Cpctc proofs practice booklet answers

Continue

Name _____ Class _____ Date _____

Practice 7-3

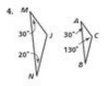
Proving Triangles Similar

Explain why the triangles are similar. Write a similarity statement for each pair.

1.

2.

3.

4. 

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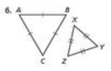
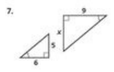
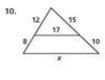
6. 

Algebra **Find the value of *x*.**

7. 

8.

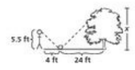
9.

10. 

11.

12.

13. Natasha places a mirror on the ground 24 ft from the base of an oak tree. She walks backward until she can see the top of the tree in the middle of the mirror. At that point, Natasha's eyes are 5.5 ft above the ground, and her feet are 4 ft from the image in the mirror. Find the height of the oak tree.



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LESSON 4-3

Practice A

Congruent Triangles

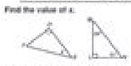
Fill in the blanks to complete each definition.

1. ___Corresponding___ angles and ___corresponding___ sides are in the same position in polygons with an equal number of sides.
2. Two polygons are ___congruent___ polygons if and only if their corresponding angles and sides are congruent.

Refer to the figure of △GHI and △JKL for Exercises 3 and 4.

3. Name the three pairs of corresponding sides.
   $\overline{GH} \cong \overline{JK}$; $\overline{HI} \cong \overline{KL}$; $\overline{GI} \cong \overline{JL}$
4. Name the three pairs of corresponding angles.
   $\angle G \cong \angle J$, $\angle H \cong \angle K$; $\angle I \cong \angle L$

Find the value of *x*.



5. **Given:** △DEF ≅ △LMN $x = 39$
6. **Given:** △ABC ≅ △PQR $x = 8.1$
7. Etienne flies a kite. When the kite is flying well, the tail sticks out straight so the indicated angles at V are congruent. Use the phrases from the word bank to complete this two-column proof.

Given: ∠S and ∠U are right angles.
∠SVW ≅ ∠UVW; $\overline{SV} \cong \overline{UV}$, $\overline{ST} \cong \overline{UT}$

Prove: △STV ≅ △UTV

△S ≅ △U
Third ∠ Thm.
Given
∠SVT ≅ ∠UVT

Proof:

Statements	Reasons
1. $\overline{SV} \cong \overline{UV}$, $\overline{ST} \cong \overline{UT}$	1. Given
2. $\overline{TV} \cong \overline{TV}$	2. Reflex. Prop. of ≅
3. ∠S and ∠U are right angles.	3. a. Given
4. a. ∠S ≅ ∠U	4. Rt. ∠ ≅ Thm.
5. ∠SVW ≅ ∠UVW	5. Given
6. ∠SVW and ∠SVT are supplementary. ∠UVW and ∠UVT are supplementary.	6. Lin. Pair Thm.
7. a. ∠SVT ≅ ∠UVT	7. ≅ Supps. Thm.
8. △STV ≅ △UTV	8. a. Third ∠s Thm.
9. △STV ≅ △UTV	9. Def. of ≅ △s

LESSON 4-3

Practice B

Congruent Triangles

In baseball, home plate is a pentagon. Pentagon *ABCDE* is a diagram of a regulation home plate. The baseball rules are very specific about the exact dimensions of this pentagon so that every home plate is congruent to every other home plate. If pentagon *PQRST* is another home plate, identify each congruent corresponding part.

1. ∠S ≅ ∠D
2. ∠R ≅ ∠Q
3. $\overline{EA} \cong \overline{TP}$
4. ∠E ≅ ∠T
5. $\overline{PQ} \cong \overline{AB}$
6. $\overline{TS} \cong \overline{ED}$

Given: △DEF ≅ △LMN **Find each value.**

7. $m\angle L =$ 40°
8. $EF =$ 37.3

9. Write a two-column proof.

Given: ∠U ≅ ∠WVY ≅ ∠ZXY ≅ ∠Z
$\overline{UV} \cong \overline{WV} \cong \overline{XY} \cong \overline{ZY}$, $\overline{UX} \cong \overline{WZ}$

Prove: △UVW ≅ △XYZ

Proof: Possible answer:

Statements	Reasons
1. ∠U ≅ ∠VWY ≅ ∠ZXY ≅ ∠Z	1. Given
2. ∠V ≅ ∠Y	2. Third ∠s Thm.
3. $\overline{UV} \cong \overline{WV}$, $\overline{XY} \cong \overline{ZY}$	3. Given
4. $\overline{UX} \cong \overline{WZ}$	4. Given
5. $\overline{UX} \cong \overline{WZ}$, $\overline{WX} \cong \overline{WX}$	5. Def. of ≅ segs. Reflexive Prop. of ≅
6. $\overline{UX} \cong \overline{UW} \cong \overline{WX}$, $\overline{WZ} \cong \overline{XZ} \cong \overline{WX}$	6. Seg. Add. Post.
7. $\overline{UW} + \overline{WX} \cong \overline{XZ} + \overline{WX}$	7. Subst.
8. $\overline{UW} \cong \overline{XZ}$	8. Subtr. Prop. of ≅
9. △UVW ≅ △XYZ	9. Def. of ≅ △s

10. **Given:** △CDE ≅ △HIJ, $DE = 9x$, and $IJ = 7x + 3$. Find *x* and *DE*.
$x = \frac{3}{2}$; $DE = 13\frac{1}{2}$

11. **Given:** △CDE ≅ △HIJ, $m\angle D = (6y + 1)°$, and $m\angle I = (8y - 25)°$. Find *y* and $m\angle D$.
$y = 26$; $m\angle D = 131°$

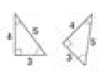
LESSON 4-3

Practice C

Congruent Triangles

Mr. X is an inventive person. He takes pleasure in drawing a triangle and seeing if another person can recreate his drawing from piecemeal information. For each exercise, draw a diagram to support your answer. (*Hint:* Begin each exercise by drawing a triangle. Measure the parts of your triangle that Mr. X gives you and try to draw a different triangle with those parts. If the two triangles are congruent, you drew Mr. X's triangle.)

1. If Mr. X gives you the measures of the sides of a triangle, could you be sure you would draw Mr. X's triangle?
   Yes; possible answer:

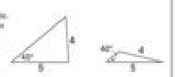


2. If Mr. X gives you the measures of the angles of a triangle, could you be sure you would draw Mr. X's triangle?
   No; possible answer:

3. If Mr. X gives you the measures of one angle and of both sides of that angle, could you be sure you would draw Mr. X's triangle?
   Yes; possible answer:

4. If Mr. X gives you the measures of one side and both angles that share that side, could you be sure you would draw Mr. X's triangle?
   Yes; possible answer:

5. If Mr. X gives you the measures of one angle, one adjacent side, and the side opposite the angle, could you be sure you would draw Mr. X's triangle? (*Hint:* Start with an angle less than 45° and a long adjacent side.)
   No; possible answer:



LESSON 4-3

Reteach

Congruent Triangles

Triangles are **congruent** if they have the same size and shape. Their **corresponding parts**, the angles and sides that are in the same positions, are congruent.

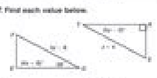
Corresponding Parts	
Congruent Angles	Congruent Sides
∠A ≅ ∠J	$\overline{AB} \cong \overline{JK}$
∠B ≅ ∠K	$\overline{BC} \cong \overline{KL}$
∠C ≅ ∠L	$\overline{CA} \cong \overline{LJ}$

To identify corresponding parts of congruent triangles, look at the order of the vertices in the congruence statement such as △ABC ≅ △JKL.

Given: △*RYZ* ≅ △*NPQ*. **Identify the congruent corresponding parts.**

1. ∠Z ≅ ∠Q
2. $\overline{YZ} \cong \overline{PQ}$
3. ∠P ≅ ∠Y
4. ∠X ≅ ∠N
5. $\overline{NQ} \cong \overline{XZ}$
6. $\overline{PN} \cong \overline{YX}$

Given: △*EFG* ≅ △*RST*. **Find each value below.**



7. $x =$ 21
8. $y =$ 6
9. $m\angle F =$ 63°
10. $ST =$ 10

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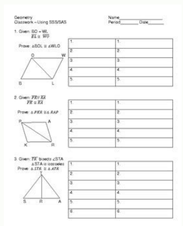


