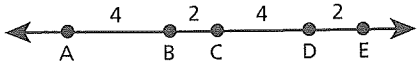
Name _____ Date _____

Congruence of Segments

Congruent segments have the same length. The symbol for congruent is $\cong$.

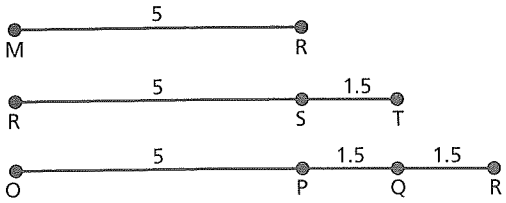


Congruent segments:

$\overline{AB} = 4$ and $\overline{CD} = 4$ $\quad \overline{AB} \cong \overline{CD}$

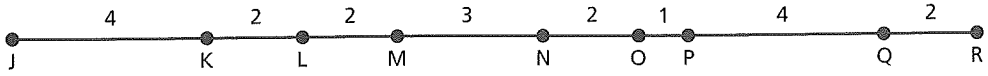
$\overline{AB} = 4$ and $\overline{BC} = 2$ $\quad \overline{AB}$ and $\overline{BC}$ are not congruent.

Use the diagram. Write **true** or **false** for each statement.



1. $\overline{MR} \cong \overline{RS}$ _____
2. $\overline{ST} \cong \overline{QP}$ _____
3. $\overline{OP} \cong \overline{TS}$ _____
4. $\overline{PQ} \cong \overline{RM}$ _____
5. $\overline{QP} \cong \overline{ST}$ _____
6. $\overline{SR} \cong \overline{MR}$ _____
7. $\overline{RS} \cong \overline{OP}$ _____
8. $\overline{QR} \cong \overline{ST}$ _____

Find the length of the indicated segments. Circle the congruent segments in each row.

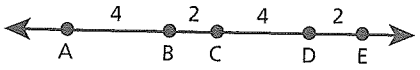


9. $\overline{JK} =$ _____ $\quad \overline{LM} =$ _____ $\quad \overline{MN} =$ _____ $\quad \overline{PQ} =$ _____
10. $\overline{NO} =$ _____ $\quad \overline{MN} =$ _____ $\quad \overline{QR} =$ _____ $\quad \overline{KL} =$ _____
11. $\overline{KL} =$ _____ $\quad \overline{OP} =$ _____ $\quad \overline{QR} =$ _____ $\quad \overline{PQ} =$ _____
12. $\overline{MN} =$ _____ $\quad \overline{ON} =$ _____ $\quad \overline{QP} =$ _____ $\quad \overline{KJ} =$ _____

Name _____ Date _____

Add to Find Congruent Segments

Add segments to find the length of a new segment.



Is $\overline{AC} \cong \overline{CE}$?

1. Find lengths of given segments. Add.

$\overline{AB} + \overline{BC} = \overline{AC}$

$4 + 2 = 6 \qquad \overline{AC} = 6$

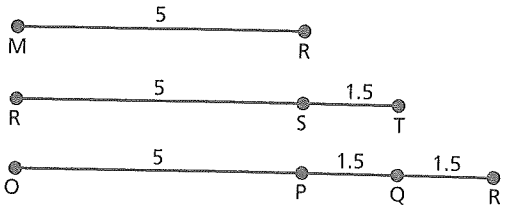
$\overline{CD} + \overline{DE} = \overline{CE}$

$4 + 2 = 6 \qquad \overline{AC} = 6$

2. Compare given segments.

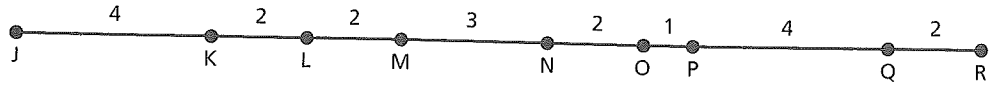
$\overline{AC} \cong \overline{CE}$

Use the diagram. Write **true** or **false** for each statement.



