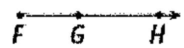
Geometry Unit 2 Day 1 Notes Naming Geometric Figures

Learning Target – Students can identify and name points, lines, planes, line segments, rays and angles using correct notation.

Below are some types of figures you have seen in earlier mathematics courses. Describe each figure using your own words. If you can recall the mathematical terms that identify the figures, you can use them in your descriptions.

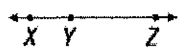
1. 

point Q

2. 

Ray FG or FH — must start name with endpoint

$\overrightarrow{FG}$ or $\overrightarrow{FH}$

3. 

line xy, xz, yx or yz

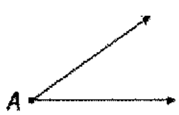
$\overleftrightarrow{XY}$ or $\overleftrightarrow{XZ}$ or $\overleftrightarrow{YX}$ or $\overleftrightarrow{YZ}$

4. 

Segment DE or ED

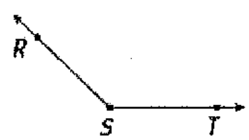
$\overline{DE}$ $\overline{ED}$

vertex

5. 

angle A

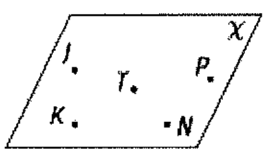
$\angle A$

6. 

angle RST or TSR

$\angle RST$ or $\angle TSR$

vertex in center, one point on each side

7. 

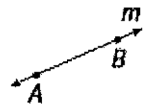
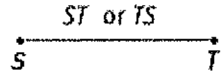
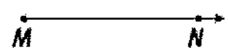
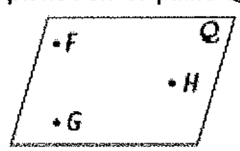
plane X

or

any 3 points on the plane not in a straight line

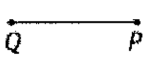
ex) plane JKT

Naming Geometric Figures

Geometric Figure	Naming	Example
point	Named with a capital letter	point P P•
line	Named using any two points on the line, in any order, with a line symbol drawn above OR Named using a lowercase letter	$\overleftrightarrow{AB}$, $\overleftrightarrow{BA}$, or line m 
line segment	Named using the two endpoints, in any order, with a segment symbol drawn above	$\overline{ST}$ or $\overline{TS}$ 
ray	Named using the endpoint and one other point, with a ray symbol drawn above; the endpoint is always listed first	$\overrightarrow{MN}$ 
plane	Named using any three points in the plane that are not on the same line, in any order OR Named using a capital cursive letter	plane FGH or plane $\mathcal{Q}$ 

$\overleftrightarrow{AB}$ is read, "line AB." $\overline{ST}$ is read, "line segment ST" or "segment ST." $\overrightarrow{MN}$ is read, "ray MN."

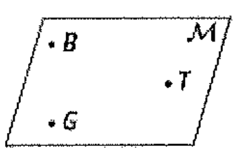
8. Identify each geometric figure. Then give all possible names for the figure.

a. 

$\overline{QP}$ or $\overline{PQ}$

b. 

$\overleftrightarrow{NC}$ or $\overleftrightarrow{CN}$

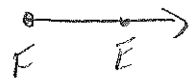
c. 

plane M
or
plane BGT

d. D•

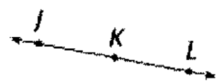
point D

9. Draw $\overrightarrow{FE}$. Explain where the points F and E lie on the ray.



F is the end point and E lies on the ray.

10. Critique the reasoning of others. Caleb says that the figure below can be named $\overleftrightarrow{KJ}$. Jen says the figure can be named $\overleftrightarrow{JL}$. Who is correct? Explain.



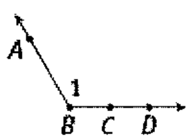
Both. a line is named using any 2 points on the line.

There are three different ways to name an angle.

- Use the angle symbol and a number.
- Use the angle symbol and the vertex of the angle.
- Use the angle symbol and three points on the angle. The first point is on one side of the angle, the second point is the vertex, and the third point is on the other side of the angle.

Example A

Give all possible names for the angle.



Use a number: $\angle 1$.

Use the vertex: $\angle B$.

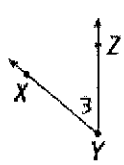
Use three points. The second point should be the vertex. Be sure the first and third points are not on the same side.

$\angle ABC$, $\angle ABD$, $\angle CBA$, $\angle DBA$

Try These A

Give all possible names for each angle.

a.



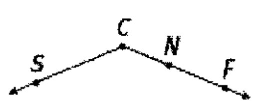
$\angle 3$

$\angle Y$

$\angle XYZ$

$\angle ZYX$

b.



$\angle C$

$\angle SCN$

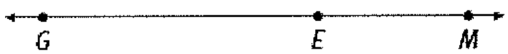
$\angle SCF$

$\angle NCS$

$\angle FCS$

Geometry Unit 2 Day 1 HW

1. Which is a correct name for this line?



A. $\overline{G}$ B. $\overline{GM}$

C. $\overleftrightarrow{MG}$ D. $\overleftrightarrow{ME}$

2. Draw each figure.
   a. point *L*
   b. $\overleftrightarrow{MN}$
   c. $\overline{PQ}$
   d. plane $\mathcal{R}$
   e. $\overrightarrow{ST}$
   f. $\angle U$

a. •L e. S T

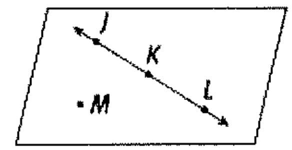
b. M N f. U

c P Q

d R

9. a. Explain why plane *JKL* is not an appropriate name for the plane below.
   b. Give three names for the plane that would be appropriate.

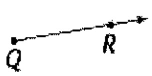
the points all lie on same line



JMK
JML
KML
MKJ

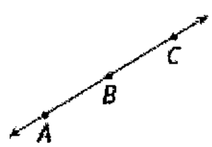
16. Identify each geometric figure. Then give all possible names for the figure.

a.



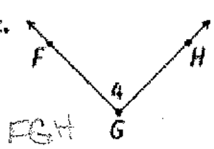
$\overrightarrow{QR}$

b.



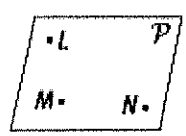
$\overleftrightarrow{AB}$ $\overleftrightarrow{BC}$ $\overleftrightarrow{CA}$ $\overleftrightarrow{AC}$ $\overleftrightarrow{BA}$ $\overleftrightarrow{CB}$

c.



∡4
∡G
∡FGH
∡HGF

d.



