

Accelerated Geometry B/Algebra 2 (Accelerated Math 2) Summer Packet

Similarity and Congruence

Hello, everyone. I hope you're excited to finish Geometry in the fall. You should have gotten through the Coordinate Geometry Unit, Similarity/Congruence/Proofs Unit, and the Right Triangle Trigonometry Unit in your Accelerated Math 1 (Accel Algebra 1/Geometry A) class. We'll start with the Circles Unit as soon as school starts in August. Your knowledge of Similarity and Congruence must be thorough before starting Circles. Please consider the resources below when completing this summer packet. You may use other resources as well. This packet should be completed with well-constructed and thought-out answers by the first day of school. Please bring it with you to class. Our Geometry EOC will take place just after Thanksgiving.

Have a great summer.

Dr. Shildneck and Mr. O'Dell

Resources for Similarity and Congruence:

Khan Academy Congruence Unit (watch all videos)

<https://www.khanacademy.org/math/geometry/hs-geo-congruence>

Khan Academy Similarity Unit (watch all videos)

<https://www.khanacademy.org/math/geometry/hs-geo-similarity>

Khan Academy Geometry Unit (for reference)

<https://www.khanacademy.org/math/geometry>

Math Is Power 4 U (See "Triangles and Congruence" and "Similarity" in right-hand column)

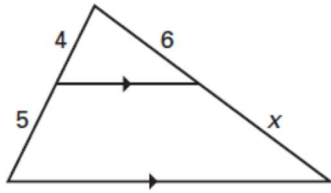
<http://www.mathispower4u.com/geometry.php>

Accelerated Geometry B/Algebra 2 (Accelerated Math 2) Summer Packet

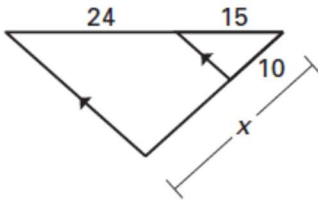
Similarity and Congruence

Use the diagram to find the value of x .

1)



2)

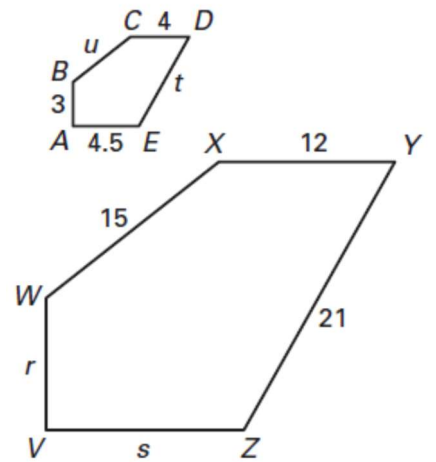


Given $ABCDE \sim VWXYZ$.

3) Find the scale factor.

4) What is the value of r ?

5) What is the value of t ?



6) (5 points) What is the ratio of the perimeter of $ABCDE$ to the perimeter of $VWXYZ$?

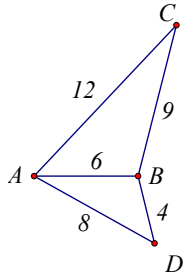
7) (5 points) If $m\angle B = (9x)^\circ$ and $m\angle W = (120 + x)^\circ$, what is the value of x ?

Accelerated Geometry B/Algebra 2 (Accelerated Math 2) Summer Packet

Similarity and Congruence

Is there enough information to determine that the two triangles are similar? If yes, state the reason. (Leave the reason blank if you circle "NO".)

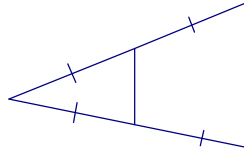
8)



YES / NO

Reason: _____

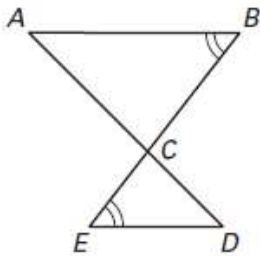
9)



YES / NO

Reason: _____

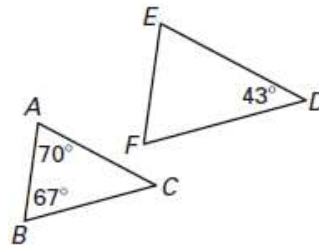
10)



YES / NO

Reason: _____

11)



YES / NO

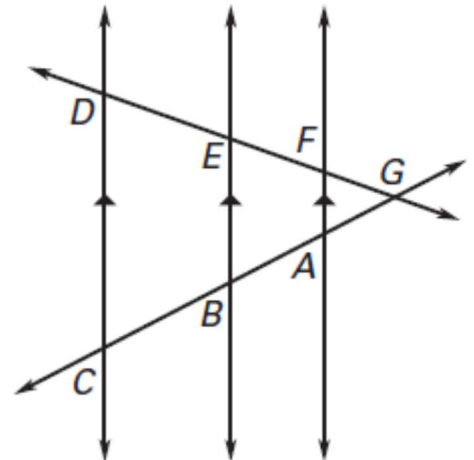
Reason: _____

Finish the proportionality statements using the diagram. (use diagram for problems 12 – 17)

12) $\frac{DE}{GF} = \frac{CB}{?}$

13) $\frac{CD}{AF} = \frac{?}{GA}$

14) $\frac{BG}{CA} = \frac{EG}{?}$



Find the requested value using the given information. Note that the diagram is not drawn to scale.