1. $\overline{MR} \cong \overline{RT}$ _____
2. $\overline{MR} \cong \overline{RP}$ _____
3. $\overline{OP} \cong \overline{TR}$ _____
4. $\overline{PR} \cong \overline{RS}$ _____
5. $\overline{QO} \cong \overline{RT}$ _____
6. $\overline{SR} \cong \overline{MR}$ _____
7. $\overline{RT} \cong \overline{QO}$ _____
8. $\overline{RP} \cong \overline{RT}$ _____

Find the length of the indicated segments. Circle the congruent segments in each row.

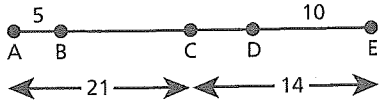


9. $\overline{JK}$ = _____ $\overline{JM}$ = _____ $\overline{MK}$ = _____ $\overline{RP}$ = _____
10. $\overline{LO}$ = _____ $\overline{MN}$ = _____ $\overline{PR}$ = _____ $\overline{KN}$ = _____
11. $\overline{MJ}$ = _____ $\overline{OL}$ = _____ $\overline{QN}$ = _____ $\overline{PR}$ = _____
12. $\overline{MP}$ = _____ $\overline{JM}$ = _____ $\overline{KN}$ = _____ $\overline{LP}$ = _____

Name _____ Date _____

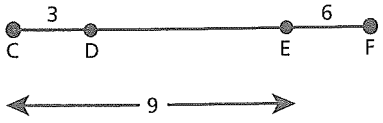
Subtract to Find Segment Lengths

Use what is known about line segment lengths. Subtract to find missing line segment measurements.

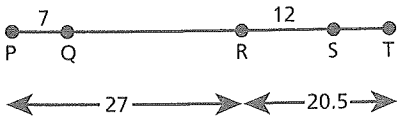


1. Use the lengths you know.
   $\overline{AC} = \overline{AB} + \overline{BC}$ $\overline{AC} = 21$ $\overline{AB} = 5$
2. Subtract given lengths.
   $21 - 5 = 16$
3. $\overline{BC} = 16$

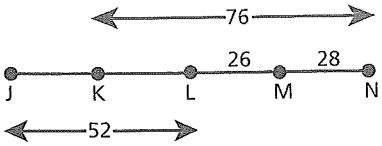
Use each diagram to find the lengths of the given segments.

1. 

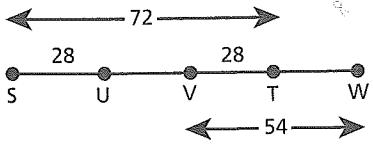
$\overline{CE} =$ _____ $\overline{DE} =$ _____ $\overline{CF} =$ _____

2. 

$\overline{QR} =$ _____ $\overline{PS} =$ _____ $\overline{ST} =$ _____

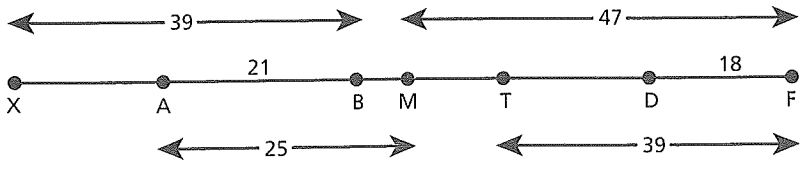
3. 

$\overline{JK} =$ _____ $\overline{JM} =$ _____ $\overline{KM} =$ _____

4. 

$\overline{SV} =$ _____ $\overline{UV} =$ _____ $\overline{TW} =$ _____

Use the diagram to find the segment lengths.