Plane P
Plane LMN
Plane LNM
Plane MLN
Plane MNL
Plane NML
Plane NLM

The diagram below includes $\overleftrightarrow{RU}$. Use the figure for Items 17–19.

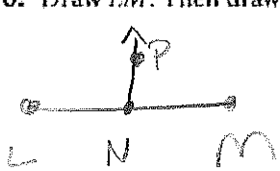
17. How many different rays does the figure include? Name them. 5 $\overrightarrow{ST}$ $\overrightarrow{SU}$ $\overrightarrow{SR}$ $\overrightarrow{RU}$ $\overrightarrow{UR}$

18. **Reason abstractly.** Explain why $\angle S$ is not an appropriate name for $\angle 1$. B/c there are 2 ∡s at that vertex

19. Give the other possible appropriate names for $\angle 2$.

∡TSU or ∡UST

20. Draw $\overleftrightarrow{LM}$. Then draw $\overrightarrow{NP}$ so that point *N* lies on $\overleftrightarrow{LM}$.



Geometry Unit 1 Day 2 Angles and Angle Pairs

Learning Target: Students will describe and draw angles and angle pairs. Students will identify circles and their parts.

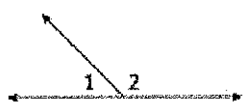
As you share your ideas, be sure to use mathematical terms and academic vocabulary precisely. Make notes to help you remember the meaning of new words and how they are used to describe mathematical ideas.

1. Draw four angles with different characteristics. Describe each angle. Name the angles using numbers and letters.

acute ∡ obtuse ∡ Right ∡ straight ∡

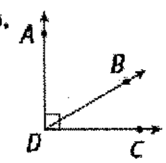
2. ***Compare and contrast*** each pair of angles.

a.



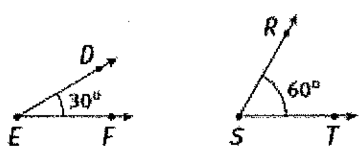
adjacent angles
Supplementary ∡s
linear pair
one acute & one obtuse

b.



adjacent ∡s
Complementary ∡'s
both acute

c.



Both acute
complementary
<u>Not</u> adjacent

d.

one acute & one obtuse
<u>Not</u> adjacent
supplementary
<u>Not</u> a linear pair

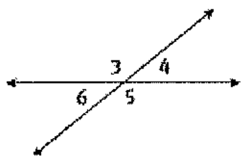
Recall that the sum of the measures of *complementary angles* is 90° and the sum of the measures of *supplementary angles* is 180°.

3. a. The figure below shows two intersecting lines. Name two angles that are supplementary to ∠4. ∡3 + ∡5

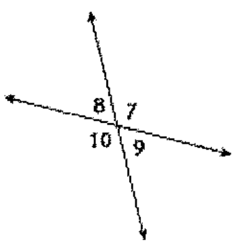
b. Reason quantitatively. Explain why the angles you named in part a must have the same measure.

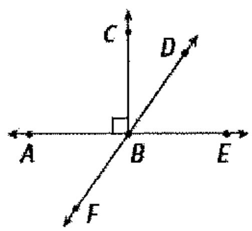
B) ∠ n∡4 + each of them = 180

Called vertical ∡'s



4. Complete the chart by naming all the listed angle types in each figure.





Acute angles	∡8, ∡9	∡CBD ∡ABF ∡DBE
Obtuse angles	∡10, ∡7	∡FBE ∡ABD
Angles with the same measure	∡8 ≅ ∡9 ∡10 ≅ ∡7	∡ABF ≅ ∡DBE ∡ABC ≅ ∡CBE ∡ABD ≅ ∡FBE
Supplementary angles	∡8+∡7=180 ∡7+∡9=180 ∡9+∡10=180 ∡10+∡8=180	∡ABF+∡FBE=180 ∡FBE+∡DBE=180 ∡DBE+∡ABD=180 ∡DBA+∡AFB=180
Complementary angles		∡CBD+∡DBE=90 ∡ABF+∡CBD=90

∡ABC+∡CBE=180

Angles can be classified by their measures.

- An *acute angle* measures greater than 0° and less than 90°.
- A *right angle* measures 90°.
- An *obtuse angle* measures greater than 90° and less than 180°.
- A *straight angle* measures 180°.

A *chord* of a circle is a segment with both endpoints on the circle.

A *diameter* is a chord that passes through the center of a circle.

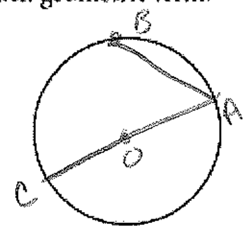
A *radius* is a segment with one endpoint on the circle and one endpoint at the center of the circle.

5. In the circle below, draw and label each geometric term.

a. radius OA

b. chord BA

c. diameter CA



6. Refer to your drawings in the circle above. What is the geometric term for point O?

the Center of the circle

Geometry Unit 2 Day 2 HW

11. Classify each segment in circle O. Use all terms that apply.

a. $\overline{AF}$ chord

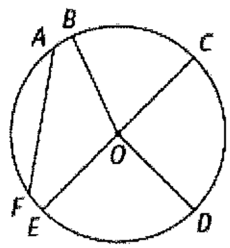
b. $\overline{BO}$ radius

c. $\overline{CO}$ radius

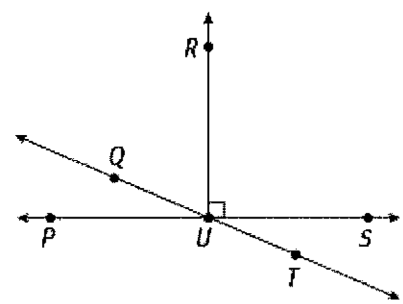
d. $\overline{DO}$ radius

e. $\overline{EO}$ radius

f. $\overline{CE}$ diameter



11. In this diagram, $m\angle SUT = 25°$.



a. Name another angle that measures 25°.
b. Name a pair of complementary angles.
c. Name a pair of supplementary angles.

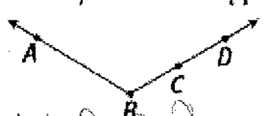
16. Two angles have the same measure. The angles are also supplementary. Are the angles acute, right, or obtuse? How do you know? right - b/c 90° + 90° = 180°

18. $\angle F$ and $\angle G$ are complementary. The measure of $\angle F$ is four times the measure of $\angle G$. What is the measure of each angle?

