

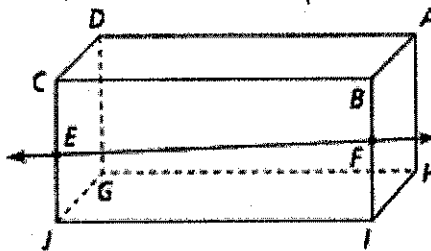
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 Geometry

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Unit 1: Tools of Geometry

LT#1: Understand basic terms and postulates of geometry.

1. Name all the segments and rays in the figure. $\overline{EF}, \overline{FE}, \overrightarrow{EF}, \overrightarrow{FE}$



- A. Name a pair of intersecting planes. $ABIH$ and $ABCD$
 B. Name a plane that is parallel to the plane that contains \overline{EF} . $ADHG$
 C. Name a line that is skew to \overline{AH} . $\overleftrightarrow{BC}, \overleftrightarrow{JI}, \overleftrightarrow{GI}, \overleftrightarrow{CD}$
2. Two distinct non-parallel planes always intersect at a line.
3. Segment \overline{AB} contains midpoint P . Which does NOT properly name the line containing \overline{AB} ?
 A. \overline{AB}
 B. \overline{PA}
 C. \overline{APB}
 D. \overline{BA}
4. Two of what geometric figure are joined at a vertex to form an angle? rays

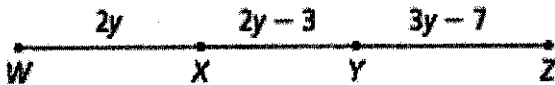
LT#2: Find and compare lengths of segments.

5. If $DM = 37$, find the value of r .



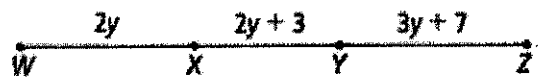
$$\begin{aligned} r+1+2r-15 &= 37 \\ 3r-14 &= 37 \\ 3r &= 51 \\ r &= 17 \end{aligned}$$

6. If $WZ = 46$, what is the value of y ?



$$\begin{aligned} 2y+2y-3+3y-7 &= 46 \\ 7y-10 &= 46 \\ 7y &= 56 \\ y &= 8 \end{aligned}$$

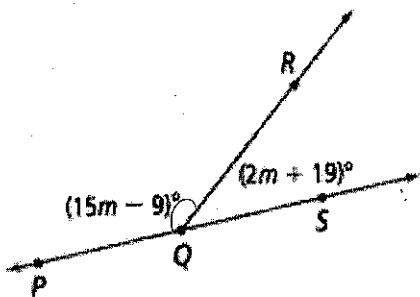
7. If $WZ = 80$, what is the value of y ?



$$\begin{aligned} 2y+2y+3+3y+7 &= 80 \\ 7y+10 &= 80 \\ 7y &= 70 \\ y &= 10 \end{aligned}$$

LT#3: Find and compare the measures of angles.

8. What is $m\angle PQR$?



$$15m - 9 + 2m + 19 = 180$$

$$17m + 10 = 180$$

$$17m = 170$$

$$m = 10$$

$$m\angle PQR = 15(10) - 9 = 150 - 9$$

$$m\angle PQR = 141$$

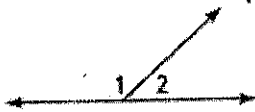
LT#4: Identify special angle pairs and use their relationship to find angle measures.

9. $\angle A$ and $\angle B$ are supplementary congruent angles. What is $m\angle B$?

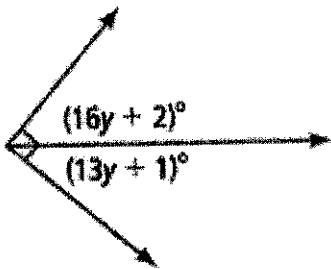
$$m\angle B = 90$$

10. What is the measure of the complement of 27° ? $90 - 27 = 63^\circ$

11. $\angle 1$ and $\angle 2$ are supplementary angles.



12. What is the value of y in the diagram?



$$16y + 2 + 13y + 1 = 90$$

$$29y + 3 = 90$$

$$29y = 87$$

$$y = 3$$

LT#6: Find the midpoint of a segment.

