




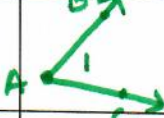

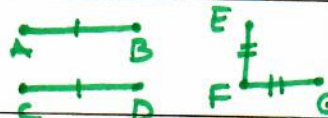





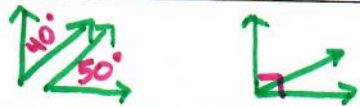


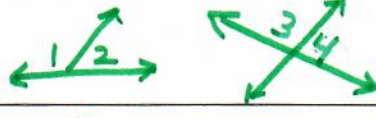

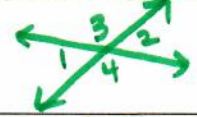


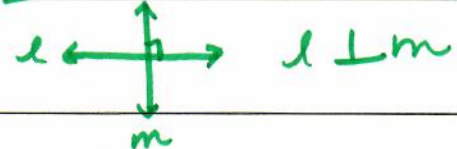


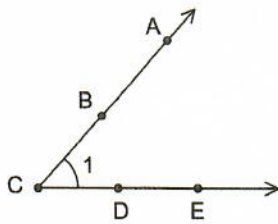
Objective: Geometry Basics, Angles, and Lines

Vocabulary	Definition	Diagram and Symbols
point	A location in space.	 Point A
line	Extends forever in two directions.	
ray	Part of a line that starts at a point and extends forever in the other direction.	
segment	Part of a line with two endpoints.	 To write "the length of AB", write AB (no bar on top)
plane	A flat surface that extends forever.	 Plane P
angle	Two rays (the sides) that share an endpoint (the vertex)	 $\angle A$ $\angle 1$ $\angle BAC$ $\angle CAB$
angle measure	Tells us how wide the opening of an angle is (how much rotation there is between the sides).	 $m\angle A = 30^\circ$ The measure of angle A is 30° .
congruent segments	Two segments that are the same length.	 $\overline{AB} \cong \overline{CD}$ $\overline{EF} \cong \overline{FG}$
congruent angles	Two angles with the same measure.	 $\angle A \cong \angle C$ $\angle B \cong \angle D$
acute angle	Measure is between 0° and 90° .	
right angle	Measure is exactly 90° .	
obtuse angle	Measure is between 90° and 180° .	
straight angle	Measure is exactly 180° .	
complementary angles	Angles whose measures add up to 90° .	

Supplementary Angles	Angles whose measures add up to 180° .	
adjacent angles	Two angles that are next to each other and share a side and a vertex (like next-door neighbors that share a fence).	
linear pair	Two angles that add up to a straight angle. The non-common sides form a straight line.	 $\angle 1$ & $\angle 2$ are a linear pair $\angle 3$ & $\angle 4$ are a linear pair
linear pair postulate	The angles in a linear pair are <u>supplementary</u> . <u>add to 180°</u> .	 $m\angle 1 + m\angle 2 = 180^\circ$
vertical angles	The angles across from each other when two lines cross.	 $\angle 1$ and $\angle 2$ are vertical angles. $\angle 3$ and $\angle 4$ are vertical angles
vertical angles theorem	Vertical angles are congruent.	 $\angle 1 \cong \angle 3$ $\angle 2 \cong \angle 4$
parallel lines	lines that are equal distance apart, they never intersect	 $l \parallel m$
perpendicular lines	Lines that intersect to form 4 right angles	 $l \perp m$

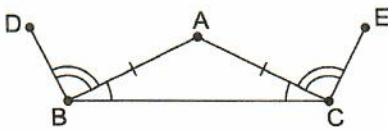
Examples:

a) Name this angle in as many ways as you can.



$\angle 1$
 $\angle C$
 $\angle ACE$ $\angle ECA$
 $\angle BCD$ $\angle DCB$
 $\angle ACD$ $\angle DCA$
 $\angle BCE$ $\angle ECB$

b) List all of the information that this diagram gives you.