∡F + ∡G = 90
4G + G = 90
5G = 90
∡G = 18
∡F = 72

20. **a.** Lucinda describes the angle below as $\angle BAC$. Ahmad describes the angle as $\angle CBD$. State whether each of these names is appropriate for the angle, and explain why or why not. → Lucinda is wrong, B is the vertex so it must be in the center. Ahmad is also wrong, you need one point on each side of the vertex

b. Give another name for the angle, and explain why the name you chose is appropriate.



∡ABC

The figure below includes $\overleftrightarrow{PL}$ and $\overleftrightarrow{JM}$. Use the figure for Items 12–13.

12. Name three pairs of supplementary angles.

13. Name two angles that appear to be obtuse.

12.) ∡JKN + ∡MKN
∡LKM + ∡PKM
∡JKL + ∡MKL

13.) ∡JKL + ∡PKM

14. Make sense of problems. Can two obtuse angles be complementary to each other? Explain. No, if an angle is obtuse it's measure is >90.

15. Model with mathematics. Is it possible for a pair of nonadjacent angles to share vertex A and arm $\overrightarrow{AB}$? If it is possible, draw an example. If it is not possible, explain your answer.

No adjacent angles share a vertex and an arm

Geometry Unit 2 Day 3 The axiomatic system of Geometry

Learning Target – Students will distinguish between defined and undefined terms.

Geometry is an ***axiomatic system***. That means that from a small, basic set of agreed-upon assumptions and premises, an entire structure of logic is devised. Many interactive computer games are designed with this kind of structure. A game may begin with a basic set of scenarios. From these scenarios, a gamer can devise tools and strategies to win the game.

In geometry, it is necessary to agree on clear-cut meanings, or definitions, for words used in a technical manner. For a definition to be helpful, it must be expressed in words whose meanings are already known and understood.

Compare the following definitions.

Fountain: a roundel that is barry wavy of six argent and azure

Guige: a belt that is worn over the right shoulder and used to support a shield

1. Which of the two definitions above is easier to understand? Why?

Guige b/c the words in the definition are clear.

For a new vocabulary term to be helpful, it should be defined using words that have already been defined. The *first* definitions used in building a system, however, cannot be defined in terms of other vocabulary words, because no other vocabulary words have been defined yet. In geometry, it is traditional to start with the simplest and most fundamental terms—without trying to define them—and use these terms to define other terms and develop the system of geometry. These fundamental ***undefined terms*** are **point**, **line**, and **plane**.

2. Define each term using the undefined terms.

   a. Ray Begins at a points and continues forever none direction

   b. Collinear points points on the same line

   c. Coplanar points points on the same plane.

After a term has been defined, it can be used to define other terms. For example, an **angle** is defined as a figure formed by two rays with a common endpoint.

3. Define each term using the already defined terms.

   a. Complementary angles angles that sum to 90°

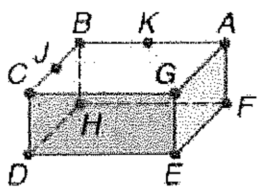
***Vocab reinforcement activity

   b. Supplementary angles angles that sum to 180°.

one, the 2 points & all points inbetween

4. Make a Conjecture – How many lines can be drawn between 2 points? Justify your thinking.
5. Make a conjecture: If two lines intersect they intersect in a __point__. Justify your thinking.
6. Make a conjecture: If two planes intersect, then they intersect in a __line__. Justify your thinking
7. Make a conjecture: Through any __3__ noncollinear points there is exactly one plane. Justify your thinking.

Skew lines are **lines** that are in different planes and never intersect. The difference between **parallel lines** and **skew lines** is **parallel lines** lie in the same plane while **skew lines** lie in different planes. In the diagram below, CB and DH are parallel, but CB and GE are skew.



8. Name the intersection of Plane CGE and AGF. $\overleftrightarrow{GE}$
9. Name the intersection of segment CG and GA. G
10. Name two line segments that are parallel to segment GE. $\overline{AF}$ $\overline{CD}$ $\overline{BH}$
11. Name a line segment that is skew to BA. $\overline{GE}$ CD
12. Name two planes that are parallel. DEF and CGA

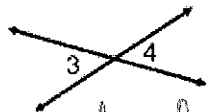
Homework Unit 2 Day 3

Identify each pair of angles as adjacent, vertical, complementary, supplementary, or a linear pair.

1.

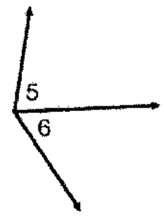
Adjacent

2.



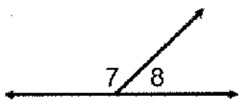
vertical

3.



adjacent

4.

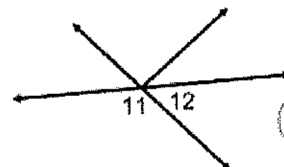


linear pair
supplementary
adjacent

5.

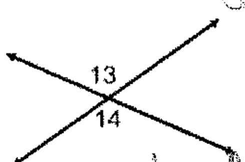
adjacent

6.



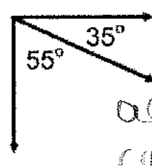
adjacent
linear pair
supplementary

7.



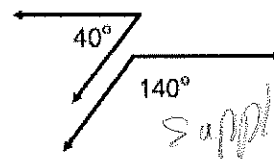
vertical

8.



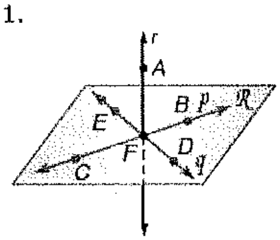
adjacent
complementary

9.



supplementary

1.



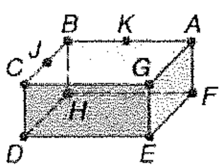
a. Name two coplanar lines: $\overleftrightarrow{ED}$ and $\overleftrightarrow{FB}$

b. Name four coplanar points: E, B, C, D

c. Name four non-coplanar points: A, F, B, D

d. Name plane R in four different ways: EBF ECF CFD CFE

2.



a. How many planes are in the diagram? 6

b. Name all of the planes: BKG, BKH, AFG, AFE, GCD, JCD

c. Name three collinear points: BKA

d. Name three non-collinear points: BKG

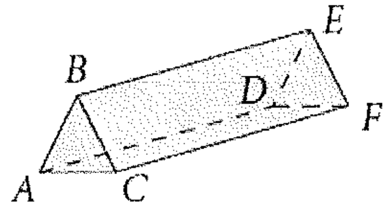
Continues on next page!

In the diagram, name all segments shown that are skew to the given segment.