15) If $EF=4$, $FG=3$, and $BA=3$, what is the length of AG ?

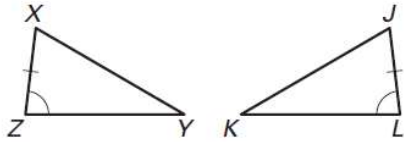
16) If $EB=6$, and $FG = FA = 4$, what is the length of EF ?

17) If $EG = 10$, $ED = 5$, and $CB = 3$, what is the length of BG ?

Similarity and Congruence

18)

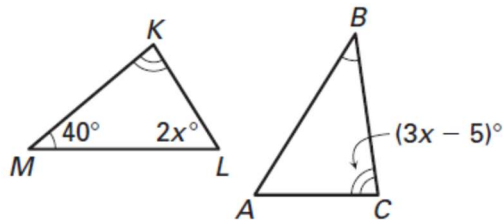
Multiple Choice Use the diagram below. Which congruence is correct to prove $\triangle XYZ \cong \triangle JKL$?



- (A) $\angle Y \cong \angle K$ by SAS Congruence Postulate
- (B) $\overline{XY} \cong \overline{JK}$ by SAS Congruence Postulate
- (C) $\overline{ZY} \cong \overline{LK}$ by SAS Congruence Postulate
- (D) A or B
- (E) B or C

20)

Multiple Choice Given $\angle M \cong \angle B$ and $\angle K \cong \angle C$, find the value of x .



- (A) 43
- (B) 40
- (C) 82
- (D) 58
- (E) 29

22)

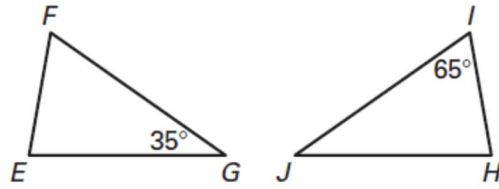
Multiple Choice Find the measure of $\angle 1$.

- (A) 50°
- (B) 90°
- (C) 60°
- (D) 30°
- (E) 85°



19)

Multiple Choice In the diagram, $\triangle EFG \cong \triangle HIJ$. What is the measure of $\angle H$?

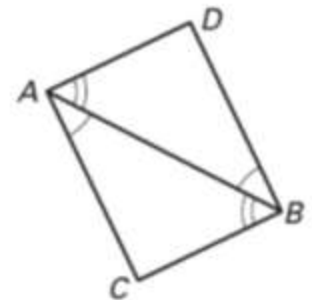


- (A) 35°
- (B) 65°
- (C) 70°
- (D) 80°
- (E) Cannot be determined

21)

Given that $\triangle DBA \cong \triangle CAB$, what reason could you give to prove that $\overline{BC} \cong \overline{AD}$?

- A. Vertical Angles Theorem
- B. Reflexive Property
- C. ASA Congruence Postulate
- D. Corres. Parts of $\cong \Delta$ s are \cong (CPCTC)

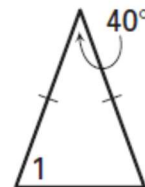


E. Opposite sides of a rectangle are congruent

23)

Multiple Choice Find the measure of $\angle 1$.

- (A) 40°
- (B) 70°
- (C) 80°
- (D) 140°
- (E) Cannot be determined

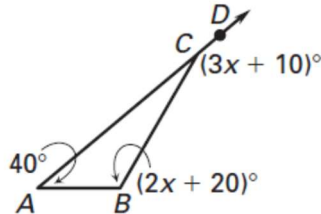


Similarity and Congruence

24)

Multiple Choice Find the measure of $\angle BCD$.

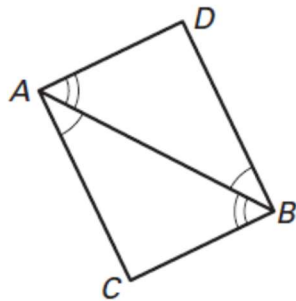
- (A) 50°
- (B) 120°
- (C) 60°
- (D) 160°
- (E) 20°



26)

Multiple Choice Which postulate or theorem can be used to prove that $\triangle ABC \cong \triangle BAD$?

