2.1

- Inductive Reasoning: Using examples to make a conclusion

- Conjecture ⟺ Conclusion

Ex) Movie times

8:30, 9:45, 11, 12:15, ?? 1:30

Ex) 4, 10, 18, 28, 40, (54)

Ex) If $x^2 = 9$ then $x = 3$ True

F, $x = -3$

If $x = 3$, then $x^2 = 9$

(T)

Ex) If n is a real #, then $n^2 > n$ T or F

F: If n is 0, $0^2 > 0$ = False

$n = 1$ $1^2 > 1$ = False

$n = \frac{1}{2}$ $\frac{1}{4} > \frac{1}{2}$ = False

Ex) The sum of 2 odds is even

$7 + 5 = 12$

$9 + 3 = 12$

$11 + 7 = 18$

2.2

Conditional Statements: "If", "Then"

"If" = Given, Known, Stuff We Know, Hypothesis

"Then" = Conclusion

Ex) An angle that measures 30 is an acute angle

If an angle measures 30°, Then it is acute ∠

Converse: The reverse of the conditional

Inverse: Negate the conditional. : $\sim P \rightarrow \sim Q$ (Negation)

↳ What it is not

Contrapositive: Negate the converse : $\sim Q \rightarrow \sim P$

** Conditional and the contrapositive are logically equivalent

Converse/Inverse are logically equivalent

Sec: 2.3 : Deductive Reasoning

Deductive Reasoning : Using facts, definitions, theorum to make conclusions

- Law of Detatchment: If p implies q is true and p is true then q must be true

Ex) If a car is out of gas then it will not start.

P/1 Q/2

John's car is out of gas

C: John's car wont start

Law of Syllogism: If p implies q and q implies r then p has to imply r

$p \to q$ $q \to r$

$p \to r$ P Q

Ex) If I get a job then I will earn money

If I earn money then I can buy a car

C: If I get a job then I can get a car

STEPS For Proof - 2.4

- Draw 2 column
- Left column is statements (we get these by making conclusions from the INFO we KNOW)
- Right column is the Reasons (These will always be our Definitions or Thm's)

- STEP 1: Start with the Given Info
- STEP 2: Use the written given INFO to make a conclusion. If you need help say the given info in words using "if, then" form. The "If" will be the given info, the then will be your conclusion. This statement will then be your reason.
- STEP 3: Use step 2 to make a conclusion. If you need help say step 2 in words using "If, then" form. The then will be your conclusion. This statement will also be your reason
- STEP 4: use step 3 to make a conclusion.
  - Keep following this process until you go in circles
  - when/if you can't make any conclusions, then go to the Diagram and see if you can make conclusions, using concepts like (Linear Pair, Vertical ∠'s, Addition Prop. Subtraction Prop etc.)

** Look to combine steps/statements to help make conclusions.

*** Be Precise with your statements and reasons. You can Abbreviate but write them out. Word For Word.

Formal

Sec 2.6 Note

- Angle Addition Postulate. $\Longrightarrow$ Proof.

$\cong$ + $\cong$ are $\cong$ $\Rightarrow$ for angles

$\cong$ - $\cong$ are $\cong$ $\Rightarrow$

Thm - If 2 angles are Supp to the same $\angle$, then they are $\cong$.

Thm - If 2 angles are Comp to the same $\angle$, then they are $\cong$

Thm - If 2 angles are Supp. to $\cong$ $\angle$'s, then they are $\cong$.

Thm - " " " are Comp To " " " " "

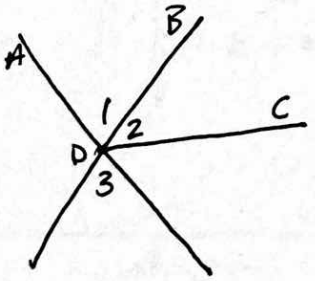
Thm - If 2 angles are Rt $\angle$'s, then they are $\cong$.

Thm - If 2 angle are Supp./$\cong$, then they are Rt $\angle$'s

Do this beginning of class before 2.7

4 steps: $\overrightarrow{DB}$ bisects $\angle ADC$.

P: $\angle 2 \cong \angle 3$



Pg 164.

1-13, 15

36-40, 42

1)

2) $\angle 1 \cong \angle 2$ - $\angle$ Bis.