1. $\overline{AC}$ $\overline{EF}$ $\overline{DE}$

2. $\overline{EF}$ $\overline{AC}$ $\overline{BA}$

3. $\overline{AD}$ $\overline{EF}$, $\overline{BC}$



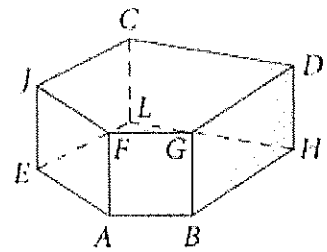
Use the figure at the right to name the following.

6. Two lines that are skew to $\overleftrightarrow{EJ}$

$\overleftrightarrow{GD}$ $\overleftrightarrow{BH}$

7. All lines that are parallel to plane JFAE

CDH, GDH



Geometry Unit 2 Day 4 Segment Addition Postulate and Midpoints

Learning Target – Students will use the segment addition postulate and the definition of midpoint to find lengths of segments

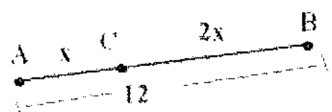
In geometry, axioms, or ***postulates***, are statements that are accepted as true without proof in order to provide a starting point for deductive reasoning.

Like *point*, *line*, and *plane*, *distance along a line* is an undefined term in geometry used to define other geometric terms. For example, the length of a line segment is the distance between its endpoints.

The Segment Addition Postulate

Postulate: **If C is between A and B, then AC + CB = AB.**

Example: **If AC = x , CB = 2x and AB = 12, then, find x, AC and CB.**



Step 1. Draw a figure

Step 2: Label fig. with given info — **AC + CB = AB**

Step 3: Write an equation — **x + 2x = 12**

Step 4: Solve and find all the answers

3x = 12

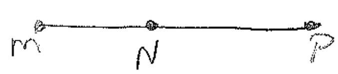
x = 4

x = 4
AC = 4
CB = 8

1.

Given that N is a point between endpoints M and P of line segment MP, describe how to determine the length of $\overline{MP}$, without measuring, if you are given the lengths of $\overline{MN}$ and $\overline{NP}$.

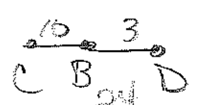
add MN+NP to get MP



2.

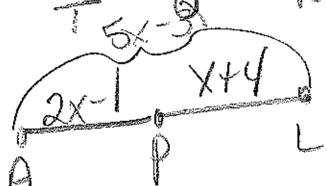
Use the Segment Addition Postulate and the given information to complete each statement.

a. If B is between C and D, $BC = 10$ in., and $BD = 3$ in., then $CD =$ 13.



b. If Q is between R and T, $RT = 24$ cm, and $QR = 6$ cm, then $QT =$ 18.

c. If P is between L and A, $PL = x + 4$, $PA = 2x - 1$, and $LA = 5x - 3$, then $x =$ 3 and $LA =$ 12.



$2x-1+x+4=5x-3$

$3x+3=5x-3$

$6=2x$

$3=x$

$LA=5(3)-3=12$

The ***midpoint*** of a segment is the point on the segment that divides it into two ***congruent*** segments. For example, if B is the midpoint of $\overline{AC}$, then $\overline{AB} \cong \overline{BC}$.

3.

Do together

Try These A

a. If Y is the midpoint of $\overline{WZ}$, $YZ = x + 3$, and $WZ = 3x - 4$, determine the length of $\overline{WZ}$. 26

Given: M is the midpoint of $\overline{RS}$. Use the given information to find the missing values.

b. $RM = x + 3$ and $MS = 2x - 1$
$x =$ 4 and $RM =$ 7

c. $RM = x + 6$ and $RS = 5x + 3$
$x =$ 3 and $SM =$ 9

a.) $3x-4$, $x+3$, W Y Z

$x+3+x+3 = 3x-4$

$2x+6 = 3x-4$

$10 = x$

$WZ = 3(10)-4 = 26$

4.

You try

Given: M is the midpoint of $\overline{RS}$. Complete each statement.

a. If $RS = 10$, then $SM =$ 5.

10
R M S

b. If $RM = 12$, then $MS =$ 12, and $RS =$ 24.

12
S M R

b.) $2x-1$, $x+3$, S M R

$x+3 = 2x-1$

$4 = x$

c.) $5x+3$, $x+6$, S M R

$x+6+x+6 = 5x+3$

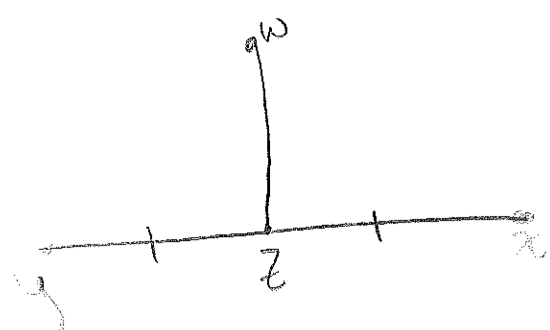
$2x+12 = 5x+3$

$9 = 3x$

$3 = x$

When you ***bisect*** a geometric figure, you divide it into two equal or congruent parts.

5. **Reason abstractly.** Line segment WZ bisects $\overline{XY}$ at point Z. What are two conclusions you can draw from this information?



1.) $\overline{YZ} \cong \overline{ZX}$

2.) point Z lies on $\overline{YX}$.

Geometry Unit 2 Day 4 Homework

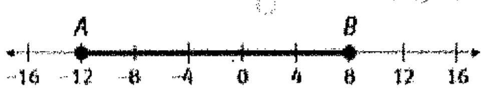
$\overline{PQ} + \overline{PR} = \overline{QR}$

1. If Q is between A and M and $MQ = 7.3$ and $AM = 8.5$, then $QA =$ __?__.
   A. 5.8 B. 1.2
   C. 7.3 D. 14.6

2. Given: K is between H and J, $HK = 2x - 5$, $KJ = 3x + 4$, and $HJ = 24$. What is the value of x?
   A. 9 B. 5
   C. 19 D. 3

3. If K is the midpoint of $\overline{HJ}$, $HK = x + 6$, and $HJ = 4x - 6$, then $KJ =$ __?__.
   A. 15 B. 9
   C. 4 D. 10

4. State the Segment Addition Postulate in your own words. Add the 2 parts of a segment to get the whole



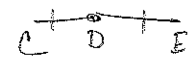
6. What is AB? 20

7. What is the coordinate of the midpoint of $\overline{AB}$? −2
   Explain how you found your answer. half-way between 8 + −12 or add them + divide by 2.

