


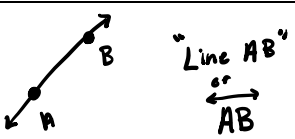
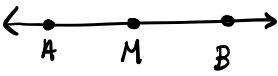
Basics of Geometry

Geometry CP

Name: Answer Key

Points, Lines, Segments, & Rays

Date:

Word	Definition	Picture/Symbol/Example
Point	<ul style="list-style-type: none"> An exact location in a 2D or 3D space Represented by a dot • Always named with an uppercase letter 	 "point A"
Line	<ul style="list-style-type: none"> A line connects at least 2 points and goes forever in both directions Lines always have arrows on both ends Named after 2 points on the line 	
Collinear	<ul style="list-style-type: none"> Points that all fall on the same line 	

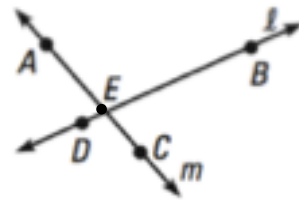
Use the diagram at the right to...

List at least two other ways to name \overleftrightarrow{AC}

\overleftrightarrow{AE} , \overleftrightarrow{CA} , \overleftrightarrow{EA} , \overleftrightarrow{CE} , \overleftrightarrow{EC}

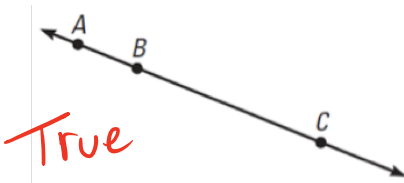
List at least two other ways to name \overleftrightarrow{DB}

\overleftrightarrow{ED} , \overleftrightarrow{DE} , \overleftrightarrow{EB} , \overleftrightarrow{BE} , \overleftrightarrow{EB}



True or False:

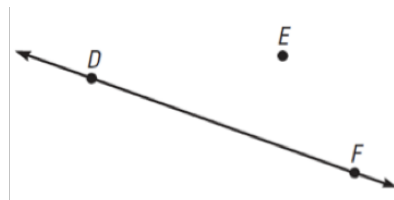
Points A, B, and C are collinear



True

True or False:

Points D, E, and F are collinear



False

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

a. Name three points that are collinear.

M, X, N or P, X, Q

b. Name three points that are not collinear.

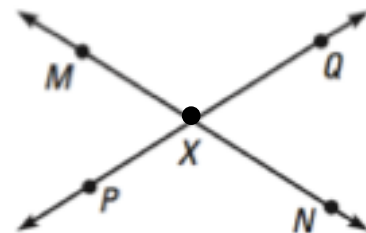
M, X, P or P, X, N (and others)

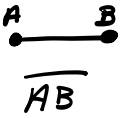
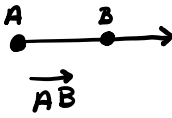
c. Give two other names for \overleftrightarrow{MN}

\overleftrightarrow{NM} , \overleftrightarrow{XM} , \overleftrightarrow{MX} , \overleftrightarrow{NX} , \overleftrightarrow{XN}

d. Give two other names for \overleftrightarrow{PX}

\overleftrightarrow{XP} , \overleftrightarrow{XQ} , \overleftrightarrow{QP}



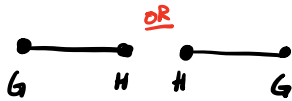
Word	Definition	Picture/Symbol/Example
Line Segment	<ul style="list-style-type: none"> - A part of a line - Has two endpoints that give the segment its name 	 "line segment AB"
Ray	<ul style="list-style-type: none"> - Part of a line that starts at an <u>initial point</u> and goes for ever in <u>on direction</u> - The name should always start with the initial point 	 "Ray AB"

Practice: Draw a picture of each line, line segment, or ray.

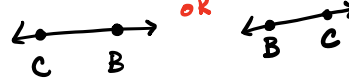
Remember to give every upper case letter a point (dot)!

It is best when there is an arrow for the line to extend *beyond* the point (dot).

\overline{GH}



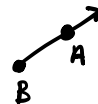
\overleftrightarrow{CB}



\overleftrightarrow{DW}



\overrightarrow{BA}



\overrightarrow{LN}



\overline{TS}



On Your Own:

1. Which is *not* a way to name the line shown?

a. \overleftrightarrow{D}

b. \overleftrightarrow{DC}

c. \overleftrightarrow{CD}

Need two points
on the line



2. Which point is labeled *incorrectly*?

a. A●

b. ●R

c. n●

Need a
Capital letter

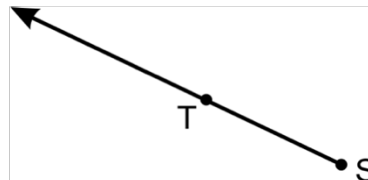
3. Which is the correct way to name the ray shown?

a. \overrightarrow{ST}

b. \overleftrightarrow{TS}

c. \overrightarrow{TS}

Name must start
with the initial point



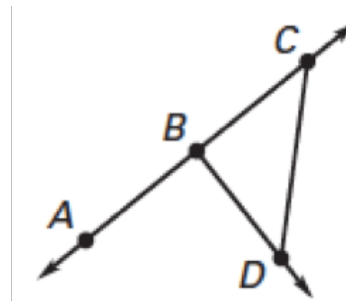
Use the diagram to name each figure. Be sure to use correct geometric notation.

