# Basics of Geometry

Geometry CP

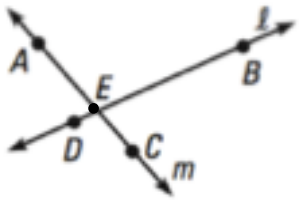
Name: _____

# Points, Lines, Segments, & Rays

Date:

| Word | Definition | Picture/Symbol/Example |
|---|---|---|
| **Point** | | |
| **Line** | | |
| **Collinear** | | |

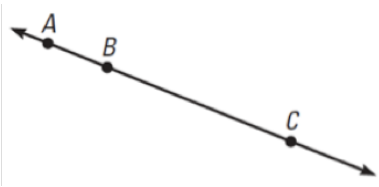
Use the diagram at the right to…



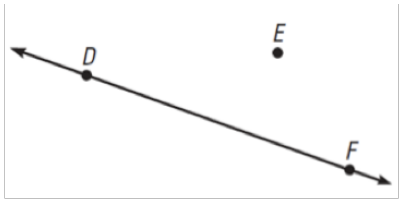

List at least two other ways to name $\overleftrightarrow{AC}$

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

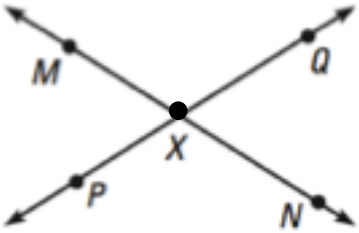
True or False:
Points A, B, and C are collinear




True or False:
Points D, E, and F are collinear




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




a. Name three points that are collinear.

b. Name three points that are not collinear.

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

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

| Word | Definition | Picture/Symbol/Example |
|---|---|---|
| **Line Segment** | | |
| **Ray** | | |

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).

$\overline{GH}$

$\overleftrightarrow{CB}$

$\overleftrightarrow{DW}$

$\overrightarrow{BA}$

$\overrightarrow{LN}$

$\overline{TS}$

<u>On Your Own:</u>

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

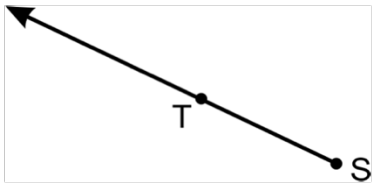

   a. $\overleftrightarrow{D}$

   b. $\overleftrightarrow{DC}$

   c. $\overleftrightarrow{CD}$

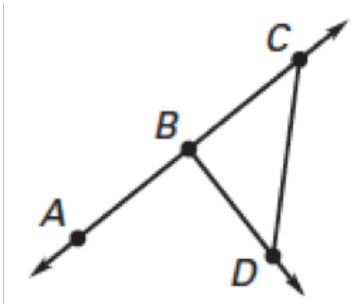
2. Which point is labeled *incorrectly*?
   a. A●
   b. ●R
   c. *n*●

3. Which is the correct way to name the ray shown?
   a. $\overrightarrow{ST}$
   b. $\overleftarrow{TS}$
   c. $\overrightarrow{TS}$




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

4. Five different line segments.




5. Two rays.

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

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

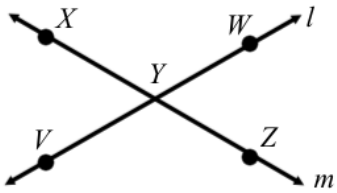
8. Give two other names for $\overleftrightarrow{AB}$

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 $m$.

12. Point $V$ lies on line $l$.

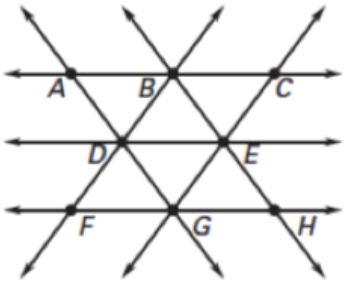
13. Point $W$ lies on line $m$.

*14.* Point $Y$ lies on line $l$.

15. $X$, $Y$, and $Z$ are collinear.

16. $V$, $Y$, and $X$ are collinear.

Name the point that is collinear with the given points.




