Geometry, 1.1 Notes – Definitions

For us to learn, we need to agree on a vocabulary of Geometry:

- We decide what to call something and what it means (definition).
- We decide how to write it so everyone knows what we mean (notation).

***Point* – A 'place' or 'position'**

notation: A point is represented by a dot and is named with a capital letter.

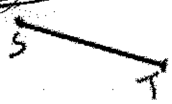
examples: A Q M

***Lines, Line Segments, Rays* – are made up of points and are straight.**

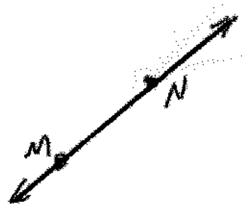
	endpoints	examples / notation
Lines	no endpoints, extends infinitely both directions	 line m  $\overleftrightarrow{AB}$ or $\overleftrightarrow{BA}$
Line Segments	2 endpoints	 $\overline{JK}$ or $\overline{KJ}$ (no arrowheads)
Rays	1 endpoint, extends infinitely in one direction	endpoint  any other point on the ray; $\overrightarrow{RS}$ – list endpoint first – arrowhead on one side

Examples: Name the following:

(pairs)



line segment $\overline{ST}$ or $\overline{TS}$



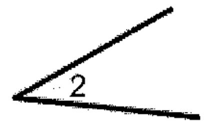
line $\overleftrightarrow{MN}$

ray $\overrightarrow{FG}$

Angle - An angle is made up of 2 rays with a common endpoint.
This point is called the vertex of the angle.
The rays are called sides of the angle.

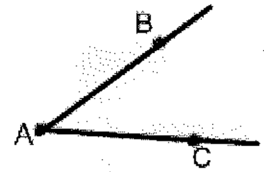
notation: 3 ways to write an angle:

1) letter, number of symbol:



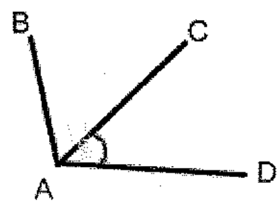
$\angle 2$

2) using 1 vertex point:



$\angle A$

3) using 3 points:

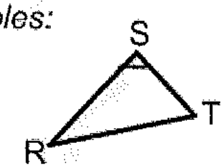


$\angle CAD$
↑
vertex in middle

Triangle - A figure with 3 line segments as its sides.

notation: $\triangle ABD$

examples:



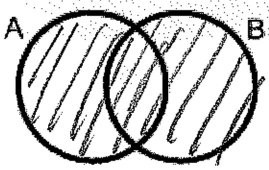
Name the triangle: $\triangle RST$

What are the 3 ways to name the top angle?

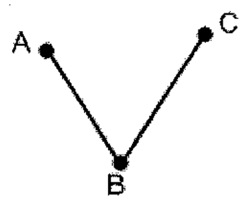
$\angle S$, $\angle RST$, $\angle TSR$

Geometry, 1.1 continued Notes – Union, Intersection, Area, Perimeter

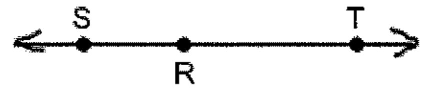
Union = ∪ 'united', 'together'



A ∪ B

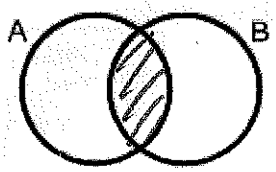


$\overline{AB} \cup \overline{BC} = \angle ABC$



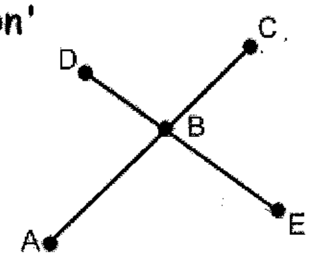
$\overrightarrow{RS} \cup \overrightarrow{RT} = \overleftrightarrow{ST}$

Intersection = ∩ 'overlap', 'like a road intersection'



A ∩ B

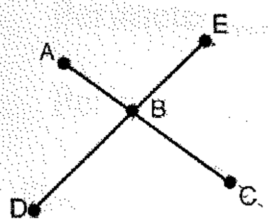
$\overline{AC} \cap \overline{BD} = \overline{BC}$



$\overline{AC} \cap \overline{DE} = B$

$\angle ABD \cap \angle EBC = B$

examples:



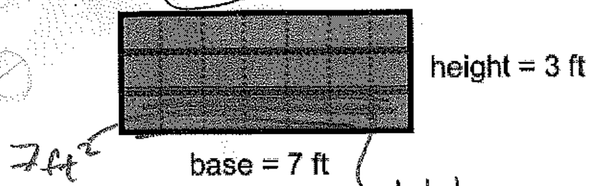
$\overline{AC} \cap \overline{DE} = B$

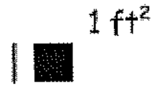
$\overline{AC} \cap \overline{BC} = \overline{BC}$

$\overline{EB} \cup \overline{CB} = \angle EBC$

$\overline{BD} \cup \overline{EB} = \overline{ED}$

Area = Space inside a closed figure



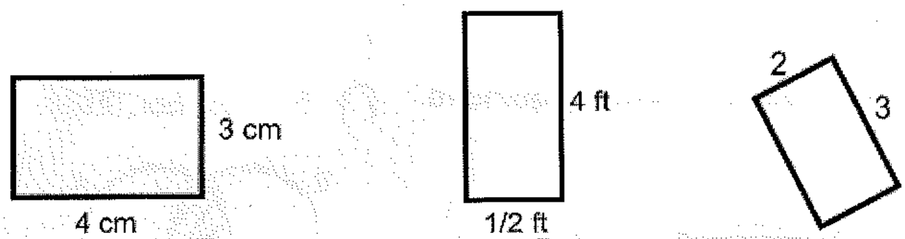


total area = $7ft^2 \times 3 = 21ft^2$

Area = base x height

Area$_{\text{rectangle}}$ = $b \cdot h$

Find the area of each rectangle:



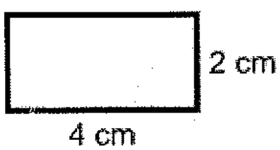
$\boxed{12\ cm^2}$ $\boxed{2ft^2}$ $\boxed{6u^2 \text{ or } 6 \text{ units}^2 \text{ or } 6}$

Perimeter = length around edge of closed figure

Perimeter$_{\text{rectangle}}$ = $2b + 2h$ (= sum of sides)

Perimeter$_{\text{triangle}}$ = sum of sides

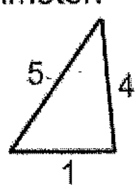
Find the area and perimeter:



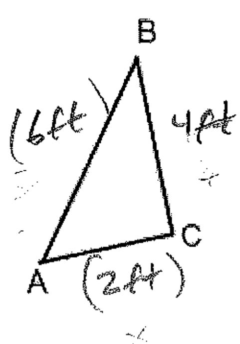
$A = b \cdot h = 4cm \times 2cm = \boxed{8cm^2}$

$P = 2b + 2h = 2(4cm) + 2(2cm) = \boxed{12\ cm}$

Find the perimeter:



$\boxed{10}$



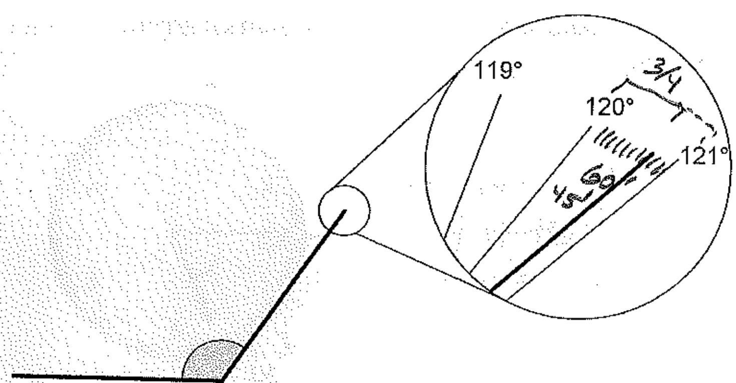
AB is 3 times as long as AC.
BC is 2 times as long as AC.
If BC = 4 ft, what is the perimeter? $\boxed{12ft}$

Geometry, 1.2 day 1– Object vs. measure, angle measure, clock problems

item	how item is written	how measure is written
line segment	$\overline{AB}$	AB (length)
angle	$\angle CAB$	$m\angle CAB$ (degrees)

Can a line segment have a measure? No Can a ray have a measure? NO

Angle units: degrees - *How do you write part of a degree?*



3 ways:

1) decimal: 120.75°
2) fraction: $120\frac{3}{4}^\circ$
3) degrees-minutes-seconds (DMS): $120^\circ 45' 00''$

($\frac{3}{4}$ of $60 = 45$)

each degree (1°) is divided into 60 minutes

each minute (1') is divided into 60 seconds

Change to degrees-minutes-seconds:

copy

87.7° $\boxed{87^\circ 42'}$

(multiply by 60)

$.7 \times 60 = 42'$

Change to degrees:

copy

$19^\circ 45'$ $19\frac{3}{4}^\circ$

(divide by 60)

$\frac{45}{60}$ simplify $\frac{\div 15}{\div 15}$ $= \frac{3}{4}^\circ$

Practice:

Change 127.25° to deg-min-sec

$\boxed{127^\circ 15'}$

$.25 \cdot 60 = 15'$

chan to $25^\circ 30'$

Change ~~25°45'~~ to degrees

$\boxed{25\frac{3}{4}^\circ \text{ or } 25.75^\circ}$

$\frac{45}{60} = \frac{3}{5}$

Adding and Subtracting angles:

Just like regular addition/subtraction except carry and borrow are slightly different...

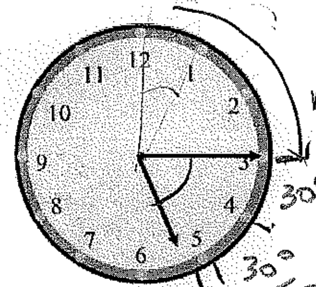
Subtracting:

$$\begin{array}{r} {}^{3}\cancel{4}5 \\ -19 \\ \hline 26 \end{array} \qquad \begin{array}{r} 89^\circ\ 69'\ 65 \\ \cancel{90^\circ}\ \cancel{10'}\ \cancel{05''} \\ -\ 37^\circ\ 66'\ 10'' \\ \hline 52^\circ\ 3'\ 55'' \end{array}$$

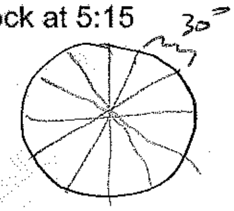
Practice:

$$\begin{array}{r} 1\quad 1\ \ \\ 35^\circ\ 53'\ 42'' \\ +\ 22^\circ\ 33'\ 31'' \\ \hline 58\ \ 87\ \ 73 \\ -60\ -60 \\ \hline 27'\ 13'' \end{array} \qquad 58^\circ 27' 13''$$

Find the angle formed by the hands of a clock at 5:15



$\frac{360^\circ}{12} = 30^\circ$



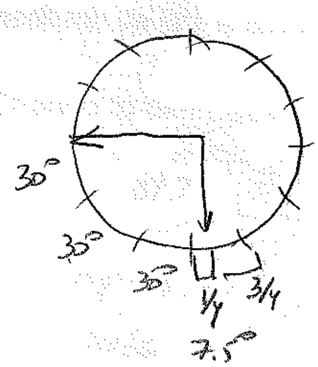
minute hand is $\frac{1}{4}$ of the way around