4. Five different line segments.

\overline{AB} , \overline{BC} , \overline{AC} , \overline{BD} , \overline{CD}

5. Two rays.

\overrightarrow{BD} , \overrightarrow{BA} , \overrightarrow{BC}



6. Name one point that is collinear with A and B.

●C

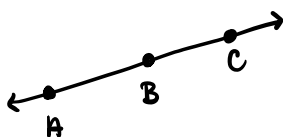
7. Name one point that is *not* collinear with A and B.

●D

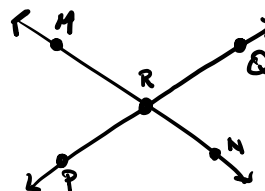
8. Give two other names for \overleftrightarrow{AB} \overleftrightarrow{BA} , \overleftrightarrow{AC} , \overleftrightarrow{CA}

Draw a sketch and label as needed.

9. Three collinear points, A, B, and C.



10. \overleftrightarrow{MN} intersecting \overleftrightarrow{PQ} at point R.



Decide whether the statement is *true* or *false*.

11. Point X lies on line m .

True

13. Point W lies on line m .

False

15. X , Y , and Z are collinear.

True

12. Point V lies on line l .

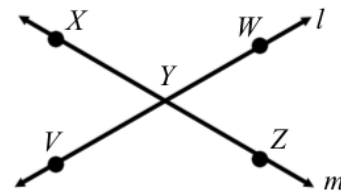
True

14. Point Y lies on line l .

True

16. V , Y , and X are collinear.

False



Name the point that is collinear with the given points.

17. B and E

H

18. F and H

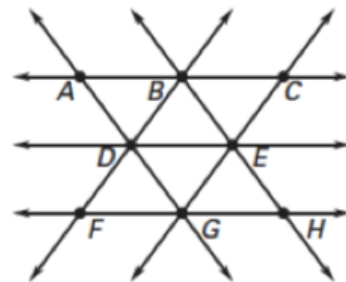
G

19. D and G

A

20. A and C

B



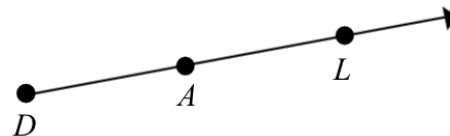
Multiple Choice

21. Which is *not* a correct way to name the ray shown?

a. \overrightarrow{LD}

b. \overrightarrow{DA}

c. \overrightarrow{DL}

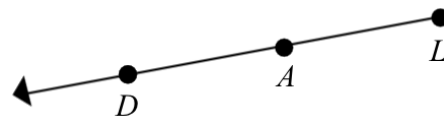


22. Which is *not* a correct way to name the ray shown?

a. \overrightarrow{LD}

b. \overrightarrow{LA}

c. \overrightarrow{DL}

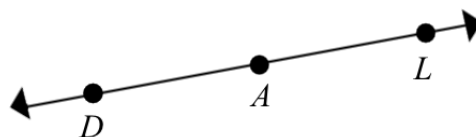


23. Which is the correct way to name the *line* shown?

a. \overleftrightarrow{da}

b. \overleftrightarrow{L}

c. \overleftrightarrow{DL}

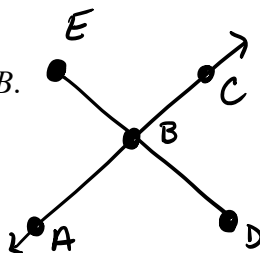


Fractions & Order of Operations

Date:

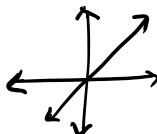
Warm-Up:

1. Draw a picture so that \overleftrightarrow{DE} intersects \overleftrightarrow{AC} at B .

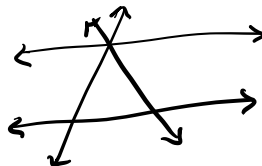


2. Sketch the figure described, if possible.

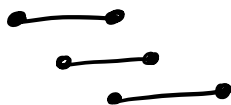
- a. Three lines that intersect at a single point.