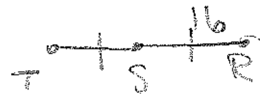
8. Point M is the midpoint of $\overline{AB}$. What is the coordinate of the midpoint of $\overline{AM}$? −7

13. What are two conclusions you can draw from this statement? Support your answers.
    Point P is the midpoint of $\overline{QR}$. $\overline{PQ} \cong \overline{PR}$

14. If D is the midpoint of $\overline{CE}$, $CD = x + 7$, and $CE = 5x - 1$, determine each missing value.
    a. $x =$ __?__ 15
    b. $CD =$ __?__ 12
    c. $CE =$ __?__ 24
    d. $DE =$ __?__ 12



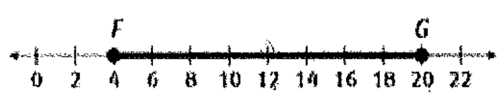
16. Point S is between points R and T. Given that $\overline{RS} \cong \overline{ST}$ and $RS = 16$, what is RT? 32 = RT



19. Given: Point K is between points H and J, $HK = x - 5$, $KJ = 5x - 12$, and $HJ = 25$. Find the value of x. $x = 7$

20. If B is the midpoint of $\overline{AC}$, $AB = x + 6$, and $AC = 5x - 6$, then what is BC? $BC = 12$

21. Point P is between points F and G. The distance between points F and P is $\frac{1}{4}$ of FG. What is the coordinate of point P? 8

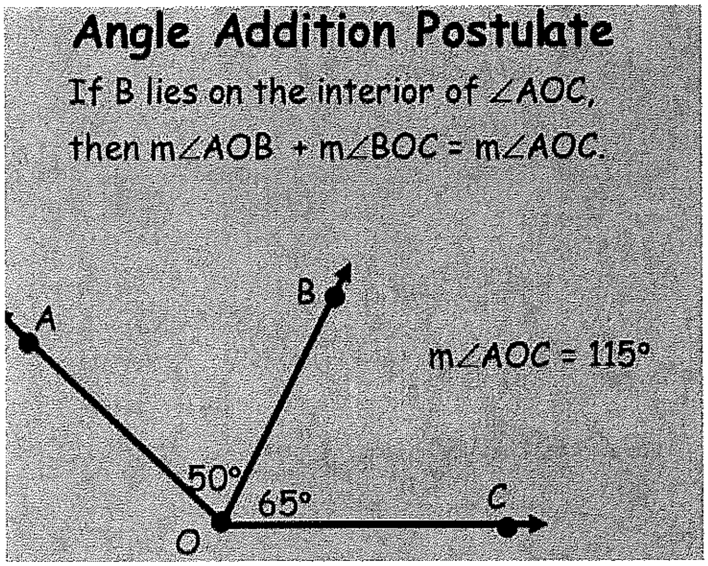


22. **Use appropriate tools strategically.** Anne has a broken ruler. It starts at the 3-inch mark and ends at the 12-inch mark. Explain how Anne could use the ruler to measure the length of a line segment in inches. Subtract 3 from where ever it ends.

23. If P is the midpoint of $\overline{ST}$, $SP = x + 4$, and $ST = 4x$, determine the length of $\overline{ST}$. $ST = 16$

Geometry Unit 2 Day 5 Finding Angle Measures.

Learning Target – Students will use the Angle Addition Postulate and definition of definition of bisect, complementary, supplementary, and vertical angles to find angle measures.



1.

Use the Angle Addition Postulate and the given information to complete each statement.

a. If P is in the interior of $\angle XYZ$, $m\angle XYP = 25°$, and $m\angle PYZ = 50°$, then $m\angle XYZ =$ 75°.

b. If M is in the interior of $\angle RTD$, $m\angle RTM = 40°$, and $m\angle RTD = 65°$, then $m\angle MTD =$ 25°.

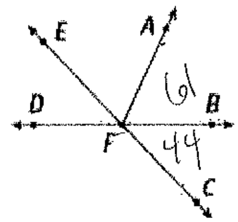
c. If H is in the interior of $\angle EFG$, $m\angle EFH = 75°$, and $m\angle HFG = (10x)°$, and $m\angle EFG = (20x - 5)°$, then $x =$ 8 and $m\angle HFG =$ 80.

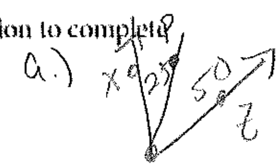
d. Lines DB and EC intersect at point F. If $m\angle BFC = 44°$ and $m\angle AFB = 61°$, then

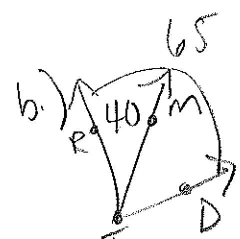
$m\angle AFC =$ 105°

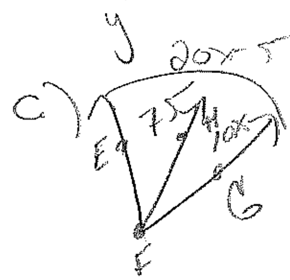
$m\angle AFE =$ 75°

$m\angle EFD =$ 44°



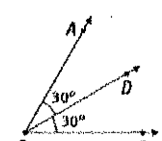




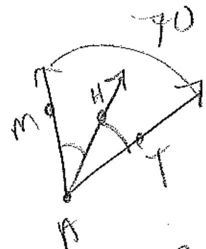


$10x + 75 = 20x - 5$
$80 = 10x$
$8 = x$

The ***bisector of an angle*** is a ray that divides the angle into two congruent adjacent angles. For example, if $\overrightarrow{BD}$ bisects $\angle ABC$, then $\angle ABD \cong \angle DBC$.



2.

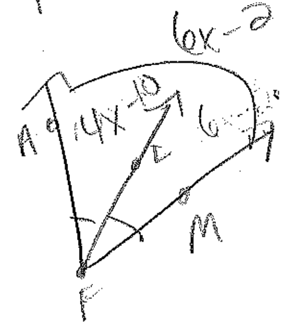


Given: $\overrightarrow{AH}$ bisects $\angle MAT$. Determine the missing measure.

a. $m\angle MAT = 70°$, $m\angle MAH =$ 35°

b. $m\angle HAT = 80°$, $m\angle MAT =$ 160°.

3.