$\overline{BA} \cong \overline{AC}$
 $\angle DBA \cong \angle ECA$
 $\angle ABC \cong \angle ACB$



Date:

Section: 8.2

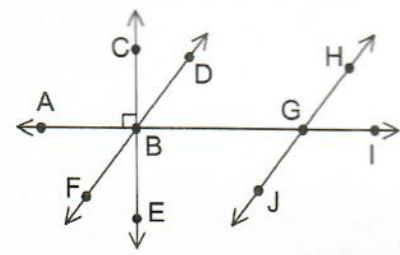
Objective: Parallel Lines and Angle Relationships

Review of angles:

Name of angle	Definition	Picture	Relationship of the angles
Complementary Angles	Two angles are complementary when they add up to 90 degrees.		$m\angle 1 + m\angle 2 = 90^\circ$
Supplementary Angles	Two angles are supplementary when they add up to 180 degrees.		$m\angle 1 + m\angle 2 = 180^\circ$
Linear Pair	A linear pair is a pair of adjacent angles formed when two lines intersect. They are always supplementary.		$m\angle 1 + m\angle 2 = 180^\circ$
Adjacent Angles	Adjacent angles are two angles that have a common angle and a common side.		$m\angle BAC + m\angle CAD = m\angle BAD$
Vertical Angles	The angles opposite each other when two lines cross. They are always equal.		$m\angle 1 = m\angle 3$ $m\angle 2 = m\angle 4$ $\angle 1 \cong \angle 3$ $\angle 2 \cong \angle 4$

Use the diagram at the right to answer the following questions.

- a) Name two pairs of vertical angles.
 $\angle CBD$ and $\angle FBE$
 $\angle HGI$ and $\angle BGJ$
- b) Name two sets of angles that form linear pairs.
 $\angle CBD$ and $\angle DBE$
 $\angle BGH$ and $\angle HGI$
- c) Name two pairs of complementary angles.
 $\angle CBD$ and $\angle DBG$
 $\angle ABF$ and $\angle FBE$
- d) Name two pairs of supplementary angles.
 $\angle ABD$ and $\angle DBG$
 $\angle BGH$ and $\angle HGI$
- e) Name two pairs of congruent angles.
 $\angle ABC$ and $\angle GBE$
 $\angle HGI$ and $\angle BGJ$
- f) Name a pair of adjacent angles that are neither complementary nor supplementary.
 $\angle ABC$ and $\angle CBD$



See (b). All linear pairs are supplementary.

See (a). All vertical angles are congruent.

Examples: Find the missing angle measures.

g) $m\angle 1 = 126^\circ$
 $m\angle 2 = 54^\circ$
 $m\angle 3 = 126^\circ$

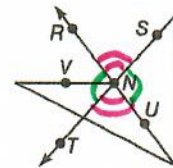
h) $m\angle 1 = 30^\circ$
 $m\angle 2 = 150^\circ$
 $m\angle 3 = 30^\circ$

i) $180 - 57 = 123^\circ$
 $123 - 50 = 73^\circ$

Use the diagram to the right to answer the following questions.

a) Name an angle congruent to $\angle RNT$. How do you know the angles are congruent?

$\angle SNU$, they are vertical angles



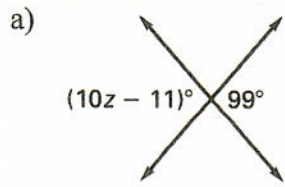
b) Name an angle congruent to $\angle RNS$. How do you know the angles are congruent?

$\angle TNU$, they are vertical angles

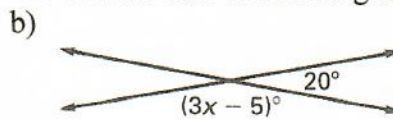
Angle Algebra Problem Tips:

- Ask yourself: "Are the angle measures equal to each other, or do they add up to something?"
 - If the angles are congruent, set one measure equal to the other.
 - If the angles are supplementary, add the measures together and set the sum equal to 180° .
 - If the angles are complementary, add the measures together and set the sum equal to 90° .