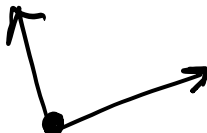
- b. A set of four lines that has three points of intersection.



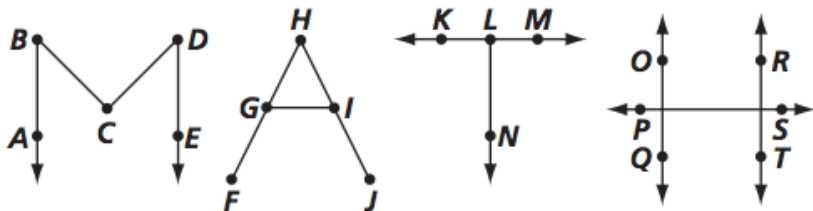
- c. Three line segments that do not intersect.



- d. Two rays that share an initial (starting) point.



Name the figures that each letter in the word MATH is made from.



M $\overleftrightarrow{BA}, \overleftrightarrow{BC}, \overleftrightarrow{CD}, \overleftrightarrow{DE}$

A $\overleftrightarrow{HF}, \overleftrightarrow{GI}, \overleftrightarrow{HJ}, \overleftrightarrow{HG}, \overleftrightarrow{HI}$

T $\overleftrightarrow{KM}, \overleftrightarrow{LK}, \overleftrightarrow{LM}, \overleftrightarrow{LN}$

H $\overleftrightarrow{PS}, \overleftrightarrow{OQ}, \overleftrightarrow{RT}$

Add and Subtract Fractions with Like Denominators

Remember to simplify your final answer.

$$1. \frac{1}{6} + \frac{3}{6} = \frac{4}{6} \rightarrow \boxed{\frac{2}{3}}$$

$$2. \frac{17}{50} + \frac{3}{50} = \frac{20}{50} \rightarrow \boxed{\frac{2}{5}}$$

$$3. \frac{3}{8} + \frac{1}{4} =$$

$$\frac{1}{4} \times \frac{2}{2} = \frac{2}{8} \quad \frac{3}{8} + \frac{2}{8} = \boxed{\frac{5}{8}}$$

$$4. \frac{11}{45} - \frac{2}{9} =$$

$$\frac{2}{9} \times \frac{5}{5} = \frac{10}{45} \quad \frac{11}{45} - \frac{10}{45} = \boxed{\frac{1}{45}}$$

$$5. \frac{23}{24} - \frac{3}{12} =$$

$$\frac{3}{12} \times \frac{2}{2} = \frac{6}{24} \quad \frac{23}{24} - \frac{6}{24} = \boxed{\frac{17}{24}}$$

$$6. \frac{1}{30} + \frac{13}{60} =$$

$$\frac{1}{30} \times \frac{2}{2} = \frac{2}{60} \quad \frac{2}{60} + \frac{13}{60} = \frac{15}{60} \rightarrow \boxed{\frac{1}{4}}$$

$$7. \frac{11}{18} - \frac{5}{9} =$$

$$\frac{5}{9} \times \frac{2}{2} = \frac{10}{18} \quad \frac{11}{18} - \frac{10}{18} = \boxed{\frac{1}{18}}$$

$$8. \frac{7}{10} - \frac{3}{10} + \frac{1}{10} =$$

$$\frac{4}{10} + \frac{1}{10} = \frac{5}{10} \rightarrow \boxed{\frac{1}{2}}$$

Use the figure at the right to answer each of the following questions.

9. Give another name for \overrightarrow{GF} .

\overrightarrow{GE}

10. Name a different ray with the same initial point as \overrightarrow{GA} .

\overrightarrow{GC}

11. Give another name for \overline{DC} .

\overline{CD}

12. Give another name for \overleftrightarrow{GC} .

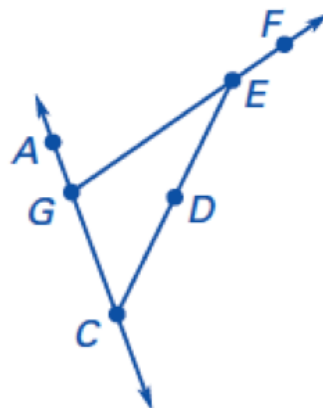
\overleftrightarrow{CG}

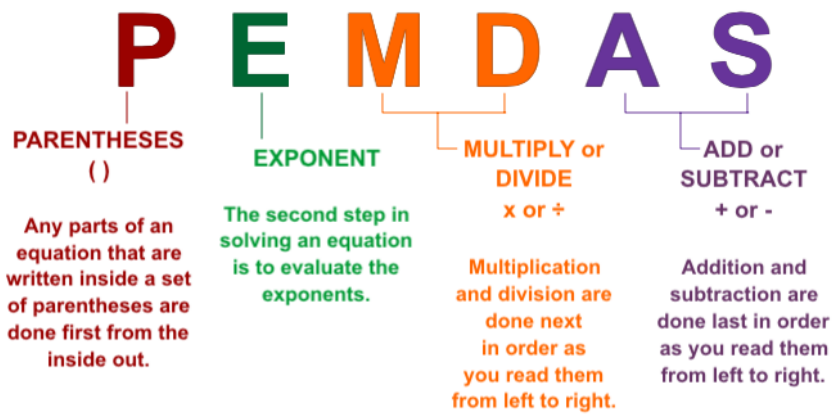
13. True or False: G, E and F are collinear.