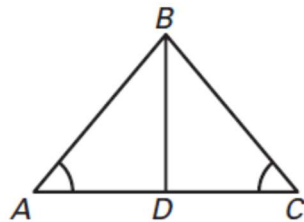
- (A) SSS
- (B) SAS
- (C) ASA
- (D) AAS
- (E) none of the above



28)

Multiple Choice What is the third congruence needed to prove that $\triangle ABD \cong \triangle CBD$ by AAS?

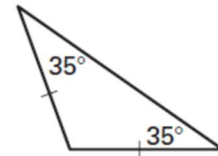
- (A) $\overline{AB} \cong \overline{BC}$
- (B) $\angle ABD \cong \angle CBD$
- (C) $\overline{AD} \cong \overline{DC}$
- (D) $\angle DBA \cong \angle CDB$
- (E) B or C



25)

Multiple Choice The triangle below can be classified as ____?

- (A) acute isosceles
- (B) acute scalene
- (C) obtuse isosceles
- (D) obtuse scalene
- (E) right scalene



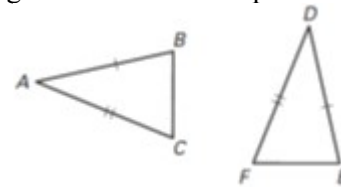
27)

Multiple Choice In rectangle $ABCD$, a diagonal is drawn from B to D . Which statement is not true?

- (A) $\angle DAB \cong \angle BCD$
- (B) $\angle ABD \cong \angle CDB$
- (C) $\overline{AB} \cong \overline{BC}$
- (D) $\overline{DB} \cong \overline{DB}$
- (E) $\angle ADB \cong \angle CBD$

29)

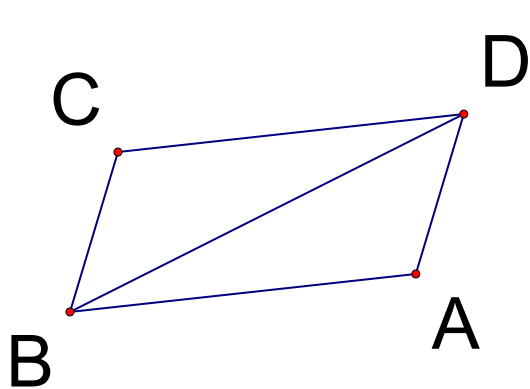
Multiple Choice Use the diagram below. Which additional congruence is correct to prove $\triangle ABC \cong \triangle DEF$?



- A. $\angle B \cong \angle E$ by SAS Congruence Postulate
- B. $\overline{BC} \cong \overline{FE}$ by SSS Congruence Postulate
- C. $\angle A \cong \angle D$ by SAS Congruence Postulate
- D. Either A or B
- E. Either B or C

Similarity and Congruence

30) Provide the reasons for each statement in the proof below. You may write the letter of the reason if you wish.



Given: $\overline{BC} \cong \overline{AD}$; $\overline{BC} \parallel \overline{AD}$

Prove: $\triangle DBC \cong \triangle BDA$

Statements	Reasons
1) $\overline{BC} \parallel \overline{AD}$	1) _____
2) $\overline{BC} \cong \overline{AD}$	2) _____
3) $\angle CBD \cong \angle ADB$	3) _____
4) $\overline{DB} \cong \overline{DB}$	4) _____
5) $\triangle DBC \cong \triangle BDA$	5) _____

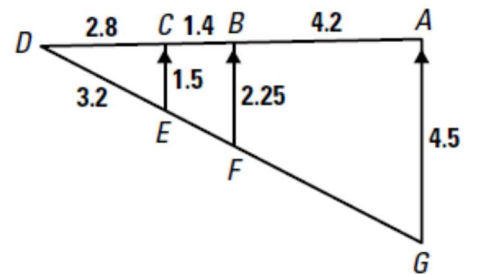
Reason choices:

- | | | |
|--|--|-----------------------------------|
| A. Corres. Parts of \cong Δ s are \cong | B. Reflexive Property | C. Vertical Angles Theorem |
| D. Definition of Midpoint | E. Alternate Interior \angle Theorem | F. Corresponding \angle Theorem |
| G. Given | H. SSS | I. SAS |
| | J. SSA | K. AAS |
| | | L. ASA |
| | | M. AAA |

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

31) Find the length of \overline{EG} .

32) Is quadrilateral FECD similar to quadrilateral GFBA (circle "YES" or "NO")? If yes, what is the scale factor? If no, explain why not.



YES

NO

Scale Factor = _____

Explain _____

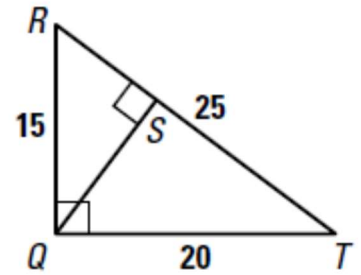
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Similarity and Congruence

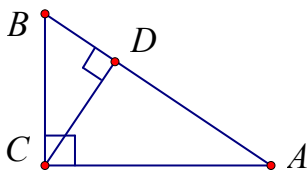
Use the diagram to the right to answer the following questions.