13. What is the other endpoint of a segment with an endpoint at $(4,4)$ and a midpoint at $(-2,-1)$? $-2 = \frac{4+x}{2}$ $x = -1$ $-1 = \frac{4+y}{2}$ $y = -6$ $(-1, -6)$

14. A segment has a midpoint $(-2,9)$ and one endpoint $(2,8)$. What is the coordinate of the other endpoint? $-2 = \frac{2+x}{2}$ $x = -6$ $9 = \frac{8+y}{2}$ $y = 10$ $(-6, 10)$

15. What is the midpoint of a segment with endpoints at $(-2,2)$ and $(5,10)$? $M = (\frac{-2+5}{2}, \frac{2+10}{2}) = (\frac{3}{2}, 6)$

LT#7: Find the distance between two points in the coordinate plane.

16. What is the length of a segment with endpoints at $(-3,5)$ and $(4,5)$?

$$d = \sqrt{(-3-4)^2 + (5-5)^2}$$

$$= \sqrt{(-7)^2 + (0)^2}$$

$$= \sqrt{49} = 7$$

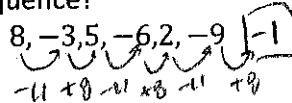
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Unit 2: Reasoning and Proof

LT#1: Use inductive reasoning to make conjectures.

1. What is the next number in the sequence?



LT#2: Recognize conditional statements and their parts.

2. Use the following conditional for A-C.

If an animal has wings, then the animal can fly.

A. What is the hypothesis of the conditional?

An animal has wings

B. What is the conclusion of the conditional?

the animal can fly.

C. What is a counterexample for the conditional?

penguin, ostrich, chickens, do-do bird

LT#3: Write converses, inverses, and contrapositives of conditionals.

3. Write the converse, inverse, and contrapositive of the following conditional.

If an animal is a mammal, then it has fur.

converse: If an animal has fur, then it is a mammal.

inverse: If an animal is not a mammal, then it does not have fur.

contrapositive: If an animal does not have fur, then it is not a mammal.

LT#4: Write biconditionals and recognize good definitions.

4. Why is the following statement not a good definition?

A linear pair is two angles whose measures sum to 180. NOT reversible

A linear pair is two ADJACENT angles whose measures sum to 180.

LT#5: Use the Law of Detachment and the Law of Syllogism.

5. If Laurel turns off her alarm, then she sleeps too late. If Laurel sleeps too late, then she misses her bus. Laurel catches the bus. What can you conclude?

If Laurel turns off her alarm, then she misses her bus.

Laurel did not turn off her alarm

LT#6: Connect reasoning in algebra and geometry.

6. What property does the following conditional statement illustrate?

If $\angle A \cong \angle B$ and $\angle B \cong \angle C$, then $\angle A \cong \angle C$.

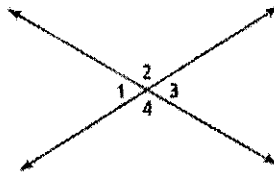
Transitive Property of \cong

7. Write a statement that illustrates the Reflexive Property of Congruence.

$\overline{AB} \cong \overline{AB}$

LT#7: Prove and apply theorems about angles.

8. Use the diagram for A-B.



- A. What reason justifies the following statement?

Angle 1 is congruent to angle 3.

Vertical Angle Thrm

- B. What reason justifies the following statement?

Angle 1 is supplementary to angle 2.

Linear Pair Postulate

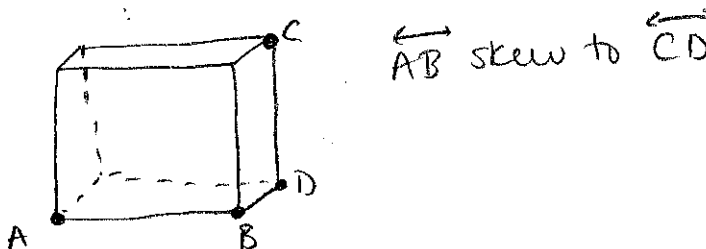
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Unit 3: Parallel and Perpendicular Lines

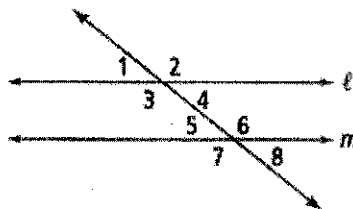
LT#1: Identify relationships between figures in space.