17. $B$ and $E$

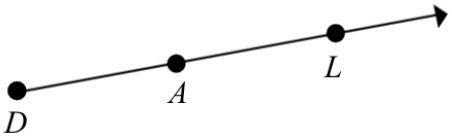
18. $F$ and $H$

19. $D$ and $G$

20. $A$ and C

Multiple Choice

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




a. $\overrightarrow{LD}$

b. $\overrightarrow{DA}$

c. $\overrightarrow{DL}$

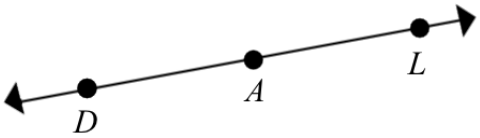
22. Which is *not* a correct way to name the ray shown?


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 $\overline{DE}$ intersects $\overleftrightarrow{AC}$ at $B$.

2. Sketch the figure described, if possible.

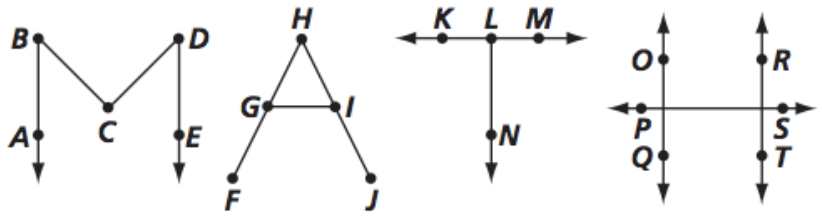
   a. Three lines that intersect at a single point.

   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 _____

A _____

T _____

H _____

**Add and Subtract Fractions with Like Denominators**
Remember to simplify your final answer.

1. $\frac{1}{6} + \frac{3}{6} =$

2. $\frac{17}{50} + \frac{3}{50} =$

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

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

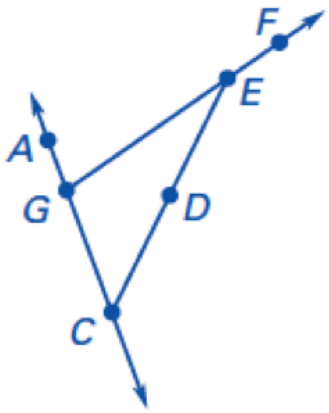
5. $\frac{23}{24} - \frac{3}{12} =$

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

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

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

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




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

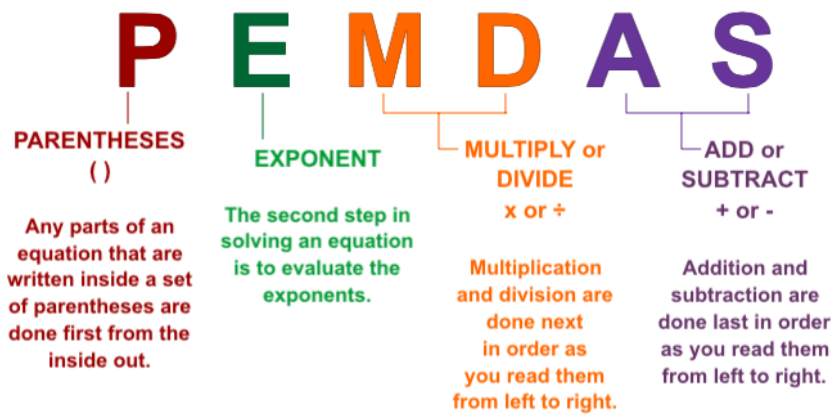
10. Name a different ray with the same initial point as $\overrightarrow{GA}$.

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

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

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

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




1. $72 \div 9 + 7$

2. $9 + 8 - 7$

3. $9 - 9 + 6 - 5$

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

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

6. $2 + 7 \times 5$

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

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

9. $9 - 32 \div 4$

# Practice Day and Solving Equations

Date:

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

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

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

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

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

**Solving Linear Equations**

a. $x + 6 = 8$

b. $3x + 6 = 15$

c. $5 + 6x = 12$

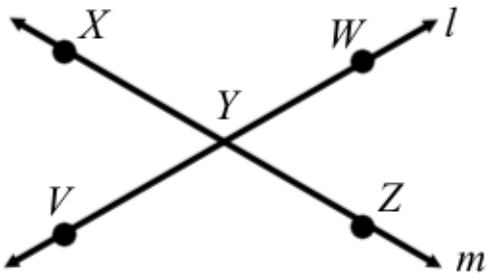
d. $x - 3 = 2x - 4$

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

1. $\overleftrightarrow{PQ}$ 2. $\overline{PQ}$ 3. $\overrightarrow{DA}$

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

4. Point X lies on $\overrightarrow{ZY}$




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

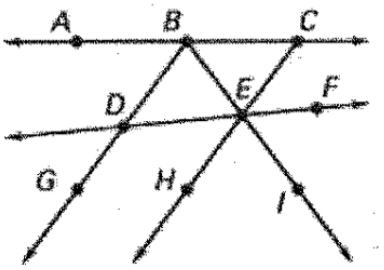
6. Point W lies on $\overrightarrow{VY}$

7. $\overrightarrow{YW}$ and $\overrightarrow{YV}$ are *collinear*

8. $\overrightarrow{YX}$ and $\overrightarrow{YV}$ are *collinear*

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

9. B and E 10. C and H




11. D and G 12. A and C

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 $\overrightarrow{ST}$

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

15. $\overline{TS}$ is the same as $\overline{ST}$

Sketch the diagram described in each of the problems below.

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

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

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

# Segment Addition

Date:

**Warm-Up:** Simplify each of the following.

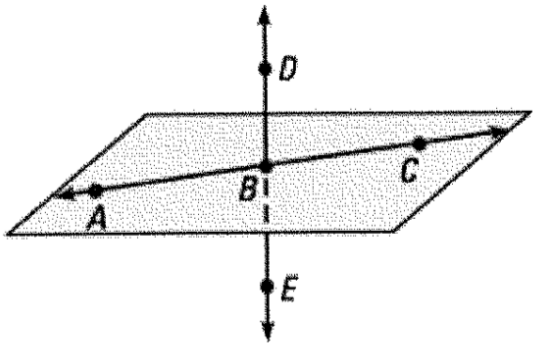
a. $\left(\frac{12}{22}\right) + \left(\frac{1}{2}\right) =$

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

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

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

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



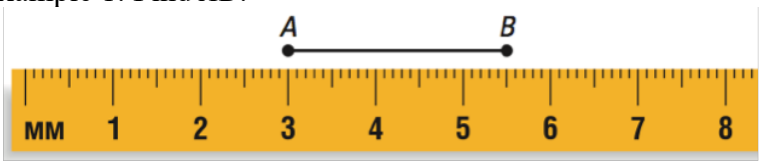

e. Name a point that is collinear with A and B.

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

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

| **Segments and their Measures** |
| --- |
| *AB* is _____ |
| *AB* is also called _____ |

Example 1: Find *AB*.

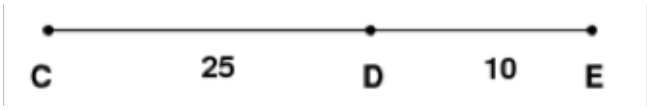


Example 2: Draw *X*, *Y*, and *Z* such that *Z* is between *X* and *Y*.

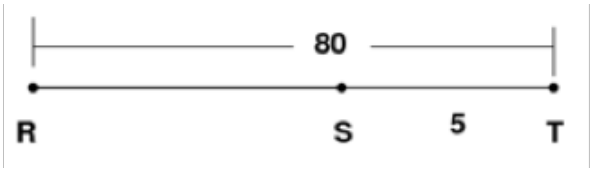
| Word | Definition | Picture/Symbol/Example |
|---|---|---|
| Segment Addition Postulate | | |
| Congruent Segments | | |

Example 3:

Find *CE*.



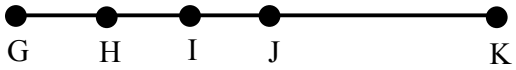

Find *RS*.