$\frac{1}{4}$ of $30^\circ = \frac{30^\circ}{4} = 7{,}5^\circ$

$$\begin{array}{r} 7.5 \\ 4\overline{)\,30} \\ 28 \\ \hline 20 \end{array}$$

$30^\circ + 30^\circ + 7{,}5^\circ = 67{,}5^\circ$

Practice: Find the angle formed by the hands of a clock at 5:45

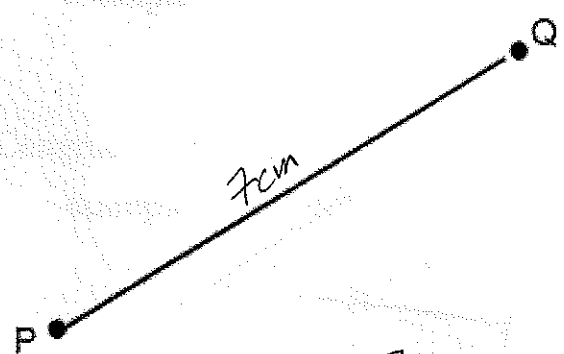


$97{,}5^\circ$

Geometry, 1.2 day2 – Measuring lengths and angles, types of angles, angle problems

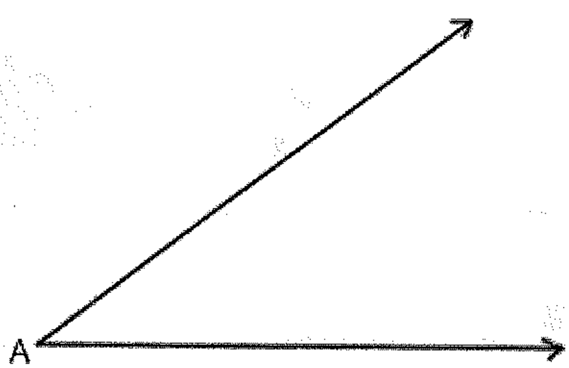
item	how item is written	how measure is written	measure with
line segment	$\overline{AB}$	AB	ruler
angle	∠CAB	m∠CAB	protrador

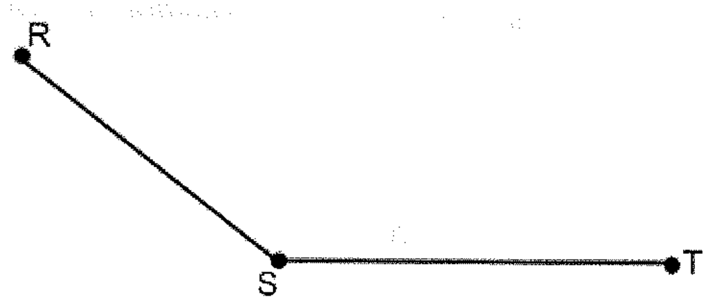
~~Can a line segment have a measure?~~ ~~Can a ray have a measure?~~



PQ = 7cm

CD = 4,2cm





m∠A = 37°

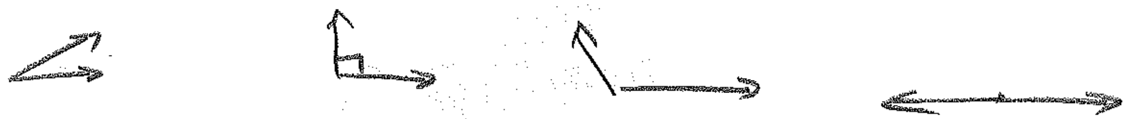
m∠RST = 142°

Angles can be classified into 4 types:

An acute angle is an ∠ whose measure is between 0° and 90°
A right angle is an ∠ whose measure is 90°
An obtuse angle is an ∠ whose measure is between 90° and 180°
A straight angle is an ∠ whose measure is 180°

Draw an example of each.

Acute angle   Right angle   Obtuse angle   Straight angle

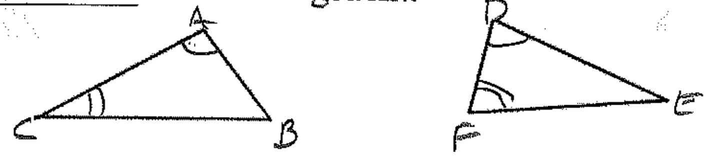


Congruent segments and angles:

Congruent angles are angles that have the <u>same</u> measure.

The symbol <u>$\cong$</u> means congruent.

example:

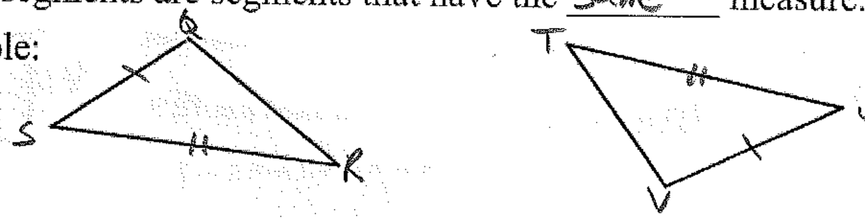


$\angle A \cong \angle D$

$\angle C \cong \angle F$

Congruent segments are segments that have the <u>same</u> measure.