True

14. True or False: \overline{DC} and \overline{DE} are collinear.

True





1. $72 \div 9 + 7$

$8 + 7$

$\boxed{15}$

2. $9 + 8 - 7$

$17 - 7$

$\boxed{10}$

3. $9 - 9 + 6 - 5$

$0 + 6 - 5$

$6 - 5$

$\boxed{1}$

4. $7 + 10 \times 5 + 10$

$7 + 50 + 10$

$57 + 10$

$\boxed{67}$

5. $20 \div (4 - (10 - 8))$

$20 \div (4 - (2))$

$20 \div 2$

$\boxed{10}$

6. $2 + 7 \times 5$

$2 + 35$

$\boxed{37}$

7. $48 \div (4 + 4)$

$48 \div 8$

$\boxed{6}$

8. $40 \div 4 - (5 - 3)$

$40 \div 4 - 8$

$10 - 8$

$\boxed{2}$

9. $9 - 32 \div 4$

$9 - 8$

$\boxed{1}$

Practice Day and Solving Equations

Date:

Warm Up: Evaluate each of the following. Make sure to simplify completely.

a. $\frac{13}{40} + \frac{7}{40}$

$$\frac{20}{40} \rightarrow \frac{2}{4} \rightarrow \boxed{\frac{1}{2}}$$

b. $\frac{9}{10} - \frac{3 \times 2}{5 \times 2}$

$$\frac{9}{10} - \frac{6}{10} = \boxed{\frac{3}{10}}$$

c. $(5 + 16) \div 7 - 2$

$$21 \div 7 - 2$$

$$3 - 2$$

$$\boxed{1}$$

d. $(6 + 25 - 7) \div 6$

$$(31 - 7) \div 6$$

$$24 \div 6$$

$$\boxed{4}$$

Solving Linear Equations

a. $x + 6 = 8$

$$-6 \quad -6$$

$$\boxed{x = 2}$$

b. $3x + 6 = 15$

$$-6 \quad -6$$

$$\frac{3x = 9}{3}$$

$$\boxed{x = 3}$$

c. $5 + 6x = 12$

$$-5 \quad -5$$

$$6x = 7$$

$$\div 6$$

$$\boxed{x = \frac{7}{6}}$$

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

$$-x \quad -x$$

$$-3 = x - 4$$

$$+4 \quad +4$$

$$\boxed{1 = x}$$

Practice Day:

Describe in words what each of the following symbols means. (How would you say it out loud?)

1. \overleftrightarrow{PQ}

Line PQ

2. \overline{PQ}

Line segment
PQ

3. \overrightarrow{DA}

Ray
DA

Decide whether the following statement is **true or false** using the diagram to the right.

4. Point X lies on \overleftrightarrow{ZY}

True

5. X, W, and Z are *collinear*

False

6. Point W lies on \overleftrightarrow{VY}

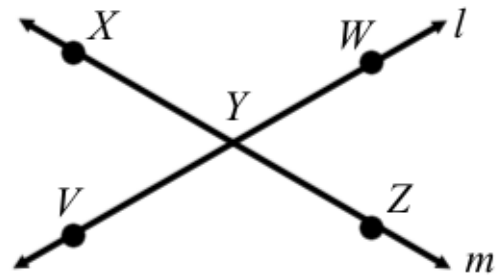
True

7. \overleftrightarrow{YW} and \overleftrightarrow{YV} are *collinear*

True

8. \overleftrightarrow{YX} and \overleftrightarrow{YV} are *collinear*

False



Use the diagram to the right to name a point that is collinear with the given points.

9. B and E

I

10. C and H

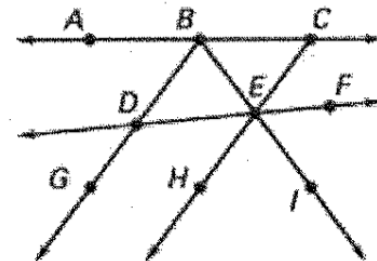
E

11. D and G

B

12. A and C

B



In the space to the right, draw a line that contains point R between points S and T.