Geometry Name _____
Checkpoint – Using SSS/SAS Period _____ Date _____

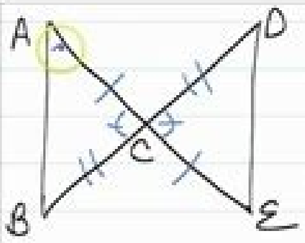
1. Given: $\overline{BC} \cong \overline{BE}$, $\overline{AD} \cong \overline{BD}$
   Prove: △BDC ≅ △BEA

2. Given: $\overline{PS} \cong \overline{QS}$, $\overline{SR} \cong \overline{SA}$
   Prove: △PSA ≅ △QSR

3. Given: $\overline{TE}$ bisects ∠STA, $\overline{ST} \cong \overline{TA}$
   Prove: △STE ≅ △ATE

CPCTC Proofs

Note Title



Given: $\overline{C}$ mp of $\overline{AE}$ + $\overline{BD}$

Prove: $\overline{AB} \cong \overline{DE}$

1) $\overline{C}$ mp $\overline{AE}$ + $\overline{BD}$		1) Given
2) $\overline{AC} \cong \overline{CE}$	S	2) MIDPT. DIVIDES SEGS
3) $\overline{BC} \cong \overline{CD}$	S	3) INTO 2 ≅ SEGMENTS
4) ∠ACB ≅ ∠DCE		4) VERT ∠s ARE ≅
5) △ABC ≅ △		5)
6) $\overline{AB} \cong \overline{DE}$		6)