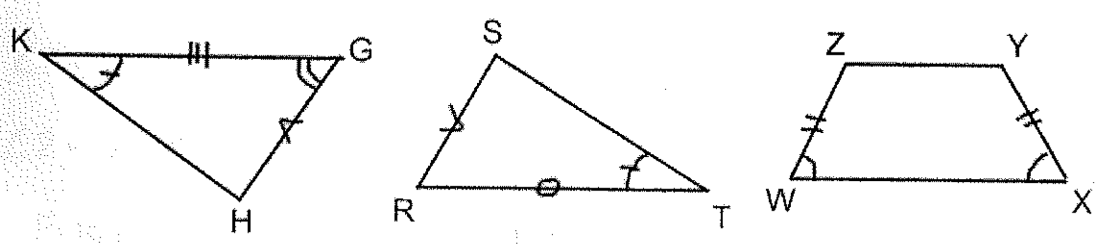
example:



$\overline{QS} \cong \overline{VU}$

$\overline{SR} \cong \overline{TU}$

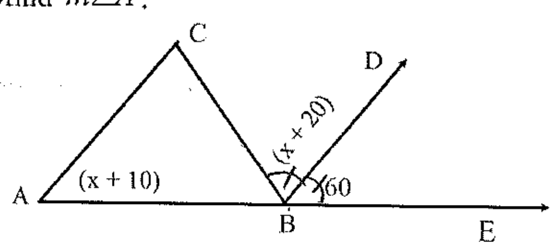
Identical <u>tick</u> <u>marks</u> are used to indicate $\cong$ angles and segments.



List all the congruent parts. $\overline{GH} \cong \overline{SR}$, $\angle K \cong \angle T$, $\angle W \cong \angle X$, $\overline{WZ} \cong \overline{YX}$

<u>Using congruency to solve for angles, sides or variables</u>:

If $\angle CBD \cong \angle DBE$, find $m\angle A$.



1) what is being asked?
find $m\angle A$

2) what do I need to answer?
$m\angle A = x+10$
So I need x

3) Use other info to find what you need

$x+20 = 60$
$-20 \quad -20$
$x = 40$

4) find final answer

$x=40$

So $m\angle A = x+10$

$m\angle A = 40+10$

$\boxed{m\angle A = 50°}$

General strategies
- label the drawing with all givens

Given:

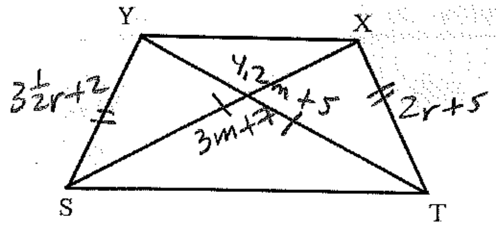
$\overline{XS} \cong \overline{YT}$, $\overline{YS} \cong \overline{XT}$,

$XT = 2r + 5$

$XS = 3m + 7$

$YS = 3\frac{1}{2}r + 2$

$YT = 4.2m + 5$



Solve for r and m.

$2r+5 = 3\frac{1}{2}r+2$

$2r+5 = \frac{7}{2}r+2$

$4r+10 = 7r+4$

$10 = 3r+4$

$6 = 3r$

$\boxed{2 = r}$

$4.2m+5 = 3m+7$

$1.2m+5 = 7$

$1.2m = 2$

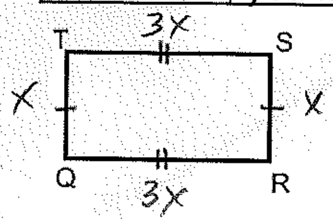
$m = \frac{2}{1.2}\cdot\frac{10}{10}$

$m = \frac{20}{12}$

$m = \frac{10}{6}$

$\boxed{m = \frac{5}{3}}$

Sometimes, you need to add your own variable to solve a problem:



Perimeter of rectangle QRST is 100 m.

If $\overline{ST}$ is 3 times as long as $\overline{RS}$, how long is $\overline{QR}$?

- make the smallest thing 'x'

$P = 3x + x + 3x + x = 8x$

$P = 8x$

$\frac{100}{8} = \frac{8x}{8}$

$\frac{100}{8} = x$

$QR = 3x$

$QR = \frac{3}{1}\left(\frac{100}{8}\right) = \frac{300}{8}$

$= \frac{150}{4}$

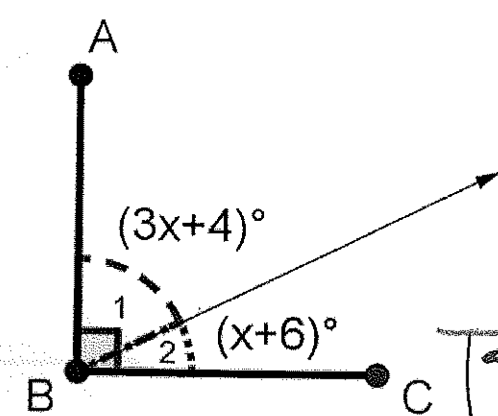
$= \boxed{\frac{75}{2}\ m}$

∠ABC is a right angle.

∠1 = (3x+4)°

∠2 = (x+6)°

Find m∠1



$3x+4 + x+4 = 90$

$4x+8 = 90$

$4x = 82$

$x = \frac{82}{4} = \boxed{\frac{41}{2}}$

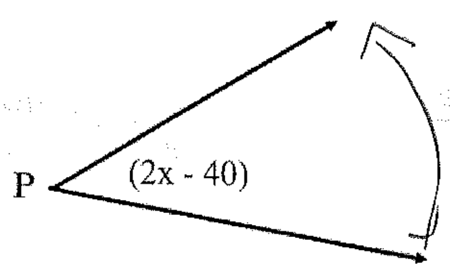
- things might not be equal, things might add up to something.

Angle range, restriction problems:

$\angle P$ is acute,

What are the restrictions on $m\angle P$?

What are the restrictions on x?