1. Draw a cube and use it to show an example of skew line segments.



LT#2: Identify angles formed by two lines and a transversal.

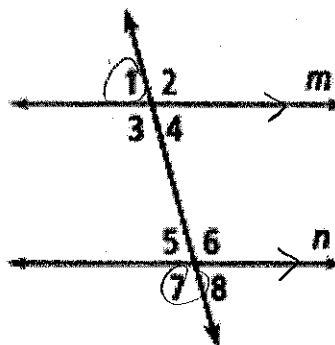
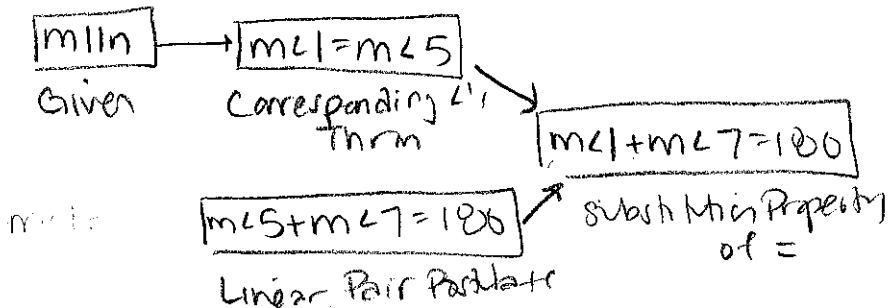
2. Use the diagram for A-B. Line $l \parallel m$. Identify each angle pair.



- A. $\angle 1$ and $\angle 5$ Corresponding Angles
 B. $\angle 6$ and $\angle 7$ Vertical Angles

LT#3: Prove theorems about parallel lines.

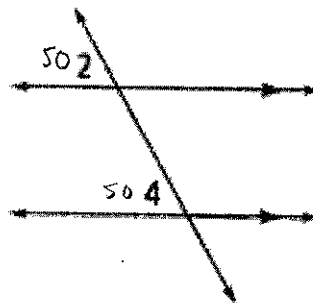
3. Given: $m \parallel n$
 Prove: $m\angle 1 + m\angle 7 = 180$



LT#4: Use properties of parallel lines to find angle measures.

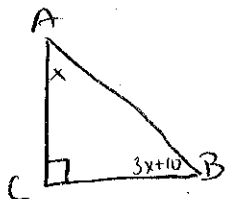
4. Given $m\angle 2 = 50$, which postulate or theorem proves $m\angle 4 = 50$?

Corresponding Angle Thrm



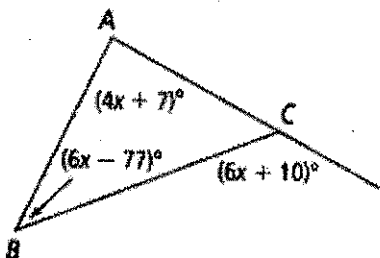
LT#8: Find measures of angles of triangles.

5. Given right $\triangle ABC$ with $m\angle B = (3x + 10)$ and $m\angle A = x$, if $\angle C$ is the right angle, what is the value of x ?



$$\begin{aligned} x + 3x + 10 &= 90 \\ 4x + 10 &= 90 \\ 4x &= 80 \\ \boxed{x} &= \boxed{20} \end{aligned}$$

6. Find $m\angle B$.



$$\begin{aligned} 6x + 10 &= 4x + 7 + 6x - 77 & m\angle B &= 6(20) - 77 \\ 6x + 10 &= 10x - 70 & &= 120 - 77 \\ 80 &= 4x & \boxed{m\angle B} &= \boxed{43} \\ 20 &= x & & \end{aligned}$$

LT#9: Graph and write linear equations.

7. Write an equation of the line that connects the points $A(1,3)$ and $B(4,-9)$.

$$m = \frac{3 - (-9)}{1 - 4} = \frac{12}{-3} = -4$$

$$\boxed{y - 3 = -4(x - 1) \text{ or } y + 9 = -4(x - 4) \text{ or } y = -4x + 7}$$

8. What is the slope of a line that passes through $(-3,5)$ and $(4,3)$?

$$m = \frac{5 - 3}{-3 - 4} = \boxed{\frac{2}{-7}}$$

LT#10: Relate slope to parallel and perpendicular lines.