Which of the following are true?

13. \overrightarrow{SR} is the same as \overrightarrow{ST}

True



14. \overrightarrow{RS} is the same as \overrightarrow{TS}

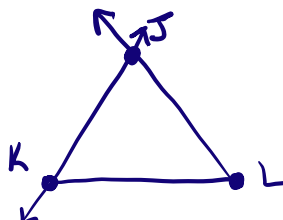
False

15. \overrightarrow{TS} is the same as \overrightarrow{ST}

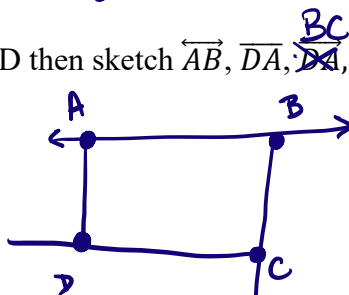
True

Sketch the diagram described in each of the problems below.

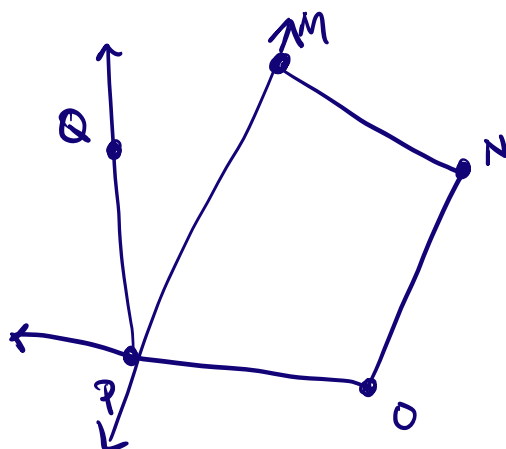
19. Draw three non-collinear points, J, K, and L. Then draw \overrightarrow{JK} , \overrightarrow{KL} , and \overrightarrow{LJ}



20. Draw four non-collinear points A, B, C, D then sketch \overrightarrow{AB} , \overrightarrow{DA} , \overrightarrow{BC} , and \overrightarrow{CD}



21. Draw five non-collinear points M, N, O, P, and Q. Then sketch \overrightarrow{MP} , \overrightarrow{MN} , \overrightarrow{OP} , \overrightarrow{PQ} , and \overrightarrow{NO} ,



Segment Addition

Date:

Warm-Up: Simplify each of the following.

a. $\left(\frac{12}{22}\right) + \left(\frac{1}{2}\right) =$

$$\frac{12}{22} + \frac{11}{22} = \boxed{\frac{23}{22}}$$

b. $\frac{4}{6} - \frac{2}{12} =$

$$\frac{8}{12} - \frac{2}{12} = \frac{6}{12} = \boxed{\frac{1}{2}}$$

c. $3(7 \times 6 - 6^2) + 8 =$

$$\begin{aligned} &3(7 \times 6 - 36) + 8 \\ &3(42 - 36) + 8 \\ &3(6) + 8 \\ &18 + 8 = \boxed{26} \end{aligned}$$

d. $4^2 - (10 + 44 - 6) \div 16 =$

$$\begin{aligned} &4^2 - (54 - 6) \div 16 \\ &4^2 - (48) \div 16 \\ &16 - 48 \div 16 \\ &16 - 3 \\ &\boxed{13} \end{aligned}$$

Use the figure at the right to answer each of the following questions.

e. Name a point that is collinear with A and B.

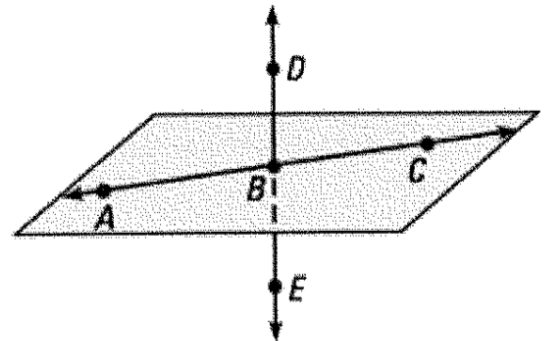
C

f. Name a pair of rays with the same initial point.

\overrightarrow{BD} and \overrightarrow{BC}

g. What is another name for \overleftrightarrow{CB} ?

\overleftrightarrow{CA}

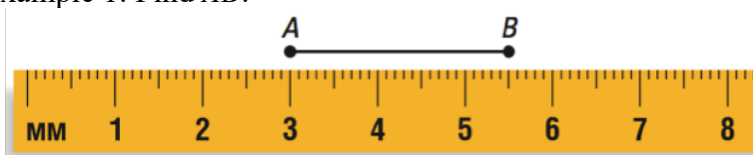


Segments and their Measures

AB is the distance between A and B

AB is also called the length of \overline{AB}

Example 1: Find AB .



$$AB = 2.5 \text{ mm}$$

Example 2: Draw X , Y , and Z such that Z is between X and Y .