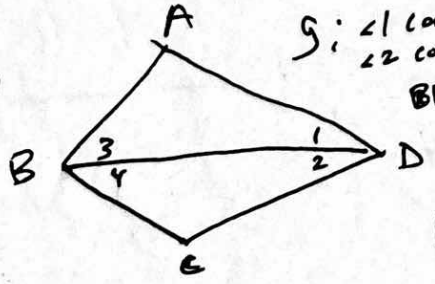
3) $\angle 1 \cong \angle 3$ - Vert

4) $\angle 2 \cong \angle 3$ Trans

3 steps

G: $\angle 1$ comp $\angle 4$
$\angle 2$ comp $\angle 3$
BD bisects ABC

P: $\angle 1 \cong \angle 2$



P:

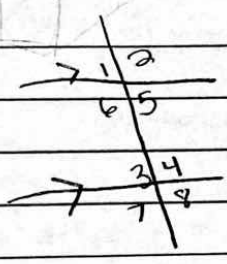
Sec 2.7 - Parallel Lines (Final Test)

Parallel Lines: If 2 coplaner lines are parallel, then they never intersect.

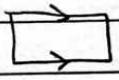
Skew Lines: 2 non-coplaner lines that dont intersect

Parallel Planes: 2 planes that never intersect

Transversal: A line that intersects parallel lines



Corresponding ∠'s
∠1 and ∠3
∠6 and ∠7
∠2 and ∠4



> = Parallel

Consecutive Interior
∠6 and ∠3
∠5 and ∠4

Alternate Interior
∠6 and ∠4
∠5 and ∠3

Alternate Exterior
∠1 and ∠8
∠2 and ∠7

Sec. 2.7 - Thms w/ // lines

Th 13: If 2 lines are parallel, then corresponding ∠'s are ≅.

Th 14: If 2 lines are //, then alternate interior ∠'s are ≅

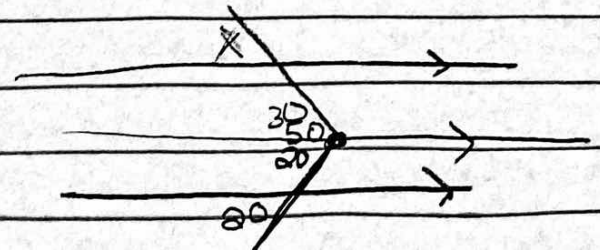
Th 15: If 2 lines are //, then alternate exterior ∠'s are congruent

Th 16: If 2 lines are //, then consecutive interior are supp

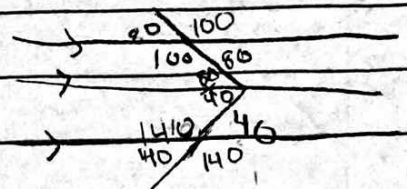
Th 17: If a line is perpendicular to 1 of 2 parallel lines, then it is perpendicular to the other

Crook Problems:

$x = 30$



$x = 120$

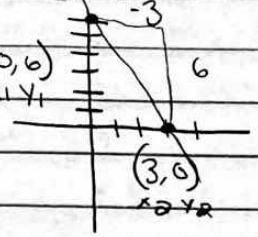


2.8 Equations of lines and slope

Slope: Steepness of a line / is a ratio (fraction)

$-\frac{\text{Rise}}{\text{Run}}$ } Graph • $m = \frac{y_2 - y_1}{x_2 - x_1}$ } Coordinates •

Ex



$\frac{\text{Rise}}{\text{Run}} = \frac{6}{-3} = -\frac{2}{1}$

$\frac{0-6}{3-0} = \frac{-6}{3} = -\frac{2}{1}$

Write Equations of Lines:

Slope Intercept Form:

$y = mx + b$

b = y intercept

mx = slope

1) Find slope

2) Find y intercept

Ex) $(2,6)$ $(-4,-3)$ (x, y, x, y)

$y = mx + b$

1) Find m

$\frac{-3-6}{-4-2} = \frac{-9}{-6} = \frac{3}{2}$

2) Find y intercept

$(0, y)$

$y = mx + b$

$6 = \frac{3}{2}(\frac{2}{1}) + b$

$6 = 3 + b$

$-3 \quad -3$

$3 = b$

$y = \frac{3}{2}x + 3$

Th: If 2 lines are parallel then they have the same slope

Th: If 2 lines are perpendicular then their slopes are – reciprocals

a product of -1

Write an equation of a line who is $\perp$ to $(3,2)$ $(-4,-7)$

$\frac{y_2 - y_1}{x_2 - x_1}$

$\frac{-7-2}{-4-3} = \frac{-9}{-7} = \frac{9}{7}$

$\perp m = -\frac{7}{9}$

$y = mx + b$

$y = -\frac{7}{9}x + b$

$2 = -\frac{7}{9}(\frac{1}{2}) + b$

$2 = \frac{7}{2} + b$

Sec 2.9 Notes:

. Please Put Following Th^{m}'s on your Th^{m} Page.