Given: $\overrightarrow{FL}$ bisects $\angle AFM$. Determine each missing value.

a. $m\angle LFM = 11x + 4$ and $m\angle AFL = 12x - 2$

$x =$ 6, $m\angle LFM =$ 70, and $m\angle AFM =$ 140°

b. $m\angle AFM = 6x - 2$ and $m\angle AFL = 4x - 10$

$x =$ 9 and $m\angle LFM =$ 26

a.) $11x+4=12x-2$

$6=x$

b.) $2(4x-10)=6x-2$

$8x-20=6x-2$

$2x=18$

$x=9$

4. $\angle A$ and $\angle B$ are complementary, $m\angle A = 3x + 7$, and $m\angle B = 6x + 11$. Determine the measure of each angle. $\angle A = 31°$ $\angle B = 59°$

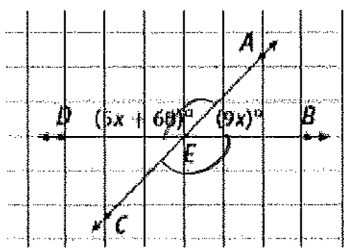
$3x+7+6x+11=90$

$9x+18=90$

$9x=72$

$x=8$

5.



In the diagram at the left, $\overleftrightarrow{AC}$ and $\overleftrightarrow{DB}$ intersect as shown. Determine the measure of $\angle CEB$.

$\angle CEB = 5x+68$

$= 108°$

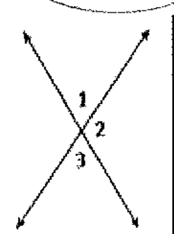
$5x+68+9x=180$

$14x+68=180$

$14x=112°$ $x=8$

6. Use the picture to answer the questions. Angles 1 and 3 are vertical angles. Vertical angles have the same measure.

In this diagram, $m\angle 1 = 4x + 30$ and $m\angle 3 = 2x + 48$. Find $m\angle 2$



$m\angle 1 = m\angle 3$

$4x+30=2x+48$

$2x=18$

$x=9$

$m\angle 1 = 4(9)+30=66$

so $m\angle 2 = 180-66 = 114°$

7. A. an angle measures x degrees, write an expression for the measure of it's compliment.
B. an angle measures x degrees, write an expression for the measure of it's supplement.
C. four times the measure of the complement of an angle is sixty degrees more than twice the measure of the angle's supplement. Find the measure of the angle, its complement, and its supplement.

A.) $(90-x)°$

B.) $(180-x)°$

C.) $2(180-x) = 60 + 4(90-x)$

$360-2x = 60+360-4x$

$2x = 60$

$x=30$

Complement = 60°

Supplement = 150°

Unit 2 Day 5 HW

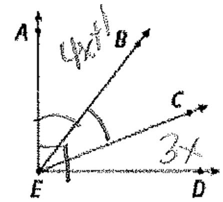
12. Point D is in the interior of $\angle ABC$, $m\angle ABC = 10x - 7$, $m\angle ABD = 6x + 5$, and $m\angle DBC = 36°$. What is $m\angle ABD$? $77°$

13. $\overrightarrow{QS}$ bisects $\angle PQR$. If $m\angle PQS = 5x$ and $m\angle RQS = 2x + 6$, then what is $m\angle PQR$? $20°$

14. $\angle L$ and $\angle M$ are complementary, $m\angle L = 2x + 25$, and $m\angle M = 4x + 11$. Determine the measure of each angle. $43°$ and $47°$

15. In this diagram, $\overrightarrow{EA} \perp \overrightarrow{ED}$ and $\overrightarrow{EB}$ bisects $\angle AEC$. Given that $m\angle AEB = 4x + 1$ and $m\angle CED = 3x$, determine the missing measures.

a. $x =$ 8 **b.** $m\angle BEC =$ $33°$

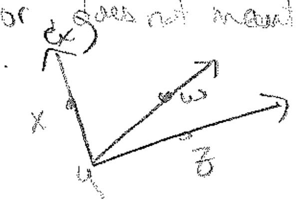


READING MATH

The symbol ⊥ is read "is perpendicular to."

16. Critique the reasoning of others. Penny knows that point W is in the interior of $\angle XYZ$. Based on this information, she claims that $\angle XYW \cong \angle WYZ$. Is Penny's claim necessarily true? Explain. Make a sketch that supports your answer.

No, just b/c W is in the interior does not mean that $\overrightarrow{YW}$ is a bisector of the ∠.



17. P lies in the interior of $\angle RST$, $m\angle RSP = 40°$ and $m\angle TSP = 10°$. $m\angle RST =$ ___?___

A. $100°$ **B.** $50°$
C. $30°$ **D.** $10°$

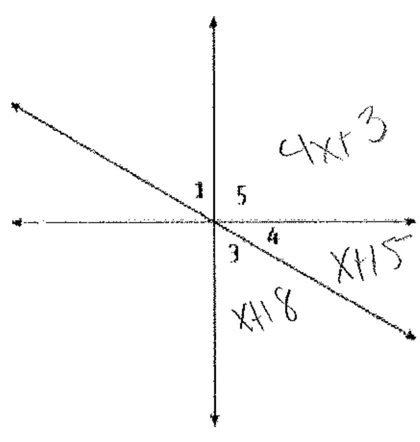
18. $\overrightarrow{QS}$ bisects $\angle PQR$. If $m\angle PQS = 3x$ and $m\angle RQS = 2x + 6$, then $m\angle PQR =$ ___?___

A. $18°$ **B.** $36°$
C. $30°$ **D.** $6°$

19. $\angle P$ and $\angle Q$ are supplementary. $m\angle P = 5x + 3$ and $m\angle Q = x + 3$. $x =$ ___?___

A. 14 **B.** 0
C. 29 **D.** 30

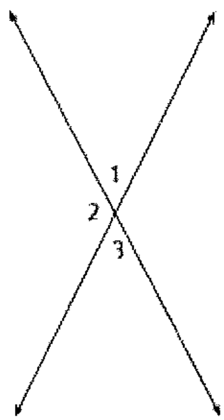
20. In this figure, $m\angle 3 = x + 18$, $m\angle 4 = x + 15$, and $m\angle 5 = 4x + 3$. Show all work for parts a, b, and c.



a. What is the value of x? 24
b. What is the measure of $\angle 1$? $42°$
c. Is $\angle 3$ complementary to $\angle 1$? Explain.

No, the are vertical ∠'s so they are ≅.