< 90°

(also can't be smaller than zero)

$0° < 2x - 40 < 90°$

$+40 \quad +40 \quad +40$

$40° < 2x < 130°$

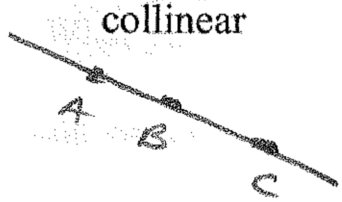
$\boxed{20° < x < 65°}$

Geometry, 1.3 – Collinearity, Betweenness, Diagram Assumptions

Points that lie on the same line are called collinear.
Points that DO NOT lie on the same line are called noncollinear.

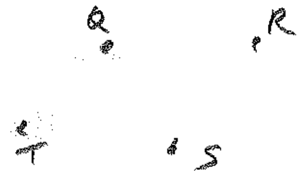
'Co' = same
'linear' = line

collinear



noncollinear

Draw a diagram showing four points, no three of which are collinear.

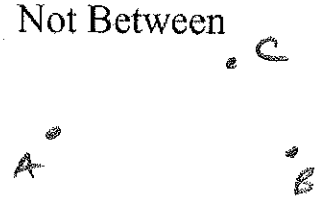


In order for us to say that a point is between two other points, all three of the points must be collinear.

Between

C is between A and B

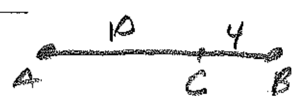
Not Between



C is not between A and B.

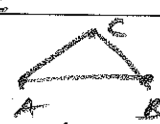
For any **three** points there are only two possibilities:

1. They are collinear. One point is between the other two. Two of the distances add up to the third.



AB = 14

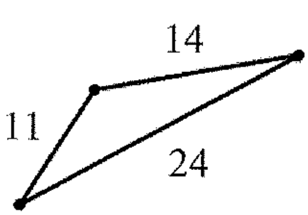
2. They are noncollinear. The three points determine a triangle.



An important characteristic of triangles:

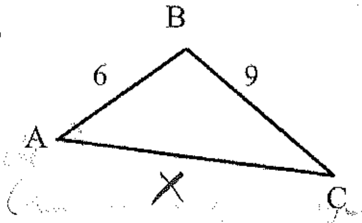
$11 + 14 > 24$
$11 + 24 > 14$
$14 + 24 > 11$

2 sides added > 3rd side



AC must be smaller than what number?

15



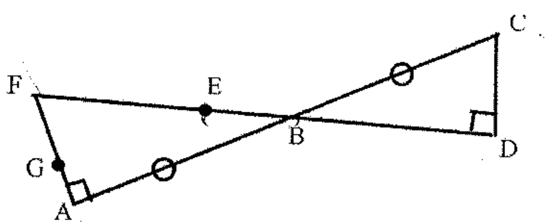
AC must be larger than what number?

$x+6 > 9 \Rightarrow x > 3$

or $x+9 > 6 \Rightarrow x > 3$ $\boxed{AC > 3}$

What you can and cannot assume about a diagram

You Should Assume	You Should Not Assume
straight lines / straight $\angle$s	right angles
collinear points	$\cong$ segments
betweenness of points	$\cong$ $\angle$s
relative positions	sizes



a Name all points collinear with E and F. B & D

b. Are G, E, and D collinear? NO Are F and C collinear? Yes (any 2 pts are collinear)

c. Which two segments do the tick marks indicate are congruent? $\overline{AB} \cong \overline{BC}$

d. Is $\angle A \cong \angle D$ yes

e. Is $\angle F \cong \angle ABF$? no

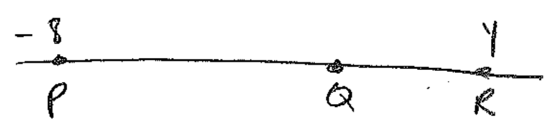
f. Where do $\overline{AC}$ and $\overleftrightarrow{FE}$ intersect? B ($\overleftrightarrow{FE}$ is a line)

g. $\overline{AG} \cap \overline{GF} =$ G

h. $\overline{AG} \cup \overline{GF} =$ $\overline{AF}$

i. B lies on a ray whose endpoint is E. Name this ray in all possible ways. $\overrightarrow{EB}$, $\overrightarrow{ED}$

j. Name all points between F and D. E, B



Q is between P and R on a number line. $P = -8$, and $R = 4$

a. What do we know about the coordinate of Q? $-8 < Q < 4$

b. What do we know about the length $PQ + QR$? 12

Geometry, 1.4 Notes – Simple Proofs

What is a proof? It is a step-by-step argument to convince someone that something is true. It gives reasons for each step in the argument.

Example: You want to convince your mom to let you go to the mall.

Statement	Reason
1. I cleaned my room.	1. Fact
2. You gave me $10.	2. I get $10 if I clean my room.
3. I get to go to the mall.	3. You said if I had money, I could go to the mall.

A **Theorem** is: A mathematical statement that can be proved.

We prove mathematical statements using Two-column proofs:

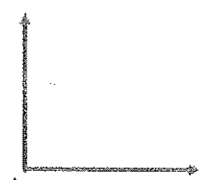
Examples:

Theorem 1: If two angles are right angles, then they are congruent.