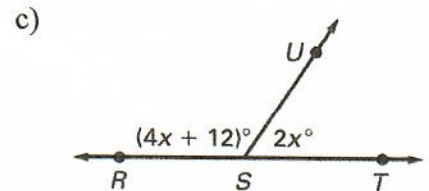
Examples: Find the value of the variable and the size of each angle.



$$\begin{array}{r} 10z - 11 = 99 \\ + 11 \quad + 11 \\ \hline 10z = 110 \\ \frac{10z}{10} = \frac{110}{10} \quad \boxed{z = 11} \end{array}$$



$$\begin{array}{r} 3x - 5 + 20 = 180 \\ 3x + 15 = 180 \\ - 15 \quad - 15 \\ \hline 3x = 165 \\ \frac{3x}{3} = \frac{165}{3} \quad \boxed{x = 55} \end{array}$$



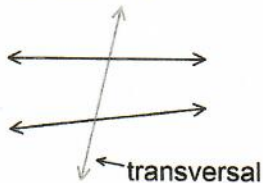
$$\begin{array}{r} 4x + 12 + 2x = 180 \\ 6x + 12 = 180 \\ - 12 \quad - 12 \\ \hline 6x = 168 \\ \frac{6x}{6} = \frac{168}{6} \\ \boxed{x = 28} \end{array}$$

d) How big is the complement of a 57° angle?

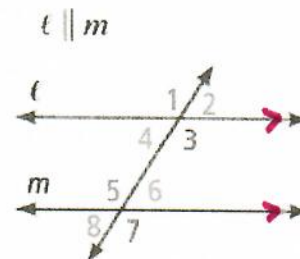
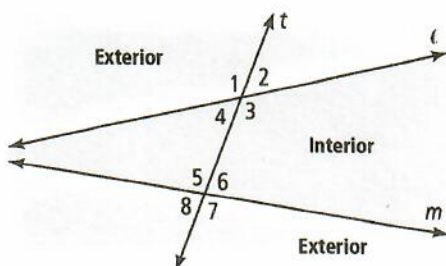
e) Two angles are supplementary. The measure of one angle is 152° . What is the measure of the other?

$$\begin{array}{r} x + 152 = 180 \\ - 152 \quad - 152 \\ \hline x = 28 \end{array} \quad \boxed{28^\circ}$$

Transversal: A line that intersects two or more coplanar lines at different points.



The lines do not need to be parallel to be intersected by a transversal.

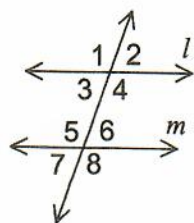


Now we are going to focus on the relationship between the angles formed if the lines are parallel and intersected by a transversal.

Types of angles formed by a transversal intersecting two or more coplanar lines at different points

Name of angles	Definition	Picture	Relationship if the lines are parallel
Corresponding Angles $\angle 1$ and $\angle 5$ $\angle 2$ and $\angle 6$ $\angle 3$ and $\angle 7$ $\angle 4$ and $\angle 8$	Any pair of angles , each of which is on the same side of one of two lines cut by a transversal and on the same side of the transversal.		$\angle 1 \cong \angle 5$, $\angle 2 \cong \angle 6$, $\angle 3 \cong \angle 7$, $\angle 4 \cong \angle 8$ * corresponding angles are <u>congruent</u>
Alternate Exterior Angles $\angle 1$ and $\angle 8$ $\angle 2$ and $\angle 7$	When two lines are crossed by a transversal, a pair of angles on the outer side of those two lines, but on opposite sides of the transversal are called Alternate Exterior Angles .		$\angle 1 \cong \angle 8$ $\angle 2 \cong \angle 7$ * alternate exterior angles are <u>congruent</u>
Alternate Interior Angles $\angle 3$ and $\angle 6$ $\angle 4$ and $\angle 5$	When two lines are crossed by a transversal, a pair of angles on the inner side of those two lines, but on opposite sides of the transversal are called Alternate Interior Angles .		$\angle 3 \cong \angle 6$ $\angle 4 \cong \angle 5$ * alternate interior angles are <u>congruent</u>
Same-Side Interior Angles $\angle 3$ and $\angle 5$ $\angle 4$ and $\angle 6$	Interior angles on the same side of the transversal		$m\angle 3 + m\angle 5 = 180^\circ$ $m\angle 4 + m\angle 6 = 180^\circ$ same-side interior angles are <u>supplementary</u>

Examples: Identify the following angle pairs. Name all possible pairs in the diagram.