25. In this figure, $m\angle 1 = 4x + 50$ and $m\angle 3 = 2x + 66$. Show all work for parts a, b, and c.

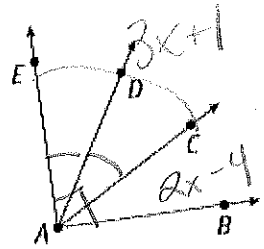


a. What is the value of x? 8

b. What is the measure of $m\angle 3$? 82°

c. What is the measure of $m\angle 2$? 98°

26. Given: $\overrightarrow{AE} \perp \overrightarrow{AB}$, $\overrightarrow{AD}$ bisects $\angle EAC$, $m\angle CAB = 2x - 4$ and $m\angle CAE = 3x + 1$. Show all work for parts a and b.



a. What is the value of x? 93/5

b. What is the measure of $m\angle DAC$? 28.4°

27. Two times the measure of the supplement of an angle is 100 degrees more than three times the measure of the angle's complement. Find the measure of the angle, its complement, and its supplement.

∡ = 10°

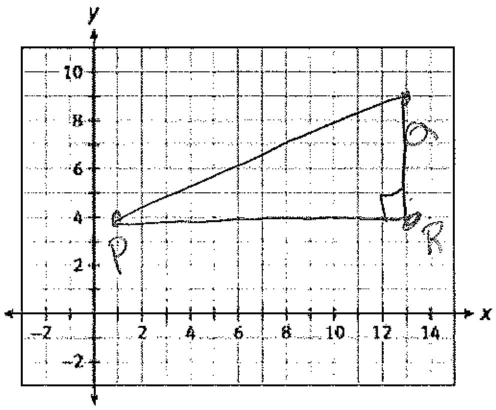
Complement = 80°

Supplement = 170°

Geometry Unit 2 Day 6 Pythagorean Theorem and Distance Formula

Learning Target – Students will derive the distance formula and use it to find the distance between two points on a coordinate plane.

Use the coordinate plane and follow the steps below to determine the distance between points $P(1, 4)$ and $Q(13, 9)$.



1. **Model with mathematics.** Plot the points $P(1, 4)$ and $Q(13, 9)$ on the coordinate plane. Then draw $\overline{PQ}$.
2. Draw horizontal segment PR and vertical segment QR to create right triangle PQR, with a right angle at vertex R.
3. **Attend to precision.** What are the coordinates of point R? (13, 4)

4. a. What is PR, the length of the horizontal leg of the right triangle?

   12

   b. What is QR, the length of the vertical leg of the right triangle?

   5

   c. Explain how you determined your answers to parts a and b.

   Counted or subtracted

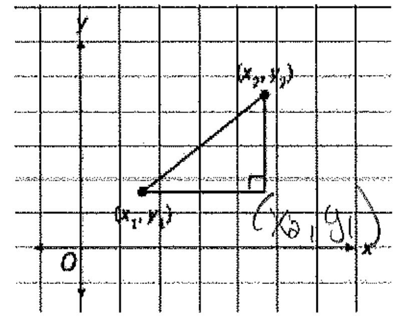
The *Pythagorean Theorem* states that the square of the length of the hypotenuse of a right triangle is equal to the sum of the squares of the lengths of the legs of the right triangle. In other words, for a right triangle with hypotenuse c and legs a and b, $c^2 = a^2 + b^2$.

5. Use the Pythagorean Theorem to find PQ. Show your work.

$5^2 + 12^2 = PQ^2$
$25 + 144 = PQ^2$
$169 = PQ^2$ so $PQ = 13$

6. **Attend to precision.** What is the distance between points $P(1, 4)$ and $Q(13, 9)$? How do you know?

13 b/c that's the length of the hypotenuse of the △



Although the method you just learned for finding the distance between two points will always work, it may not be practical to plot points on a coordinate plane and draw a right triangle each time you want to find the distance between them.

Instead, you can use algebraic methods to derive a formula for finding the distance between any two points on the coordinate plane. Start with any two points (x_1, y_1) and (x_2, y_2) on the coordinate plane. Visualize using these points to draw a right triangle with a horizontal leg and a vertical leg.

11. What are the coordinates of the point at the vertex of the right angle of the triangle?

(x_2, y_1)

12. Write an expression for the length of the horizontal leg of the right triangle.

$x_2 - x_1$

13. Write an expression for the length of the vertical leg of the right triangle.

$y_2 - y_1$

14. Use the Pythagorean Theorem to write an expression for the length of the hypotenuse of the right triangle.

$a^2 + b^2 = c^2$

$(x_2 - x_1)^2 + (y_2 - y_1)^2 = c^2$

15. Express regularity in repeated reasoning. Write a formula that can be used to find d, the distance between two points (x_1, y_1) and (x_2, y_2) on the coordinate plane.

$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

16. Use the formula you wrote in Item 15 to find the distance between the points with coordinates (12, −5) and (−3, 7).

$x_1 \ y_1 \quad x_2 \ y_2$

$d = \sqrt{(-3-12)^2 + (7--5)^2} = \sqrt{(-15)^2 + (12)^2}$

$= \sqrt{225 + 144}$

$= \sqrt{369}$

$= 3\sqrt{41}$

17. Find the distance between the points with the coordinates shown.

a. (−8, 5) and (7, −3)

b. (3, 8) and (8, 3)

a.) $d = \sqrt{(-3-5)^2 + (7--8)^2}$

$= \sqrt{(-8)^2 + 15^2}$

$= \sqrt{64 + 225}$

$= \sqrt{289}$

$= 17$

b.) $d = \sqrt{(3-8)^2 + (8-3)^2}$

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

$= \sqrt{25 + 25}$

$= \sqrt{50}$

$= 5\sqrt{2}$

Geometry Unit 2 Day 6 HW

Find the distance between the points with the given coordinates.

21. $(-8, -6)$ and $(4, 10)$

20

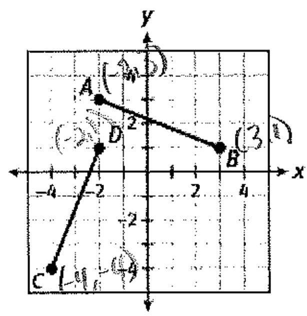
22. $(5, 14)$ and $(-3, -9)$

$\sqrt{593}$

25. The vertices of $\triangle XYZ$ are $X(-3, -6)$, $Y(21, -6)$, and $Z(21, 4)$. What is the perimeter of the triangle?

60

26. Use the Distance Formula to show that $\overline{AB} \cong \overline{CD}$.



$AB = \sqrt{(3--2)^2 + (1-3)^2}$

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

$= \sqrt{25+4}$

$= \sqrt{29}$

$CD = \sqrt{(-4--2)^2 + (-4-1)^2}$

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

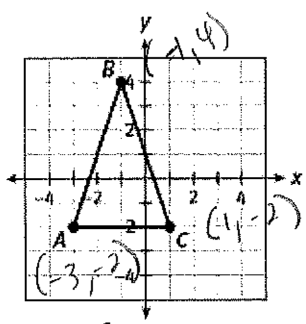
$= \sqrt{4+25}$

$= \sqrt{29}$

Since AB + CD both $= \sqrt{29}$, they are congruent

27.