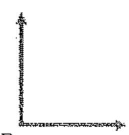
Given: $\angle A$ is a right $\angle$

$\angle B$ is a right $\angle$

Prove: $\angle A \cong \angle B$



A



B

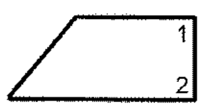
Statement	Reason
1. $\angle A$ is a right angle	1. Given
2. $m\angle A = 90°$	2. rt angles have measure $= 90°$
3. $\angle B$ is a right angle	3. Given
4. $m\angle B = 90°$	4. rt angles have measure $= 90°$
5. $\angle A \cong \angle B$	5. 2 angles with same measure are $\cong$

You can use theorems you've already proved to make other proofs shorter:

Given: $\angle 1$ is a right $\angle$

$\angle 2$ is a right $\angle$

Prove: $\angle 1 \cong \angle 2$



Full Proof:

Statements	Reasons
1. $\angle 1$ is a rt. angle	1. Given
2. $\angle 2$ is a rt. angle	2. Given
3. $m\angle 1 = 90°$	3. Measure of rt angle is 90°
4. $m\angle 2 = 90°$	4. Measure of rt angle is 90°
5. $\angle 1 \cong \angle 2$	5. If 2 angles have same measure, they are $\cong$

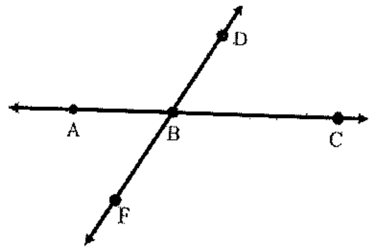
Shorter Proof:

Statements	Reasons
1. $\angle 1$ is a rt. angle	1. Given
2. $\angle 2$ is a rt. angle	2. Given
3. $\angle 1 \cong \angle 2$	3. Theorem 1 - If two angles are rt angles, then they are congruent.

Theorem 2: If two angles are straight angles, then they are congruent.

Given: Diagram

Prove: $\angle ABC \cong \angle FBD$



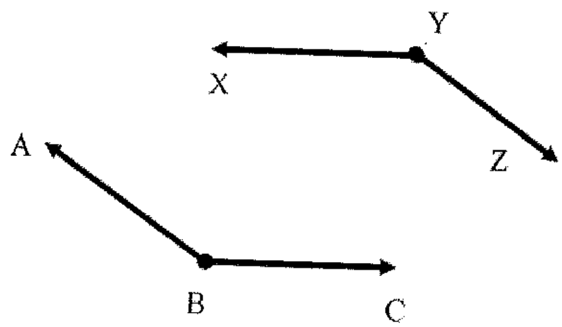
Statement	Reason
1. $\angle ABC$ is a straight angle	1. Given
2. $m\angle ABC = 180°$	2. straight $\angle$'s have measure $= 180°$
3. $\angle FBD$ is a straight angle	3. Given
4. $m\angle FBD = 180°$	4. straight $\angle$'s have measure $= 180°$
5. $\angle ABC \cong \angle FBD$	5. 2 angles with same measure are $\cong$

Try it

Given: $\angle ABC = 115°$

$\angle XYZ = 115°$

Prove: $\angle ABC \cong \angle XYZ$



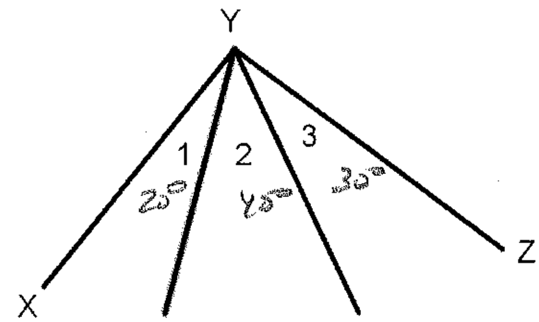
Statements	Reasons
1 $\angle ABC = 115°$	1. Given
2 $\angle XYZ = 115°$	2. Given
3 $\angle ABC \cong \angle XYZ$	3. angles with same measure are $\cong$

Given: $\angle 1 = 20°$

$\angle 2 = 40°$

$\angle 3 = 30°$

Prove: $\angle XYZ$ is a right angle.



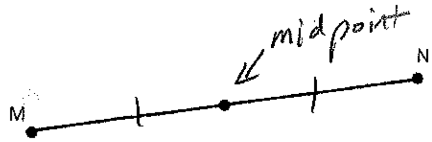
Statement	Reason
1. $\angle 1 = 20°$	1. Given
2. $\angle 2 = 40°$	2. Given
3. $\angle 3 = 30°$	3. Given
4. $\angle XYZ = 90°$	4. addition
5. $\angle XYZ$ is a right angle	5. right angles have measure $= 90°$

Geometry, 1.5 Notes – Division of segments and angles

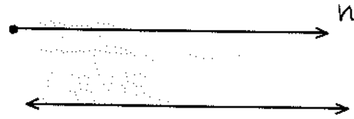
Bisect means divide into 2 equal (congruent) pieces

Trisect means divide into 3 equal pieces

You can bisect a line segment. The point that divides the segment in half is called the midpoint



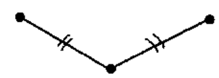
Line segments can have a midpoint, but rays and lines cannot:



no end
can't find a 'middle'

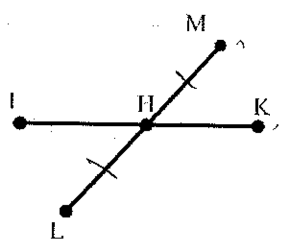
Midpoints have to be collinear with line segment endpoints:

midpoint



not a midpoint

If $\overline{IK}$ bisects $\overline{LM}$ at H, what can we assume?