33) What is the scale factor of $\triangle RSQ$ to $\triangle RQT$?

34) Find the length of \overline{QS} .



Use the diagram below and the given information in each problem to solve for the request value. Leave answers in reduced radical form when appropriate.

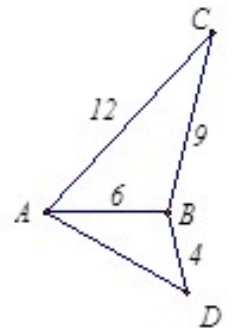


35) $BC = 5, BD = 4, BA =$ _____

36) $BD = 3, AD = 6, CD =$ _____

37) A 165 cm tall woman casts a shadow 200 cm long. At the same time of day, a building casts a 680 cm long shadow. How tall is the building? Draw and clearly label a diagram to support your answer.

38) Given that $\triangle ABC \sim \triangle DBA$ in the figure to the right, determine the length of \overline{AD} .

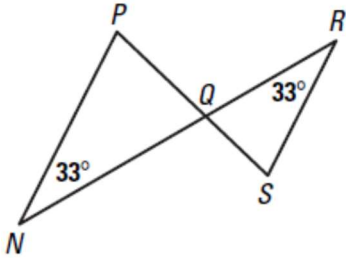


Accelerated Geometry B/Algebra 2 (Accelerated Math 2) Summer Packet

Similarity and Congruence

Determine whether each pair of triangles can be proved similar or not (circle "YES" or "NO"). If yes, state the postulate or theorem used and write a similarity statement. If no, explain why.

39)

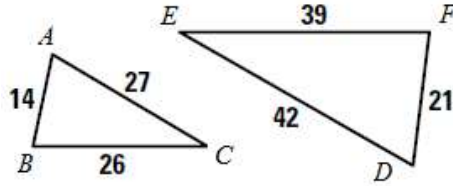


YES: Reason _____
 Similarity statement: Δ _____ \sim Δ _____

OR

NO: Explain _____

40)

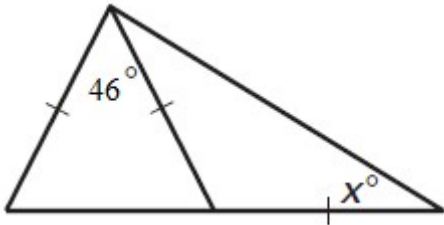


YES: Reason _____
 Similarity statement: Δ _____ \sim Δ _____

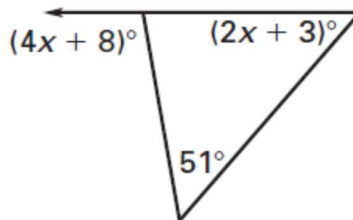
OR

NO: Explain _____

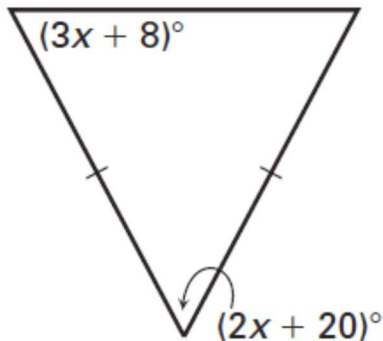
41) Solve for x.



42) Solve for x.



43) Solve for x.



Accelerated Geometry B/Algebra 2 (Accelerated Math 2) Summer Packet

Similarity and Congruence

44) The interior angle measurements of triangle ABC are given.

$$m\angle A = (10x - 20)^\circ; m\angle B = (7x - 4)^\circ; m\angle C = (9x - 4)^\circ$$

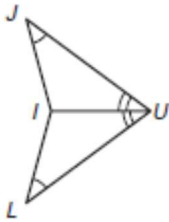
- What is the value of x ? (2 points)
- What are the measures of angles A, B, and C? (1 point)

$$m\angle A = \qquad m\angle B = \qquad m\angle C =$$

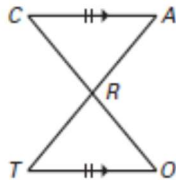
- Classify triangle ABC by its angles and its sides. Please. (2 points)

Is it possible to prove that the triangles are congruent? If so, state the reason you would use. If not, write "not enough information."