Word	Definition	Picture/Symbol/Example
Segment Addition Postulate	$AB + BC = AC$ when point B is between A and C	 $AB + BC = AC$
Congruent Segments	Segments that have the same measurement	 $LM \cong MN$

Example 3:

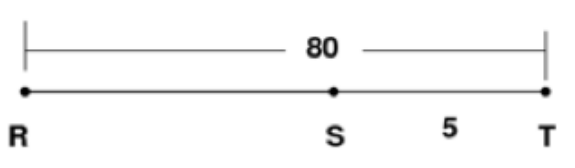
Find CE .



$$25 + 10 = 35$$

$$\boxed{CE = 35}$$

Find RS .



$$80 - 5 = 75$$

or

$$\underline{\quad} + 5 = 80$$

$$\boxed{RS = 75}$$

Example 4: Mark the diagram to show which segments are congruent.
Then, write a congruence statement for each.



$$AB \cong DE \cong EF$$

Example 5:

In the diagram of collinear points, $GK = 24$, $HJ = 10$, and $GH = HI = IJ$. Find each length.

a) HI

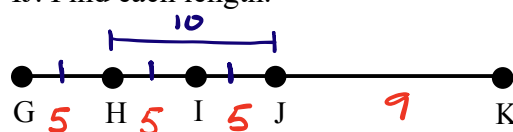
5

b) IJ

5

c) GH

5



d) JK

9

e) IG

10

f) IK

14



On your own:

1. In the diagram of the collinear points, $PT = 20$, $QS = 6$, and $PQ = QR = RS$. Find each length.

a) QR

3

b) RS

3

c) PQ

3

d) ST

11

e) RP

6

f) RT

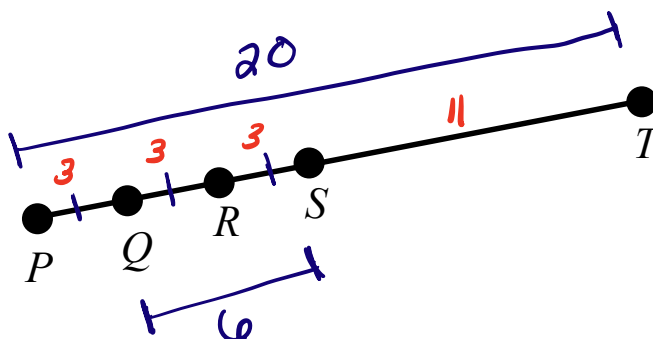
14

g) SP

9

h) QT

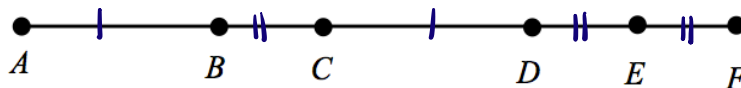
17



2. Mark the diagram to show the given congruence.

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

$$\overline{BC} \cong \overline{DE} \cong \overline{EF}$$



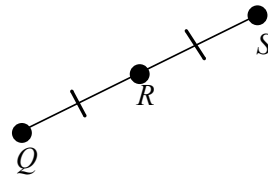
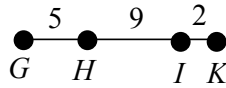
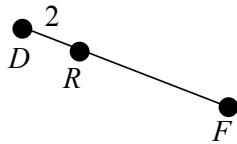
$$\overline{GE} \cong \overline{MT} \cong \overline{TR}$$

$$\overline{EO} \cong \overline{RY}$$



3. Use the three diagrams below to answer each of the questions.

Each question is separate. The only numbers that will remain constant are the ones that are written in.



1. If $RF = 7$, $DF =$ 9

2. $GI =$ 14

3. If $QR = 15$, $RS =$ 15

4. If $DF = 5$, $RF =$ 3

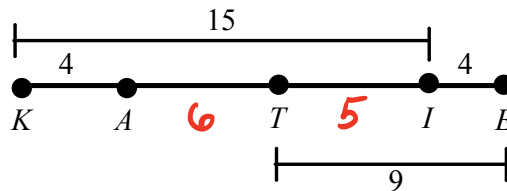
5. If $QS = 8$, $QR =$ 4

6. $\overline{DR} \cong \overline{IK}$

7. If $QR = 9.5$, $QS =$ 19

8. $GK =$ 16

4. Use the diagram below where $KA = 4$, $KI = 15$, $TE = 9$ and $IE = 4$ to answer each of the questions.



9. $TI =$ 5

10. $KT =$ 10

11. $KE =$ 19

12. $AT =$ 6

13. $AI =$ 11

14. $\overline{KA} \cong \overline{IE}$

Segment Bisectors

Date:

Warm-Up:

1. What do you think the word BISECT means? *Cut in half*

2. Evaluate:

a. $2x - 5 = 17$
 $+5 \quad +5$

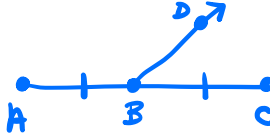

$2x = 22$
 $\underline{\quad 2 \quad}$

$x = 11$

b. $3x + 4 = 2x + 19$
 $-2x \quad -2x$

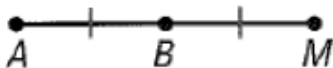
$x + 4 = 19$
 $-4 \quad -4$

$x = 15$

Word	Definition	Picture/Symbol/Example
Segment Bisector	A line, segment, or Ray that cuts a segment exactly in half	
Midpoint	A point that lays directly in the middle of a segments	

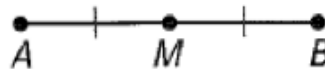
Example 1: Determine whether M is the midpoint of AB. Explain your reasoning.

a.



No
M is not in the middle

b.



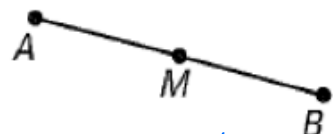
yes

c.



No, AB is not a line segment

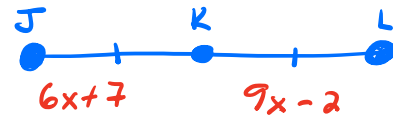
d.



Not enough info
So we have to say No

Example 2: Draw a diagram to help you solve the problem with the given information.

K is the midpoint of \overline{JL} . If $JK = 6x + 7$ and $KL = 9x - 2$



- a. Write an equation and solve for the value of x .

$$6x + 7 = 9x - 2$$

$$7 = 3x - 2$$

$$9 = 3x$$

$$\boxed{3 = x}$$

- b. Find KL .

$$9(3) - 2$$

$$27 - 2$$

$$\boxed{25}$$

Example 3: Draw a diagram. Points A, B, and C are collinear. Point B is between A and C.

Then, solve for x .

$$AC = 3x + 3, AB = -1 + 2x \text{ and } BC = 11$$

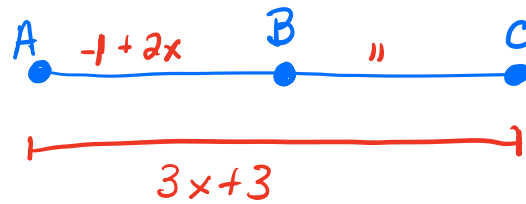
* B is not the midpoint *

$$\underline{-1} + 2x + \underline{11} = 3x + 3$$

$$10 + 2x = 3x + 3$$

$$10 = x + 3$$

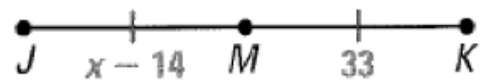
$$\boxed{7 = x}$$



Example 4: M is the midpoint of \overline{JK} . Find the value of the variable.

a. $x = \underline{47}$

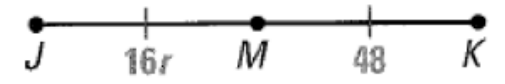
b. $r = \underline{3}$



$$x - 14 = 33$$

$$+14 \quad +14$$

$$x = 47$$



$$\underline{16r = 48}$$

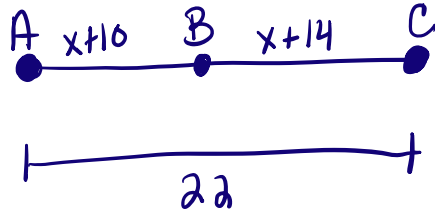
$$16$$

$$r = 3$$

On your own:

1. Draw a diagram. Points A, B, and C are collinear. Point B is between A and C.
Then, solve for x.

$$AC = 22, AB = x + 10 \text{ and } BC = x + 14$$



$$x + 10 + x + 14 = 22$$

$$2x + 24 = 22$$

$$\quad -24 \quad -24$$

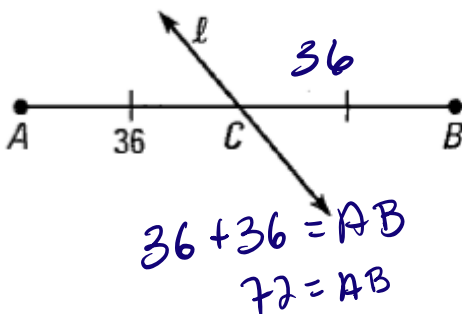
$$2x = -2$$

$$\quad \quad \quad 2$$

$$x = -1$$

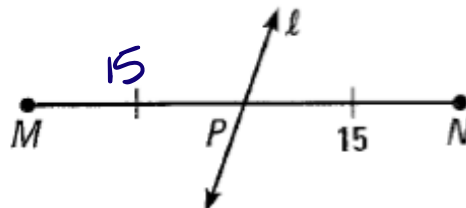
2. Line l bisects the segment. Find the segment lengths.