H is the midpoint of $\overline{LM}$

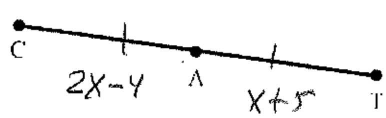
$\overline{LH} \cong \overline{HM}$

Given: A is the midpoint of $\overline{CT}$

$CA = 2x - 4$

$AT = x + 5$

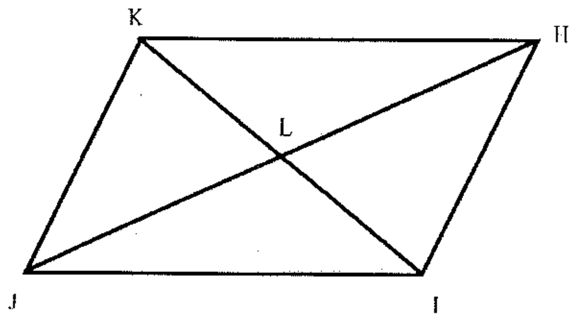
Find: CT



$$2x - 4 = x + 5$$
$$-x \quad\quad -x$$
$$x - 4 = 5$$
$$+4 \quad\quad +4$$
$$x = 9$$

$AT = 9 + 5 = 14$

$CT = 2 \cdot AT = 28$

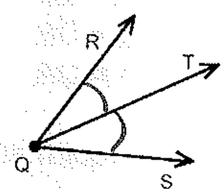


Given: $\overline{JL} \cong \overline{HL}$

Conclusion: L is the midpoint of $\overline{JH}$

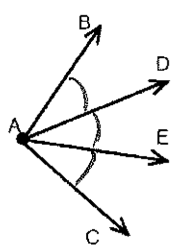
Statement	Reason
1. $\overline{JL} \cong \overline{HL}$	1. Given
2. L is the midpoint of $\overline{JH}$	2. A point divides a segment into two congruent segments is the midpoint.

Angles can also be bisected or trisected:



$\overrightarrow{QT}$ bisects $\angle RQS$

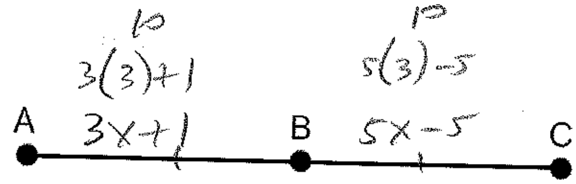
$\overrightarrow{QT}$ is called an angle bisector



$\overrightarrow{AD}$ and $\overrightarrow{AE}$ trisect $\angle BAC$

$\overrightarrow{AD}$ and $\overrightarrow{AE}$ are called angle trisector partners w/whiteboards

Try it...

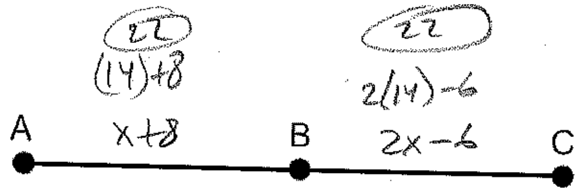


Given: $AB = 3x + 1$
$BC = 5x - 5$
B is the midpoint of AC

Find: AC $= \boxed{20}$

$3x+1 = 5x-5$
$-3x \quad -3x$
$1 = 2x-5$
$+5 \quad +5$
$6 = 2x$
$\frac{6}{2} = \frac{2x}{2}$
$2 = x$

Try it...



44

Given: $AB = x + 8$
$BC = 2x - 6$
$AC = 44$

Is B the midpoint of AC? $\boxed{\text{yes}}$

$x+8+2x-6 = 44$
$3x+2 = 44$
$3x = 42$
$x = 14$

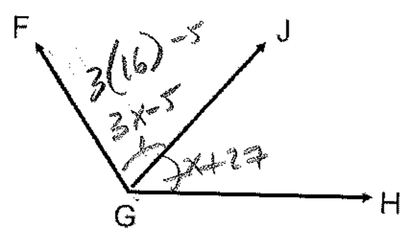
$42 \div 3 = 14$

$14 \times 2 = 28$
$28 - 6 = 22$

Try it...

Given: $m\angle FGJ = 3x - 5$
$m\angle JGH = x + 27$
$\overrightarrow{GJ}$ *bisects* $\angle FGH$

Find: $m\angle FGJ$ $= \boxed{43^\circ}$



$3x-5 = x+27$
$2x-5 = 27$
$2x = 32$
$x = 16$

$16 \times 3 = 48$
$48 - 5 = 43$

Geometry, 1.7 Notes – Deductive Structure

Deductive Structure is a system of thought in which conclusions are justified by previously assumed or proved statements.

A **deductive structure** contains:

1) **Undefined terms** – e.g.: lines, points.
2) **Postulates**, which are unproved assumptions.
   e.g. Two points make a straight line.
3) **Theorems**, which are mathematical statements that can be proved.
   e.g. If two angles are right angles, then they are congruent.
4) **Definitions**, which state the meaning of a term or idea.
   e.g. If points lie on the same line, then they are collinear.

Definitions are always reversible: If points lie on the same line, then they are collinear.
If points are collinear, then they lie on the same line.

Postulates and Theorems are not always reversible:
If two angles are right angles, then they are congruent.
If two angles are congruent, then they are right angles.

Many postulates, theorems, and definitions are in the form of a **conditional statement:**

If *p*, then *q* symbolized by: $p \Rightarrow q$

Examples of conditional statements:
If it is raining, then it is cloudy.
If two angles have the same measure, then they are congruent.

Converse: A statement with the 'if' and 'then' reversed

Examples:

Statement: If 2 angles are right angles, then they are congruent.
Converse: If 2 angles are congruent, then they are right angles.

Statement: If a person is female, then the person is a girl.
Converse: If a person is a girl, then the person is female.

Try it...

Write the converse of each statement. Is the converse true?

#1. If a person is a boy, then the person is male.

If a person is male, then the person is a boy. True (definition)

#2. If a person was born 75 years ago, then the person is old.

If a person is old, then the person was born 75 years ago, False

#3. If an angle is a 45 degree angle, then it is acute.

If an angle is acute, then it is a 45° angle. False

#4. If a point is the midpoint of a segment, it divides the segment into two congruent segments.

If a point divides a segment into two congruent segments then the point is the midpoint of a segment, True (definition)

Geometry, 1.8 Notes – Logic

A **conditional statement** is an 'If'…'then'…. sentence.
Example: If you live in Phoenix, then you live in Arizona.