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Home The page you're looking for does not exist. In order to continue enjoying our site, we ask that you confirm your identity as a human. Thank you very much for your cooperation. The CPCTC theorem states that when two triangles are congruent, their corresponding parts are equal. The CPCTC is an abbreviation used for 'corresponding parts of congruent triangles are congruent'. What is CPCTC? The abbreviation CPCTC is for Corresponding Parts of Congruent Triangles are Congruent. The CPCTC theorem states that when two triangles are congruent, then every corresponding part of one triangle is congruent to the other. This means, when two or more triangles are congruent then their corresponding sides and angles are also congruent or equal in measurements. Let us understand the meaning of congruent triangles and corresponding parts in detail. Congruent Triangles Two triangles are said to be congruent if they have exactly the same size and the same shape. Two congruent triangles have three equal sides and equal angles with respect to each other. Corresponding Parts Corresponding sides mean the three sides in one triangle are in the same position or spot as in the other triangle. Corresponding angles mean the three angles in one triangle are in the same position or spot as in the other triangle. In the given figure, △ABC ≅ △LMN. It means that the three pairs of sides and three pairs of angles of △ABC are equal to the three pairs of corresponding sides and three pairs of corresponding angles of △LMN. In these two triangles ABC and LMN, let us identify the 6 parts: i.e. the three corresponding sides and the three corresponding angles. AB corresponds to LM, BC corresponds to MN, AC corresponds to LN. ∠A corresponds to ∠L, ∠B corresponds to ∠M, ∠C corresponds to ∠N. And if △ABC ≅ △LMN, then as per the CPCTC theorem, the corresponding sides and angles are equal, i.e. AB = LM, BC = MN, AC = LN, and ∠ A = ∠L, ∠B = ∠M, ∠C = ∠N. CPCTC Triangle Congruence CPCTC states that if two triangles are congruent by any criterion, then all the corresponding sides and angles are equal. Here, we are discussing 5 congruence criteria in triangles. Criterion Explanation CPCTC SSS All the 3 corresponding sides are equal All the corresponding angles are also equal AAS 2 corresponding angles and the non included side are equal The other corresponding angles and the other 2 corresponding sides are also equal SAS 2 corresponding sides and the included angle are equal The other corresponding sides and the other 2 corresponding angles are also equal ASA 2 corresponding angles and the included sides are equal The other corresponding angles and the other 2 corresponding sides are also equal RHS / HL The hypotenuse and one leg of one triangle are equal to the corresponding hypotenuse and a leg of the other The other corresponding legs and the other two corresponding angles are equal CPCTC Proof To prove CPCTC, first, we need to prove that the two triangles are congruent with the help of any one of the triangle congruence criteria. For example, Consider triangles ABC and CDE in which BC = CD and AC = CD are given. Follow the points to prove CPCTC BC = CD and AC = CD (Given) ∠ACB = ∠EDC (Vertically opposite angles are equal) Thus, △ABC ≅ △EDC; By SAS (side-angle-side) criterion Now the two triangles are congruent, therefore, using CPCTC, AB = DE, ∠ABC = ∠EDC and ∠BAC = ∠DEC. Important Notes Given below are some important notes related to CPCTC. Have a look! Look for the congruent triangles keeping CPCTC in mind. Before using CPCTC, show that the two triangles are congruent. Related Articles on CPCTC Check out these interesting articles to know more about CPCTC and its related topics. Corresponding Angles Triangles Angles Congruence in Triangles Example 1: Observe the figure given below and find the length of LM using the CPCTC theorem, if it is given that △ EFG ≅ △LMN. Solution: Given that △ EFG ≅ △LMN. So, we can apply the ASA congruence rule to it which states that if two corresponding angles and the included side are equal in two triangles, then the triangles will be congruent. Here, two angles are given which are 30 degrees and 102 degrees such that ∠EFG = ∠LMN and ∠FEG = ∠MLN. So, by applying the CPCTC theorem we can identify that FE and ML are the corresponding sides of two congruent triangles △ EFG and △LMN. Therefore, FE = ML. Hence, the length of side LM is 3 units. Example 2: Observe the figure given below in which PR = RS and QR is perpendicular to PS. Find y using the CPCTC theorem. Solution: First let us prove that △PQR ≅ △SQR, PR = RS (given) QR = QR (common side) ∠QRP = ∠QRS (as QR is perpendicular to PS) Therefore, △PQR ≅ △SQR (SAS criterion) PQ = QS (By CPCTC) Now as PQ = QS Therefore, 4y = 28 Answer ⇒ y = 7 units View More > go to slidego to slide Have questions on basic mathematical concepts? Become a problem-solving champ using logic, not rules. Learn the why behind math with our certified experts Book a Free Trial Class FAQs on CPCTC Yes. CPCTC is a theorem that says corresponding parts of congruent triangles are congruent. Corresponding means angles and sides that are in the same respective position in the two triangles. What is CPCTC for Similar Triangles? CPCTC for similar triangles is not true. So, we cannot apply the CPCTC theorem for similar triangles. Corresponding angles of the two similar triangles are equal, whereas, corresponding sides of the triangles are not equal, but proportional. How do you Prove CPCTC? After showing the proposed triangles are congruent, we can immediately say that the corresponding parts of congruent triangles are congruent. It can be justified by superimposing triangles on each other and then by observing the corresponding angles and side lengths. What does CPCTC Stand for? CPCTC stands for corresponding parts of congruent triangles are congruent. Sometimes, it is also called CPCT which means corresponding parts of congruent triangles. What is an Example of CPCTC? The theorem CPCTC tells that when two triangles are congruent then their corresponding sides and angles are also said to be congruent. For example, triangle ABC and triangle PQR are congruent triangles therefore according to the theorem the sides AB = PQ, BC = QR, and CA = RP. Also ∠A = ∠P, ∠B = ∠Q, and ∠C = ∠R. How do you Prove CPCTC Using SSS Criterion? In SSS triangle congruence all the three corresponding sides are equal. In other words, the two triangles are said to be congruent if all corresponding sides of one triangle are equal to the sides of another triangle. Thus, when two triangles are congruent then according to CPCTC all the corresponding angles are also equal. How do you Prove CPCTC Using SAS Criterion? In SAS triangle congruence the two corresponding sides and the included angle are equal. In other words, the two triangles are said to be congruent if two corresponding sides and the included angle are equal. Thus, when two triangles are congruent then according to CPCTC the other corresponding side and the other two corresponding angles are also equal. This booklet is perfect for keeping students engaged while practicing proofs. It fits perfectly in an interactive notebook.This foldable has six CPCTC proofs. It is intended for use in a congruent triangles unit.Two versions of the foldable are included for differentiated instruction. All of the proofs are fill-in-the-blank proofs. This foldable must be copied double sided. Assembly instructions and a complete answer key are included. Make sure this is appropriate for your students. Look at the product preview to make sure this fits within your curriculum.This is also part of the following bundle:Geometry Foldables - a growing bundle _____You may also be interested in:_____Be the first to know about my new discounts, freebies, and products!Look for the green star near the top of any page within my store and click it to become a follower. 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