a. Find: $CB = \underline{36}$
 $AB = \underline{72}$

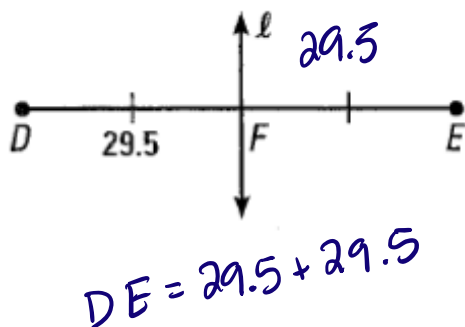


b. Find: $MP = \underline{15}$
 $MN = \underline{30}$

$$MN = 15 + 15$$

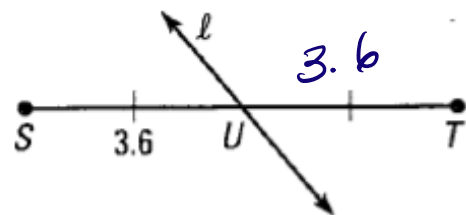


c. Find: $FE = \underline{29.5}$
 $DE = \underline{59}$



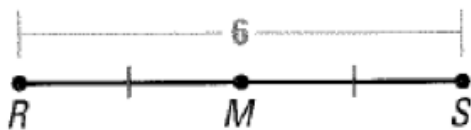
d. Find: $UT = \underline{3.6}$
 $ST = \underline{7.2}$

$$ST = 3.6 + 3.6$$



3. M is the midpoint of the segment. Find the segment lengths.

a. Find: $RM = \underline{3}$
 $MS = \underline{3}$



$$6 \div 2 = 3$$

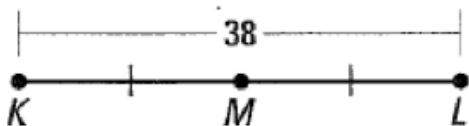
b. Find: $FM = \underline{25}$
 $MG = \underline{25}$



$$50 \div 2 = 25$$

4. M is the midpoint of the segment. Find the segment lengths.

a. Find: $KM = \underline{19}$
 $ML = \underline{19}$



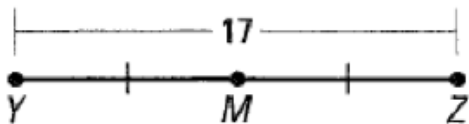
$$38 \div 2 =$$

b. Find: $DM = \underline{41}$
 $ME = \underline{41}$



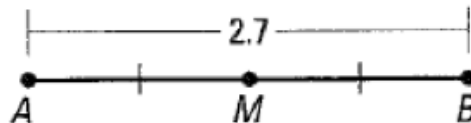
$$82 \div 2 = 41$$

c. Find: $YM = \underline{8.5}$
 $MZ = \underline{8.5}$



$$17 \div 2 = 8.5$$

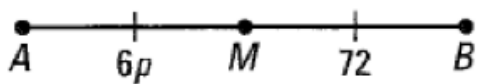
d. Find: $AM = \underline{1.35}$
 $MB = \underline{1.35}$



$$2.7 \div 2 = 1.35$$

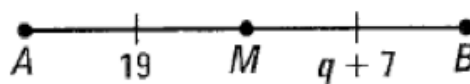
5. Find the value of the variable.

a. $p = \underline{12}$



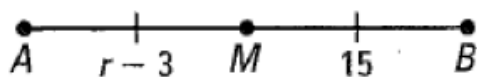
$$\begin{array}{r} 6p = 72 \\ \underline{6} \quad p = 12 \end{array}$$

b. $q = \underline{12}$



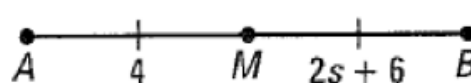
$$\begin{array}{r} 19 = q + 7 \\ -7 \quad -7 \\ \hline 12 = q \end{array}$$

c. $r = \underline{18}$



$$\begin{array}{r} r - 3 = 15 \\ +3 \quad +3 \\ \hline r = 18 \end{array}$$

d. $s = \underline{-1}$



$$\begin{array}{r} 4 = 2s + 6 \\ -6 \quad -6 \\ \hline -2 = 2s \\ \hline 2 \\ -1 = s \end{array}$$