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

Example 5:
In the diagram of collinear points, GK = 24, HJ = 10, and GH = HI = IJ. Find each length.

a) *HI* b) *IJ* c) *GH*

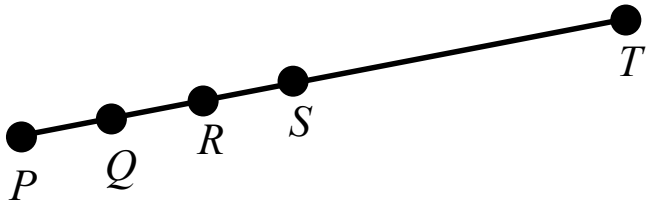



d) *JK* e) *IG* f) *IK*

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

a) *QR* b) *RS*

c) *PQ* d) *ST*

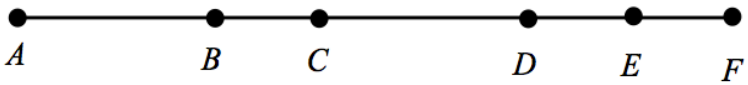



e) *RP* f) *RT*

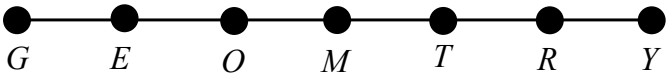
g) *SP* h) *QT*

2. Mark the diagram to show the given congruence.

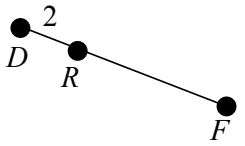
$\overline{AB} \cong \overline{CD}$
$\overline{BC} \cong \overline{DE} \cong \overline{EF}$

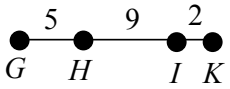


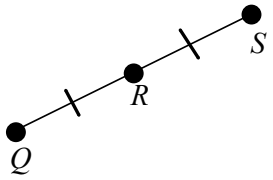

$\overline{GE} \cong \overline{MT} \cong \overline{TR}$
$\overline{EO} \cong \overline{RY}$



**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.

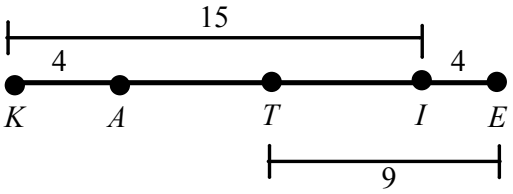



1. If $RF = 7$, $DF =$ _____
2. $GI =$ _____
3. If $QR = 15$, $RS =$ _____
4. If $DF = 5$, $RF =$ _____
5. If $QS = 8$, $QR =$ _____
6. $\overline{DR}$_____$\overline{IK}$
7. If $QR = 9.5$, $QS =$ _____
8. $GK =$ _____

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




9. $TI =$ _____
10. $KT =$ _____
11. $KE =$ _____
12. $AT =$ _____
13. $AI =$ _____
14. $\overline{KA} \cong$ _____

# Segment Bisectors

Date:

**Warm-Up:**

1. What do you think the word BISECT means?

2. Evaluate:

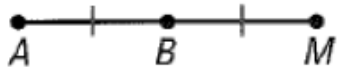
   a. $2x - 5 = 17$

   b. $3x + 4 = 2x + 19$

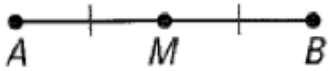
| Word | Definition | Picture/Symbol/Example |
|---|---|---|
| Segment Bisector | | |
| Midpoint | | |

**Example 1:** Determine whether $M$ is the midpoint of $\overline{AB}$. Explain your reasoning.

a.

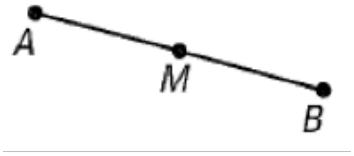



b.




c.


d.



**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 $x$.

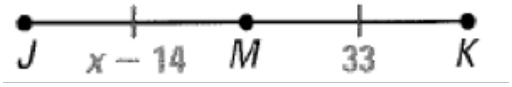
b. Find $KL$.