Use the Distance Formula to show that $\triangle ABC$ is isosceles.



Since $BA \cong BC$

$\triangle ABC$ is isosceles.

$BA = \sqrt{(4--2)^2 + (-1-3)^2}$

$= \sqrt{6^2 + 2^2}$

$= \sqrt{36+4}$

$= \sqrt{40}$

$= 2\sqrt{10}$

$BC = \sqrt{(-2-4)^2 + (1--1)^2}$

$= \sqrt{(-6)^2 + (2)^2}$

$= \sqrt{36+4}$

$= \sqrt{40}$

$= 2\sqrt{10}$

Geometry Unit 2 Day 7 Midpoint Formula

Learning Target – Use the midpoint formula to find the coordinates of a midpoint on the coordinate plane.

1. Define midpoint. the point that splits a segment into 2 congruent parts.

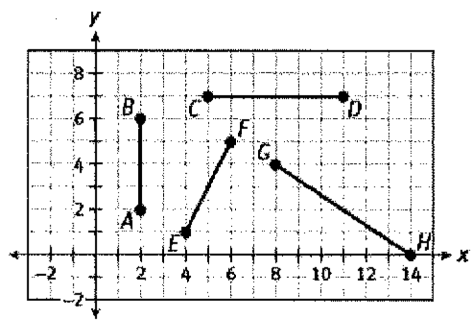
MATH TIP

For a segment on a number line, the coordinate of the midpoint is the average of the coordinates of the endpoints.

2. Write a formula that could be used to find the midpoint between two points A(x_1, y_1) and B(x_2, y_2)

$$M\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$$

3.



In the table below, write the coordinates of the endpoints of each segment shown on the coordinate plane.

Use appropriate tools strategically. Use a ruler to help you identify the midpoint of each segment. Then write the coordinates of the midpoint in the table.

Segment	Endpoints	Midpoint
$\overline{AB}$	A(2, 2) and B(2, 6)	(2, 4)
$\overline{CD}$	C(5, 7) and D(11, 7)	(8, 7)
$\overline{EF}$	E(4, 1) and F(6, 7)	(5, 4)
$\overline{GH}$	G(8, 4) and H(14, 0)	(11, 2)

Find the coordinates of the midpoint of each segment with the given endpoints.

9. $Q(-3, 14)$ and $R(7, 5)$ $\left(2, \frac{19}{2}\right)$ **10.** $S(13, 7)$ and $T(-2, -7)$ $\left(\frac{11}{2}, 0\right)$

11. $E(4, 11)$ and $F(-11, -5)$ $\left(\frac{-7}{2}, 3\right)$ **12.** $A(-5, 4)$ and $B(-5, 18)$ $(-5, 11)$

13. Find and explain the errors that were made in the following calculation of the coordinates of a midpoint. Then fix the errors and determine the correct answer.

Find the coordinates of the midpoint M of the segment with endpoints R(−2, 3) and S(13, −7).

$$M = \left(\frac{-2+3}{2}, \frac{13+(-7)}{2}\right)$$

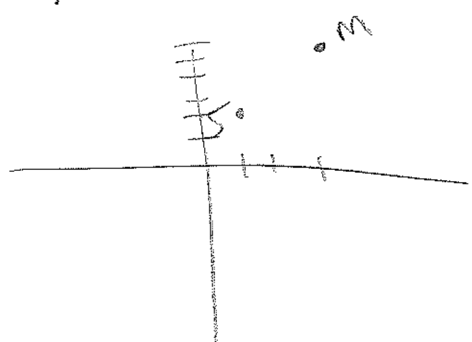
$$= \left(\frac{1}{2}, \frac{6}{2}\right) = \left(\frac{1}{2}, 3\right)$$

The x values and y values should be added, not the x and y's together.

$$\left(\frac{-2+13}{2}, \frac{3+-7}{2}\right) = \left(\frac{11}{2}, -2\right)$$

14. Make sense of problems. $\overline{HJ}$ is graphed on a coordinate plane. Explain how you would determine the coordinates of the point on the segment that is $\frac{1}{4}$ of the distance from H to J. Find the mid point M. Then find the midpoint of H M.

15. The midpoint M of $\overline{ST}$ has coordinates (3, 6). Point S has coordinates (1, 2). What are the coordinates of point T? Explain how you determined your answer.



$$(3, 6) = \left(\frac{1+x}{2}, \frac{2+y}{2}\right)$$

$$\frac{1+x}{2} = 3 \qquad \frac{2+y}{2} = 6$$

$$1+x = 6 \qquad 2+y = 12$$

$$x = 5 \qquad y = 10$$

$T(5, 10)$

Used the midpoint formula to solve for the unknown

Geometry Unit 2 Day 7 HW

17. Point C is the midpoint of $\overline{AB}$. Point A has coordinates (2, 4), and point C has coordinates (5, 0).
- **a.** What are the coordinates of point B? (8, -4)
- **b.** What is AB? 10
- **c.** What is BC? 5

21. A circle on the coordinate plane has a diameter with endpoints at (6, 8) and (15, 8).
- **a.** What are the coordinates of the center of the circle? $\left(\frac{21}{2}, 8\right)$
- **b.** What is the diameter of the circle? 9
- **c.** What is the radius of the circle? 4.5
- **d.** Identify the coordinates of another point on the circle. Explain how you found your answer. (10.5, 12.5) added 4.5 (radius) to the y coordinate of the center

22. Two explorers on an expedition to the Arctic Circle have radioed their coordinates to base camp. Explorer A is at coordinates (26, 15). Explorer B is at coordinates (13, 21). The base camp is located at the origin.
- **a.** Determine the linear distance between the two explorers. 53.07
- **b.** Determine the midpoint between the two explorers. $\left(-\frac{13}{2}, \frac{7}{2}\right)$
- **c.** Determine the distance between the midpoint of the explorers and the base camp. 26.53

24. Point J is the midpoint of $\overline{FG}$ with endpoints $F(1, 4)$ and $G(5, 12)$. Point K is the midpoint of $\overline{GH}$ with endpoints $G(5, 12)$ and $H(-1, 4)$. What is JK? 1