1) If corresponding $\angle$'s are $\cong$, then the lines are Parallel

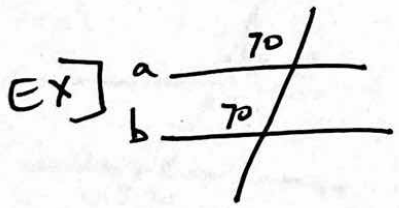
2) If alt. Int. $\angle$'s are $\cong$, then lines are Parallel.

3) If alt. Ext $\angle$'s are $\cong$, then lines are Parallel.

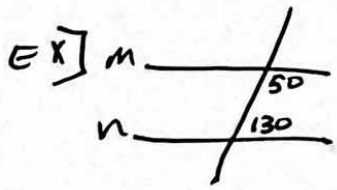
4) If Consecutive $\angle$s are Supp, then lines are Parallel

** Be careful with these theorems and the First ones You got. They are Converse's of Eachother.

** Really Pay attention to the "If" so you Can make/know the correct conclusion.

Ex] 

given: the picture:
conclusion: a // b
Reason: If corresponding $\angle$'s are $\cong$, then lines are //.

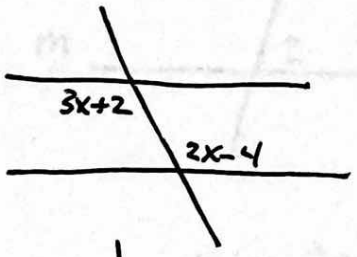
Ex] 

given: Picture:
Conclusion: m // n
Reason: If Consecutive Int $\angle$'s are Supp then lines are //.

- Again Be Careful with the given (If)!

Sec 2.9 Notes Cont.:

Ex) Find x so that a is Parallel to b.



- Since we want lines Parallel we know 4 Th'm's to make that happen (we Just wrote them down) For this Picture we are thinking:

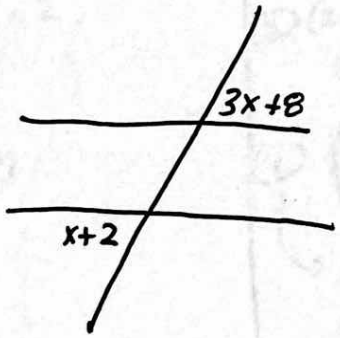
→ If Alt. Int. $\angle$s are $\cong$, then lines are $\parallel$

Thus if we want $a \parallel b$ we will use the equation:

$$3x+2 = 2x-4.$$

Now we can solve for x.

Ex)



→ Find x.

In this Problem you must be very careful!! go through your Th'ms what do you know?? For this Problem we can NOT say:

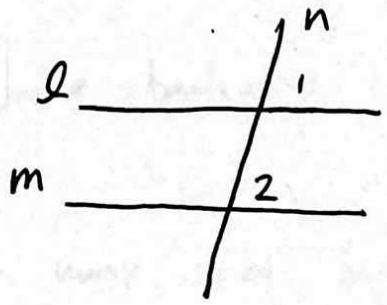
$3x+8 = x+2$ ⟶ why?? Because...

If lines are $\parallel$, then alt ext. $\angle$s are $\cong$.

In this Problem DO we know if lines are $\parallel$?? NO. Thus this Problem has NO solution the way it is given.

** Pay attention TO Detail and the given, then make the appropriate conclusion.

Sec 2.9 Notes. Cont.



g: $l \perp n$
$m \perp n$

P: $l \parallel m$

* start this proof and follow the system like every other proof:

① $l \perp n$, $m \perp n$	① given
② $\angle 1$ RT $\angle$, $\angle 2$ RT $\angle$	② (If is above us) If 2 lines are $\perp$, then they intersect to form RT $\angle$'s.
③ $\angle 1 \cong \angle 2$.	③ (If is above us) If 2 $\angle$'s are RT $\angle$'s, then they are $\cong$.
④ $l \parallel m$	④ (we now know $\angle 1 \cong \angle 2$, look at picture, what types of angles are $\angle 1$ & $\angle 2$?? & we know they are $\cong$) → If corresponding $\angle$'s are $\cong$, then lines are $\parallel$.

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8-21
23, 25, 26
33-35