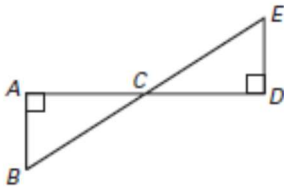
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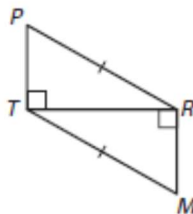
46)



47)

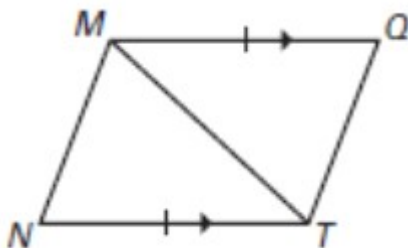


48)



49) Fill in the blanks of the two-column proof. (1 point per blank)

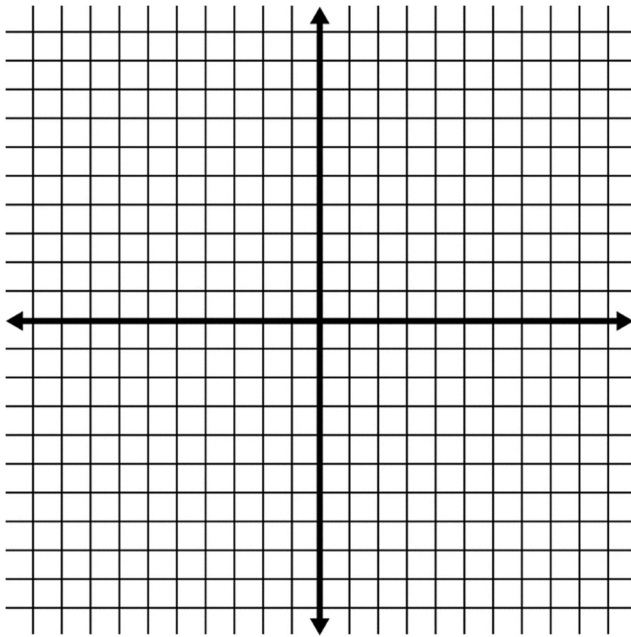
Given: $\overline{MQ} \cong \overline{NT}$ and $\overline{MQ} \parallel \overline{NT}$
 Prove: $\overline{MN} \cong \overline{TQ}$



Statements	Reasons
1. $\overline{MQ} \parallel \overline{NT}$	1. Given
2. _____	2. Alternate Interior Angles
3. _____	3. Reflexive Property
4. $\overline{MQ} \cong \overline{NT}$	4. Given
5. $\triangle NTM \cong \triangle QMT$	5. _____
6. _____	6. _____

Similarity and Congruence

50) Graph an isosceles right triangle with legs of 6 units on the graph provided. Then, provide the coordinates of each vertex. Finally, find the area of the triangle.



Graph (2 points)

Vertices (1 point):

(,)

(,)

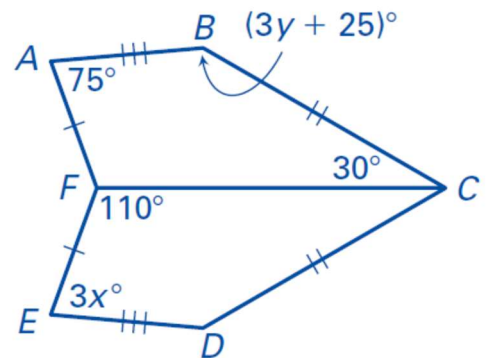
(,)

Area (2 points):

Given that $ABCF \cong EDCF$, find the value of x and y .

51) $x =$ _____

52) $y =$ _____



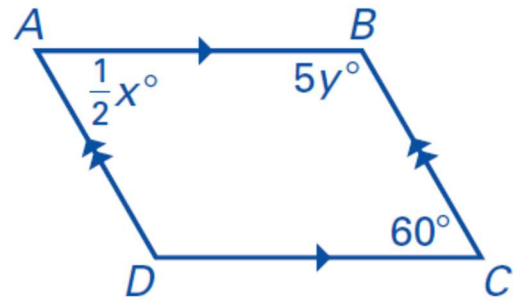
53) Draw a concave quadrilateral.

Similarity and Congruence

Given parallelogram $ABCD$, find x and y .

54) $x =$ _____

55) $y =$ _____



Use the diagram to the right to answer the following questions. Start by labeling the diagram with the following given information.

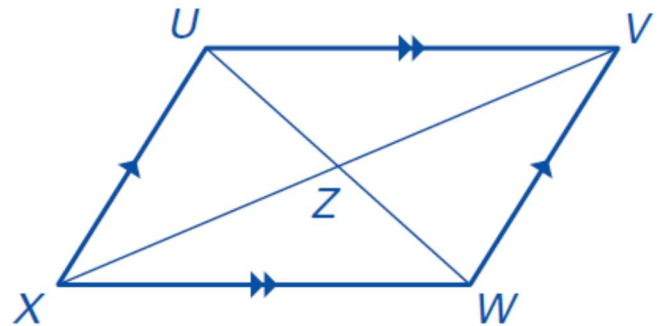
$UX = 8$; $XW = 14$; $XV = 16$; $UZ = 5$