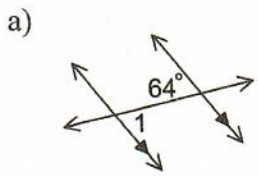
Corresponding Angles $\angle 1$ & $\angle 5$, $\angle 2$ & $\angle 6$, $\angle 3$ & $\angle 7$, $\angle 4$ & $\angle 8$

Alternate Exterior Angles $\angle 1$ and $\angle 8$, $\angle 2$ and $\angle 7$

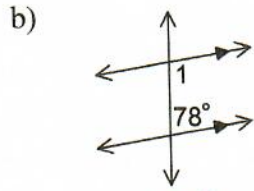
Alternate Interior Angles $\angle 3$ and $\angle 6$, $\angle 4$ and $\angle 5$

Same-Side Interior Angles $\angle 3$ and $\angle 5$, $\angle 4$ and $\angle 6$

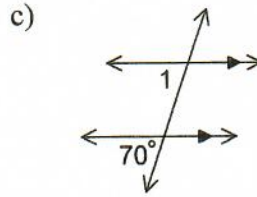
Examples: Find $m\angle 1$ in each diagram. Give a reason for each answer.



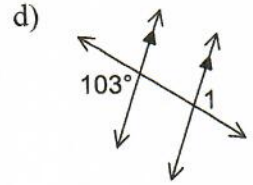
$m\angle 1 = 64^\circ$
alternate interior angles



$180^\circ - 78^\circ = 102^\circ$
 $m\angle 1 = 102^\circ$
same-side interior angles

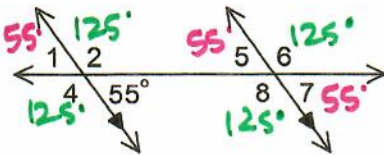


$m\angle 1 = 70^\circ$
corresponding angles



$m\angle 1 = 103^\circ$
alternate exterior angles

Example: Find the measure of each numbered angle.



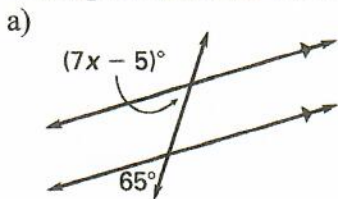
$180^\circ - 55^\circ = 125^\circ$

$m\angle 1 = 55^\circ$
 $m\angle 2 = 125^\circ$

$m\angle 4 = 125^\circ$

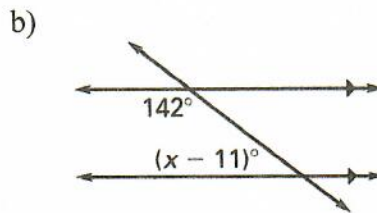
$m\angle 5 = 55^\circ$
 $m\angle 6 = 125^\circ$
 $m\angle 7 = 55^\circ$
 $m\angle 8 = 125^\circ$

Examples: Find the value of x .



$7x - 5 = 65$
 $+5 \quad +5$
 $7x = 70$
 $\frac{7x}{7} = \frac{70}{7}$
 $x = 10$

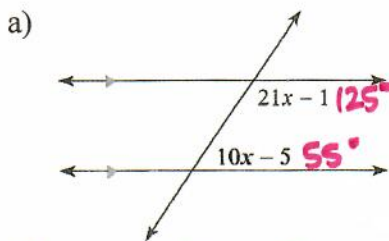
corresponding angles are congruent.



$x - 11 + 142 = 180$
 $x + 131 = 180$
 $-131 \quad -131$
 $x = 49$

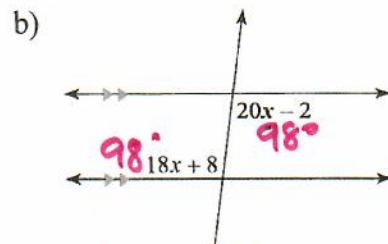
same-side interior angles are supplementary.

Examples: Find the value of x . Then find the degree of both angles.



$21(6) - 1 = 125$
 $10(6) - 5 = 55$

$21x - 1 + 10x - 5 = 180$
 $31x - 6 = 180$
 $+6 \quad +6$
 $31x = 186$
 $\frac{31x}{31} = \frac{186}{31}$
 $x = 6$



$18x + 8 = 20x - 2$
 $-18x \quad -18x$
 $8 = 2x - 2$
 $+2 \quad +2$
 $10 = 2x$
 $\frac{10}{2} = \frac{2x}{2}$
 $5 = x$

$18(5) + 8 = 98$
 $20(5) - 2 = 98$