Notation: $p \Rightarrow a$
if p, then a

Negation means 'not' -

	Statement	negation
Example:	You live in Phoenix.	You do not live in Phoenix
Notation:	p	$\sim p$

We can negate a statement or 'reverse it', or do both. Each of these has a name:
Example: <u>how to write it</u>

Statement: If you live in Phoenix, then you live in Arizona. $p \Rightarrow a$ T

Converse: If you live in Arizona, then you live in Phoenix. $a \Rightarrow p$ F

Inverse: If you don't live in Phoenix, then you don't live in Arizona. $\sim p \Rightarrow \sim a$ F

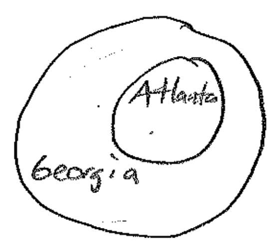
Contrapositive: If you don't live in Arizona, then you don't live in Phoenix. $\sim a \Rightarrow \sim p$ T

If a statement is true then the <u>contrapositive</u> is also true. The <u>converse and inverse</u> are not necessarily true (might be, might not be, usually not true.)

Venn diagram: Another way to figure out logic.

Venn diagram

Example: If Jenny lives in Atlanta, then Jenny must live in Georgia.



If Jenny lives in Georgia, then she must live in Atlanta.
If Jenny does not live in Georgia, then she must not live in Atlanta.

Chain of reasoning:

If you kick a chair, then you stub your toe. $k \Rightarrow s$

If you stub your toe, then your foot hurts. $s \Rightarrow h$

$k \Rightarrow s \quad s \Rightarrow h$

$k \Rightarrow h$

Given these true statements:

If you live in Arizona, you can drive to the Grand Canyon in less than 5 hours. $a \Rightarrow g$

If you don't live in Arizona, then you don't live in Phoenix. $\sim a \Rightarrow \sim p$

Is this statement true?
If you live in Phoenix, then you can drive to the Grand Canyon in less than 5 hours. $p \Rightarrow g$

$\sim a \Rightarrow \sim p$

contrapositive is true

$p \Rightarrow a \quad a \Rightarrow g$

$p \Rightarrow g$ $\boxed{\text{true}}$

Geometry, 1.9 Notes – Probability

Probability means how likely something is to occur. It is a number (usually a fraction) between 0 and 1.

Probability = 0 means will never happen.

Probability = 1 means will always happen.

Probability between 0 and 1 means something might happen…they higher the number, the more likely it is to happen.

Probability = $\frac{1}{2}$ means will happen about half the time.

Calculating probability:

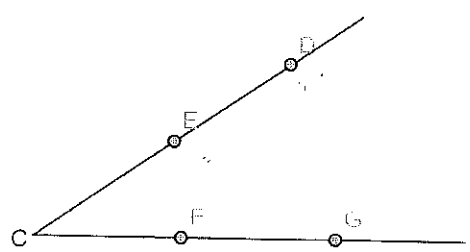
Probability = $\frac{\#\textit{desired choices}}{\#\textit{total choices}}$

Example: In a group of 5 students where 3 are boys and 2 are girls, if you pick one students, what is the probability you will pick a boy?

total choices = 5
desired choices = 3

B B B G G

$P(\text{boy}) = \boxed{\frac{3}{5}}$



More examples:

If you randomly select 1 point, what is the probability it will be on line segment $\overline{CD}$?

D E F G

$\frac{2}{4} = \boxed{\frac{1}{2}}$

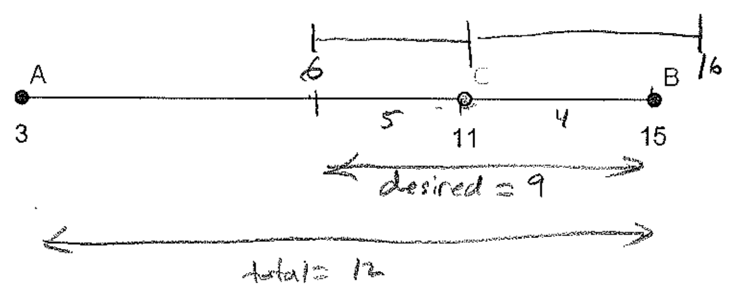
If you randomly select 2 points, what is the probability they will both be on line segment $\overline{CD}$?

DE EF FG
DF EG
DG

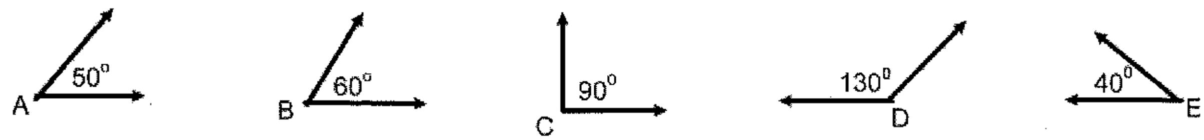
$P = \boxed{\frac{1}{6}}$

Sometimes, you can calculate probability using lengths…

Example: A point Q is randomly chosen on $\overline{AB}$. What is the probability that it is within 5 units of C?



$P(\text{within 5 units}) = \frac{9}{12} = \boxed{\frac{3}{4}}$



1 HW)

#3 **Left** If one of the 5 angles is selected at random, what is the probability that the angle is obtuse? $\boxed{\frac{1}{5}}$

#4 **Middle** If one of the 5 angles is selected at random, what is the probability that the angle is straight? $\boxed{\frac{0}{5}}$ or $\boxed{0}$

#6 **Right** If two of the 5 angles is selected at random, what is the probability that both are acute?

all possibilities: AB BC CD DE
AC BD CE
AD BE
AE

$\boxed{\frac{3}{10}}$