56) $VU =$ _____

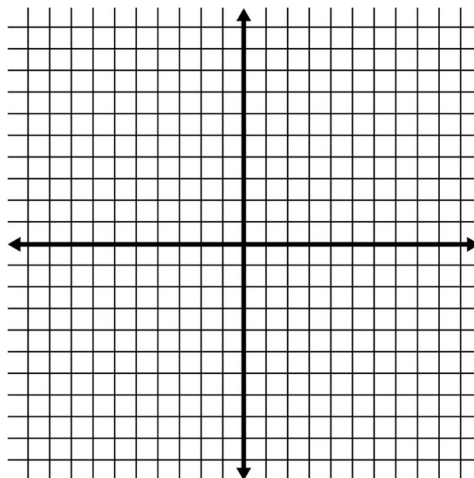
57) $WU =$ _____

58) $ZV =$ _____

59) $WV =$ _____

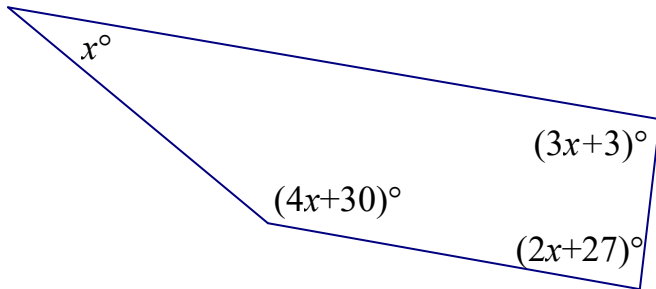


60) Graph the quadrilateral whose vertices are $(0, 1)$, $(3, 3)$, $(9, -1)$, and $(6, -3)$. Verify that the quadrilateral is a parallelogram. Explain how you know.



Similarity and Congruence

61) Using the diagram below, what is the degree measurement of the largest angle?



62) Given the following information about parallelogram $PARL$, determine its most specific classification.

$$\overline{PA} \cong \overline{RL} \quad \overline{AR} \cong \overline{PL} \quad \overline{PR} \perp \overline{AL} \quad \overline{PA} \parallel \overline{RL} \quad \overline{AR} \parallel \overline{PL} \quad PR \neq AL$$

- a. Parallelogram
- b. Rhombus
- c. Rectangle
- d. Square

Determine whether each statement is true or false. If false, **change one word in the statement to make it true.**

63) A square is sometimes a parallelogram.

64) The diagonals of a rhombus are sometimes congruent.

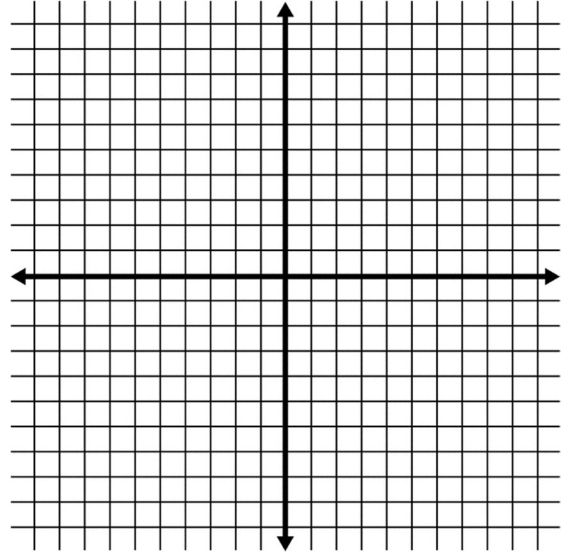
65) The diagonals of a trapezoid are always congruent.

66) The diagonals of a rectangle always bisect each other.

Similarity and Congruence

67) Plot the following points on the graph provided. Then answer the questions related to these points.

A(-3, 1) B(0, 5) C(4, 2) D(1, -2)



68) Find the slopes of the following line segments.

Slope of \overline{AB} = _____

Slope of \overline{BC} = _____

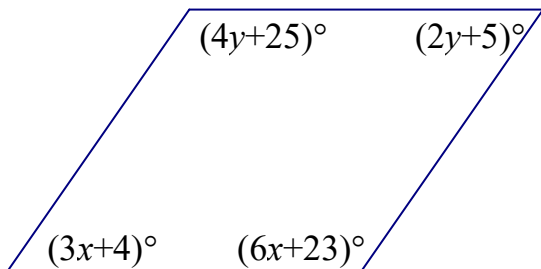
Slope of \overline{CD} = _____

Slope of \overline{AD} = _____

69) What is the most specific classification of quadrilateral $ABCD$ above? Explain your reasoning. (Include both calculations and complete sentences in your answer.)

Find the value of the variables in each parallelogram.