**Example 3:** Draw a diagram. Points A, B, and C are collinear. Point B is between A and C. Then, solve for $x$.

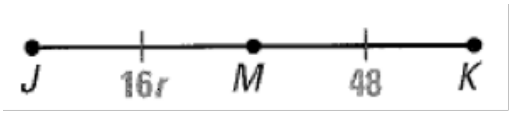
$AC = 3x + 3$, $AB = -1 + 2x$ and $BC = 11$

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

a. $x =$ _____




b. $r =$ _____



**On your own:**

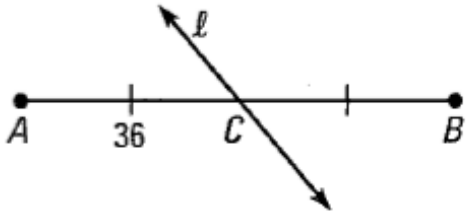
1. Draw a diagram. Points A, B, and C are collinear. Point B is between A and C. Then, solve for $x$.

$AC = 22$, $AB = x + 10$ and $BC = x + 14$

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

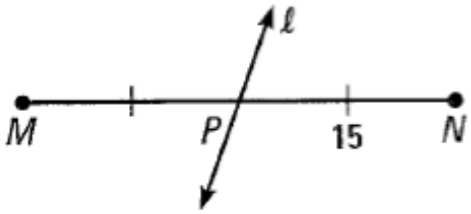
a. Find: $CB =$ _____

$AB =$ _____



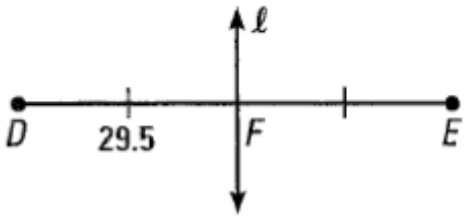

b. Find: $MP =$ _____

$MN =$ _____



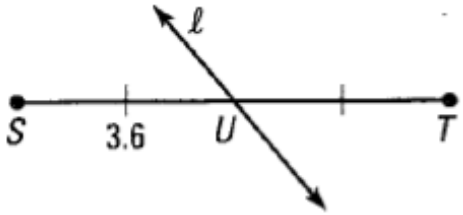

c. Find: $FE =$ _____

$DE =$ _____




d. Find $UT =$ _____

$ST =$ _____



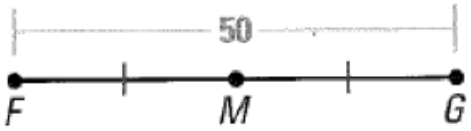
3. *M* is the midpoint of the segment. Find the segment lengths.

a. Find: *RM* = _____

*MS* = _____


b. Find: *FM* = _____

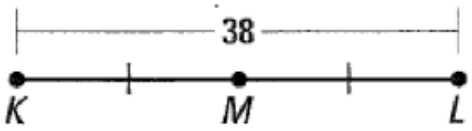
*MG* = _____




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

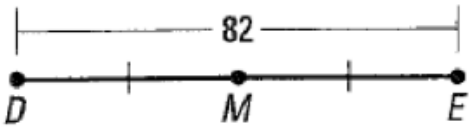
a. Find: *KM* = _____

*ML* = _____



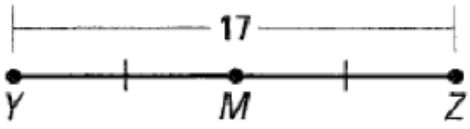

b. Find: *DM* = _____

*ME* = _____



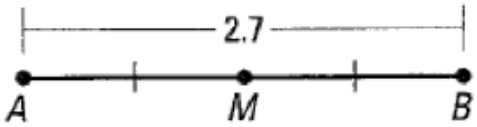

c. Find: *YM* = _____

*MZ* = _____



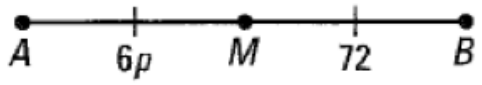

d. Find *AM* = _____

*MB*= _____

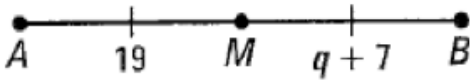


5. Find the value of the variable.

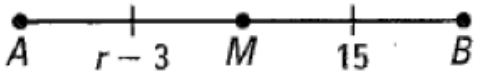
a. $p =$ _____




b. $q =$ _____




c. $r =$ _____




d. $s =$ _____