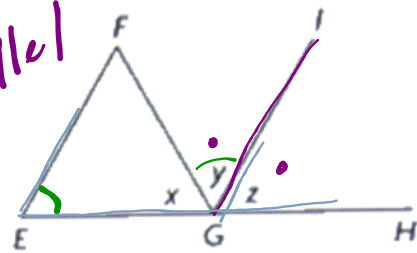
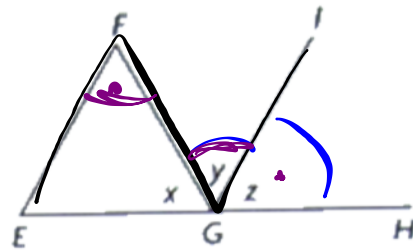| Statement	Justification
$\angle y = \angle z$	Bisected
$\angle E = \angle y$	Given
$\angle E = \angle z$	Transitive
$\therefore EF \parallel GI$	CA

Therefore

In $\triangle EFG$, GI bisects $\angle FG\underline{H}$

b) If $\angle F = \angle z$, then prove that EF || GI

S	J
$\angle y = \angle z$	Bisected
$\angle F = \angle z$	Given
$\angle y = \angle F$	Transitive
$\therefore$ EF || GI	AIA

Homework...

p. 72: #2, 4-6

p. 78: #1, 2, 4, 8, 10, 12, 15, 20

Attachments

Assignment - Angle Properties.pdf