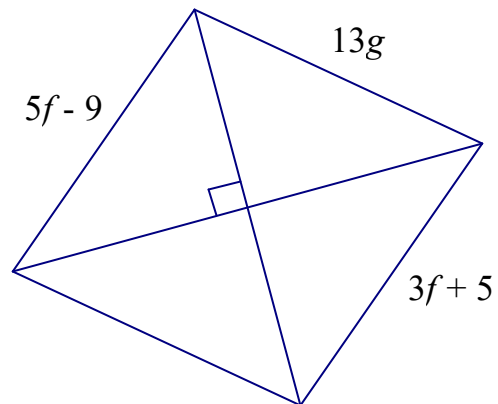
70)



x = _____

y = _____

71)

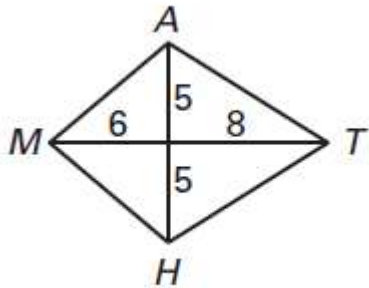


f = _____

g = _____

Similarity and Congruence

72) Find all the missing sides of the kite below:

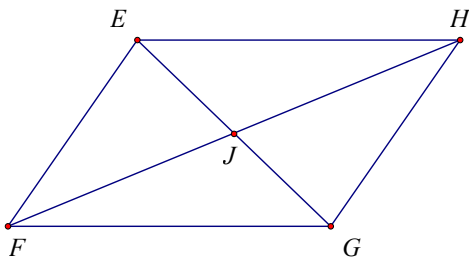


MA=_____ MH=_____ AT=_____ TH=_____

73) Fill in the blanks for the proof outlined below.

Given: EFGH is a parallelogram

Prove: EJ = GJ

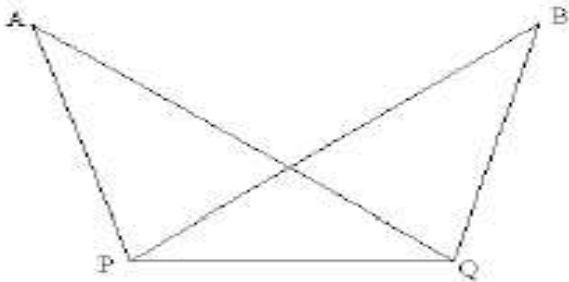


Statements	Reasons
1. EFGH is a parallelogram	1. _____
2. _____	2. Definition of parallelograms
3. _____	3. Alternate interior angles
4. _____	4. Alternate interior angles
5. _____	5. Opposite sides of a parallelogram are congruent
6. $\triangle EJH \cong \triangle GJF$	6. _____
7. _____	7. _____

Similarity and Congruence

Given: $\angle A \cong \angle B$ and $\angle APQ \cong \angle BQP$

74) Prove: $AQ \cong BP$

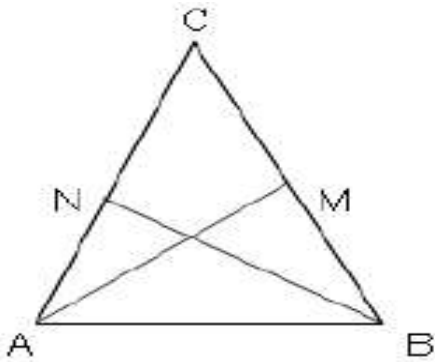


Statements	Reasons
1	1
2 $PQ \cong PQ$	2
3 $\Delta \underline{\hspace{1cm}} \cong \Delta \underline{\hspace{1cm}}$	3
4	4

Given: $\triangle ANB \cong \triangle BMA$

Prove: $\triangle ADN \cong \triangle BDM$

75)



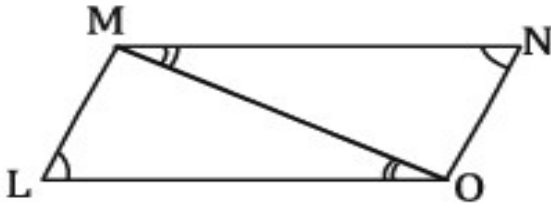
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Statements	Reasons
1	1
2 $NA \cong MB; \angle ANB \cong \angle BMA$	2
3 $\angle NDA \cong \angle MDB$	3
4	4

Similarity and Congruence

Given: $\angle L \cong \angle N$, $\angle LOM \cong \angle NMO$

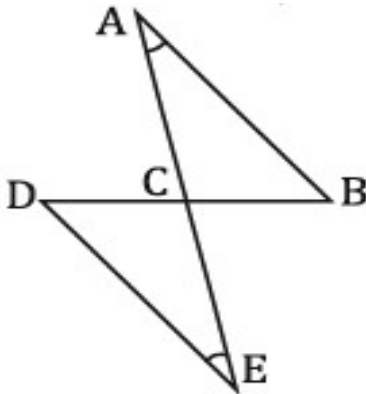
76)



Prove: $\triangle LMO \cong \triangle NOM$

Statements	Reasons
1.	1.
2.	2. Given
3.	3. Reflexive Property
4. $\triangle LMO \cong \triangle NOM$	4.