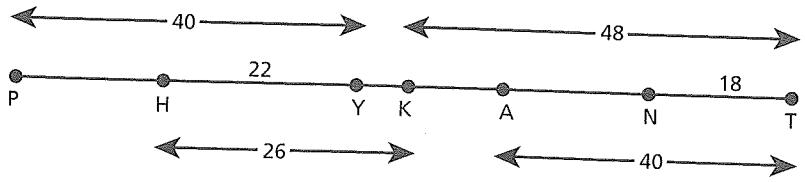


5. $\overline{XA} =$ _____
6. $\overline{AB} =$ _____
7. $\overline{BM} =$ _____
8. $\overline{MT} =$ _____
9. $\overline{TD} =$ _____
10. $\overline{DF} =$ _____
11. $\overline{XB} =$ _____
12. $\overline{BT} =$ _____
13. $\overline{AT} =$ _____

Name _____ Date _____

Find Congruent Line Segments

Use what is known to find the missing segment lengths.



Find the length of these line segments.

1. $\overline{PH}$ = _____
2. $\overline{PY}$ = _____
3. $\overline{PK}$ = _____
4. $\overline{PA}$ = _____
5. $\overline{YK}$ = _____
6. $\overline{YA}$ = _____
7. $\overline{YN}$ = _____
8. $\overline{YT}$ = _____
9. $\overline{HK}$ = _____
10. $\overline{HA}$ = _____
11. $\overline{HT}$ = _____
12. $\overline{KA}$ = _____
13. $\overline{KN}$ = _____
14. $\overline{KT}$ = _____
15. $\overline{AN}$ = _____
16. $\overline{AT}$ = _____

Use the diagram and your information above. Are these segments congruent? Write **true** or **false**.

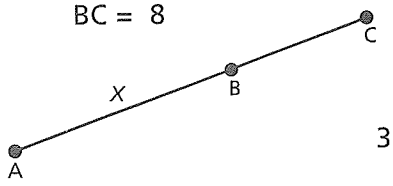
17. $\overline{PH} \cong \overline{TN}$ _____
18. $\overline{HK} \cong \overline{YA}$ _____
19. $\overline{PY} \cong \overline{YN}$ _____
20. $\overline{TA} \cong \overline{YP}$ _____
21. $\overline{HK} \cong \overline{YA}$ _____
22. $\overline{HY} \cong \overline{NA}$ _____
23. $\overline{HK} \cong \overline{KN}$ _____
24. $\overline{PK} \cong \overline{KT}$ _____
25. $\overline{YP} \cong \overline{YN}$ _____
26. $\overline{PY} \cong \overline{AT}$ _____

Name _____ Date _____

Geometry and Algebraic Equations

In order to solve for missing line segment lengths, use the given information. Write an algebraic equation and solve for *x*.

AC = 24
BC = 8



1. Find the value of the segment marked *x*.

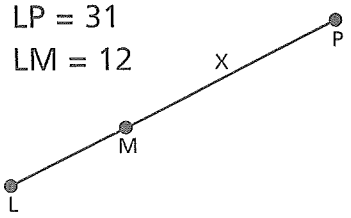
2. The length of $\overline{AB}$ and $\overline{BC}$ is equal to the length of $\overline{AC}$.
   AB + BC = AC

3. Replace with what you know.
   $x + 8 = 24$

4. Solve for *x*.
   $24 - 8 = 16$ $x = 16$

For each diagram, use an algebraic equation and solve for *x*.

1 LP = 31
LM = 12

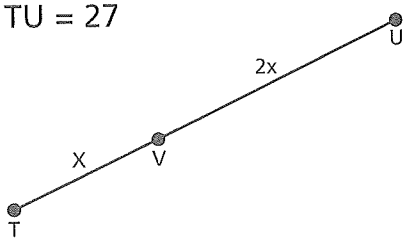


LM + *x* = LP

_____

_____

2 TU = 27

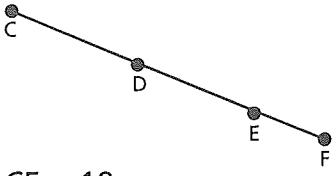


$x + 2x$ = TU

_____

_____

3



CF = 19
$\overline{CD} \cong \overline{DE}$
EF = 3

$x + x + 3$ = CF

_____

_____

4

$\overline{XB} \cong \overline{NY}$
XY = 9
XB = $x - 3$

$(x - 3) + x + (x - 3) = 9$

_____

_____