9. What is the slope of a line parallel to $-8x + y = 2$?

$$\begin{aligned} +8x & \quad +8x \\ y &= 8x + 2 \end{aligned} \quad \boxed{m = 2}$$

10. What is the slope of a line that is perpendicular to the line that passes through $(-2,2)$ and $(1,3)$?

$$m = \frac{2 - 3}{-2 - 1} = \frac{-1}{-3} = \frac{1}{3} \quad \boxed{m = -3}$$

11. What is the slope of a line that is perpendicular to $3x + 5y = 2$?

$$\begin{aligned} -3x & \quad -3x \\ 5y &= -3x + 2 \\ \hline \frac{5y}{5} &= \frac{-3x + 2}{5} \\ y &= -\frac{3}{5}x + \frac{2}{5} \end{aligned} \quad \boxed{m = \frac{5}{3}}$$

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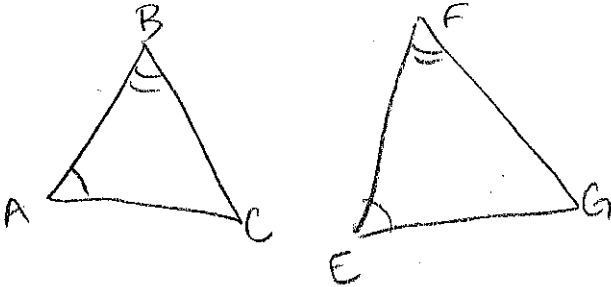
Unit 4: Congruent Triangles

LT#1: Recognize congruent figures and their corresponding parts.

1. If $\triangle ABC \cong \triangle DEF$, which statement is NOT a correct congruence statement?

- ~~A. $\angle B \cong \angle E$~~
- B. $\overline{AB} \cong \overline{EF}$**
- ~~C. $\overline{CA} \cong \overline{FD}$~~
- ~~D. $\angle A \cong \angle D$~~

2. Draw $\triangle ABC \cong \triangle EFG$. Write all six congruence statements.



- $\angle A \cong \angle E$
- $\angle B \cong \angle F$
- $\angle C \cong \angle G$

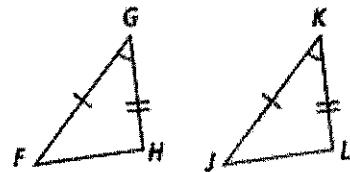
- $\overline{AB} \cong \overline{EF}$
- $\overline{BC} \cong \overline{FG}$
- $\overline{AC} \cong \overline{EG}$

LT#2: Prove two triangles congruent using SSS and SAS Postulates.

LT#3: Prove two triangles congruent using the ASA Postulate and the AAS Theorem.

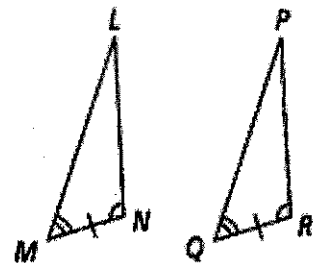
3. What triangle congruence postulate or theorem can be used to justify $\triangle FGH \cong \triangle JKL$?

SAS



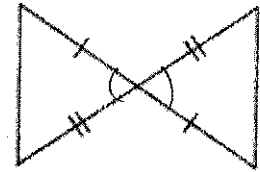
4. Which postulate can be used to justify stating that $\triangle LMN \cong \triangle PQR$?

ASA



5. How can you prove that the two triangles are congruent?

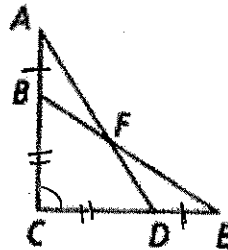
SAS



LT#7: Identify congruent overlapping triangles.