77) Given: \overline{AE} bisects \overline{BD} , $\angle A \cong \angle E$

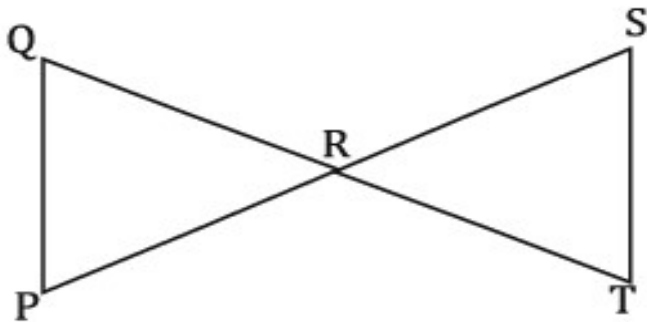


Prove: $\triangle ABC \cong \triangle EDC$

Statements	Reasons
1. $\angle A \cong \angle E$	1.
2.	2. Given
3.	3. Definition of Bisect
4. $\angle ACB \cong \angle DCE$	4.
5. $\triangle ABC \cong \triangle EDC$	5.

Similarity and Congruence

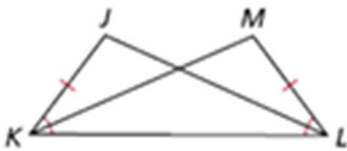
78) Given: \overline{QT} bisects \overline{SP} , \overline{SP} bisects \overline{QT}



Prove: $\triangle QRP \cong \triangle SRT$

Statements	Reasons
1. \overline{QT} bisects \overline{SP}	1. Given
2.	2. Given
3. $\overline{QR} \cong \overline{TR}$	3. Definition of Bisect
4. $\overline{PR} \cong \overline{SR}$	4.
5.	5. Vertical Angles
6. $\triangle QRP \cong \triangle SRT$	6.

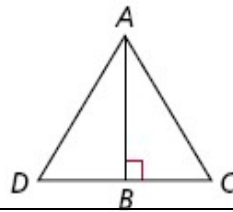
79) Given: $\overline{JK} \cong \overline{ML}$ and $\angle JKL \cong \angle MLK$
 Prove: $\triangle JKL \cong \triangle MLK$



Statements	Reasons
1. $\overline{JK} \cong \overline{ML}$ and $\angle JKL \cong \angle MLK$	1.
2. $\overline{KL} \cong \overline{KL}$	2.
3.	3.

Similarity and Congruence

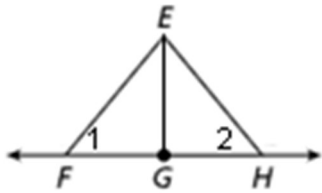
80) Given: B is the midpoint of \overline{DC} and $\overline{AB} \perp \overline{DC}$
 Prove: $\triangle ABD \cong \triangle ABC$



Statements	Reasons
1. B is the midpoint of \overline{DC} and $\overline{AB} \perp \overline{DC}$	1.
2.	2. Defn of midpoint
3. $\angle ABD$ and $\angle ABC$ are right angles	3.
4. $\angle ABD \cong \angle ABC$	4.
5.	5. Reflexive Property
6.	6.

81) Given: G is the midpoint of \overline{FH} and $\overline{EF} \cong \overline{EH}$

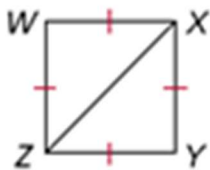
Prove: $\angle 1 \cong \angle 2$



Statements	Reasons
1. G is the midpoint of \overline{FH} and $\overline{EF} \cong \overline{EH}$	1.
2. $\overline{FG} \cong \overline{GH}$	2.
3.	3.
4.	4. SSS Congruence
5.	5.

82) Given: $\overline{WX} \cong \overline{XY} \cong \overline{YZ} \cong \overline{ZW}$

Prove: $\angle W \cong \angle Y$

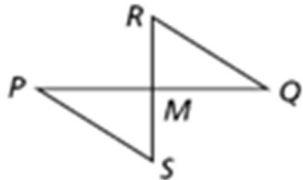


Statements	Reasons
1.	1.
2.	2.
3.	3.
4.	4.

Similarity and Congruence

83) Given: M is the midpoint of \overline{PQ} and \overline{RS}

Prove: $\overline{QR} \cong \overline{PS}$



Statements	Reasons
1.	1.
2.	2. Defn of midpoint
3.	3.
4.	4.
5.	5.

End of Packet