6. Use the figure for A-C.

Given: $\overline{AB} \cong \overline{ED}$, $\overline{BC} \cong \overline{DC}$



A. Which reason could you use to prove $\overline{AC} \cong \overline{EC}$?

Segment Addition Postulate & Transitive Property

B. Which reason could you use to prove $\angle C \cong \angle C$?

Reflexive Property

C. Which reason could you use to prove $\triangle ACD \cong \triangle ECB$?

SAS

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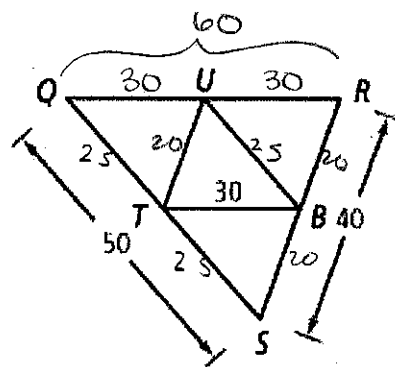
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Unit 5: Relationships Within Triangles

LT#1: Use properties of midsegments to solve problems.

1. In $\triangle QRS$, T , U , and B are midpoints. What are the lengths of \overline{TU} , \overline{UB} , and \overline{QR} ? What are the perimeters of $\triangle QRS$ and $\triangle TUB$?

$QR = 60$ $\triangle QRS = 60 + 40 + 50 = 150$
 $UB = 25$ $\triangle TUB = 20 + 25 + 30 = 75$
 $TU = 20$



Use the figure at the right for #2-4.

2. Which segment is parallel to \overline{JK} ?

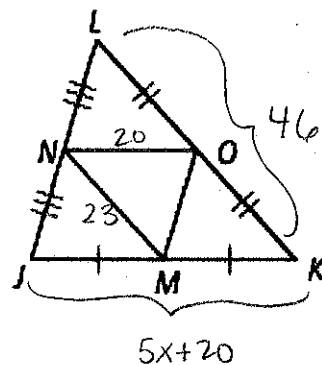
\overline{NO}

3. If $LK = 46$, what is NM ?

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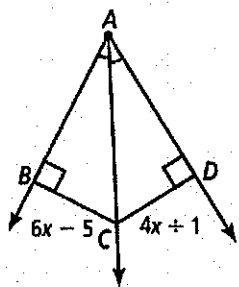
4. If $JK = 5x + 20$ and $NO = 20$, what is the value of x ?

$20 = \frac{1}{2}(5x + 20)$ $20 = 5x$
 $40 = 5x + 20$ $4 = x$



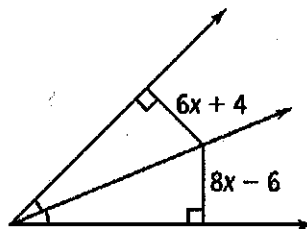
LT#2: Use properties of perpendicular bisectors and angle bisectors.

5. What is CD ?



$6x - 5 = 4x + 1$
 $2x = 6$
 $x = 3$
 $CD = 4(3) + 1$
 $= 12 + 1$
 $CD = 13$

6. Find the value of x .



$6x + 4 = 8x - 6$
 $10 = 2x$
 $5 = x$

LT#4: Identify properties of medians and altitudes of a triangle.

In $\triangle XYZ$, A is the centroid.

7. If $DZ = 12$, find ZA and AD .

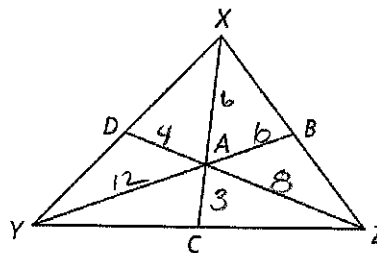
$$ZA = 8 \quad AD = 4$$

8. If $AB = 6$, find BY and AY .

$$AY = 12 \quad BY = 18$$

9. If $AC = 3$, find CX and AX .

$$CX = 9 \quad AX = 6$$



LT#6: Use inequalities involving angles and sides of triangles.

The lengths of two sides of a triangle are given. Find the range of possible lengths for the third side.

10. 4, 8

$$4 + 8 > x$$

$$12 > x$$

$$4 + x > 8$$

$$x > 4$$

$$8 + x > 4$$

$$x > -4$$

$$4 < x < 12$$

11. 13, 8

$$13 + 8 > x$$

$$21 > x$$

$$13 + x > 8$$

$$x > -5$$

$$8 + x > 13$$

$$x > 5$$

$$5 < x < 21$$

12. 10, 15

$$10 + 15 > x$$

$$25 > x$$

$$10 + x > 15$$

$$x > 5$$

$$15 + x > 10$$

$$x > -5$$

$$5 < x < 25$$