

End of Term 3 Revision



تم تحميل هذا الملف من موقع المناهج الإماراتية

موقع المناهج ← المناهج الإماراتية ← الصف التاسع المتقدم ← رياضيات ← الفصل الثالث ← ملفات متنوعة ← الملف

تاريخ إضافة الملف على موقع المناهج: 01:50:01 2026-06-15

ملفات اكتب للمعلم اكتب للطالب | اختبارات الكترونية | اختبارات | حلول | عروض بوربوينت | أوراق عمل
منهج انجليزي | ملخصات وتقارير | مذكرات وبنوك | الامتحان النهائي | للمدرس

المزيد من مادة
رياضيات:

إعداد: Nuzhat

التواصل الاجتماعي بحسب الصف التاسع المتقدم



صفحة المناهج
الإماراتية على
فيسبوك

الرياضيات

اللغة الانجليزية

اللغة العربية

التربية الاسلامية

المواد على تلغرام

المزيد من الملفات بحسب الصف التاسع المتقدم والمادة رياضيات في الفصل الثالث

مذكرة مراجعة للترم الثالث

1

الحقيبة التدريبية كراسة تدريبية

2

أسئلة متوقعة للامتحان 2026م بدون حل

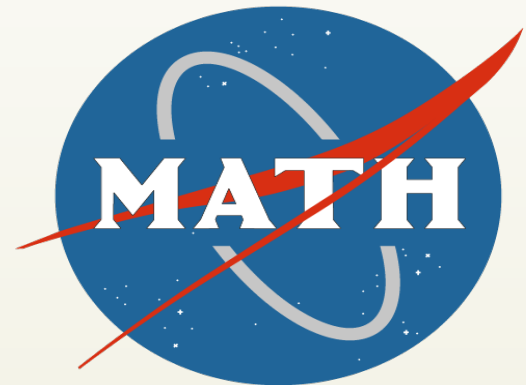
3

Congruent Triangles - Module 14

4

9ADV MATH EOT TERM 3 2025-2026

5



BE

READY

END OF TERM 3

REVISION

MATHS

GRADE 09 ADV

COMPILED BY
MRS NUZHAT

مدير المجمع
أمجد الجبر

وحدة الشؤون الأكاديمية
جلال عبدالرحمن صالح
حمدة العامري

EOT COVERAGE TERM -3

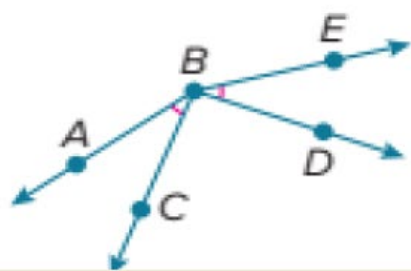
الأسئلة الموزونة: MCQ	1	Disprove conjectures by using counterexamples	(EX5,18-23)	706, 708
	2	Apply angle relationship theorems to identify parallel lines and find missing values	(EX1-1-6)	776,779
	3	Prove theorems about angles by using the Angle Addition Postulate	(EX1,1-3)	747,753
	4	Prove theorems about angles by using properties and theorems of angle congruence	(13-18)	754
	5	Solve problems involving equilateral triangles	(8-15)	880
	6	Classify lines as parallel, perpendicular, or neither by comparing the slopes of the lines	(1-6)	771
	7	Find the distance between parallel lines by using perpendicular distance	(9-14)	790
	8	Classify lines as parallel, perpendicular, or neither by comparing the equations of the lines	(EX5,22-25)	770,772
	9	Use rigid motions to reflect figures on the coordinate plane and describe the effects of the reflections	(EX1,1-6)	799,801
	10	Determine the translation vector	(EX1,1-2)	803,805
	11	Use rigid motions to rotate figures about points that are not the origin and describe the effects of the rotations	(EX1,1-4)	807-809
	12	Prove the Exterior Angle Theorem and apply the theorem to solve problems	(EX2,5-8)	841,843
	13	Use congruence criterion of corresponding congruent parts of triangles to solve problems	(EX2,6,7,10-13)	848,851,852
	14	Use the right triangle congruence theorems to prove relationships in geometric figures	(4-9)	873
	15	Use the SAS congruence criterion for triangles to solve problems	(17-20)	861
	16	Use the AAS congruence criterion for triangles to prove relationships in geometric figures	theorem,Ex3(12-15)	865,866,869
	17	Solve problems involving isosceles triangles	Theorem,Ex2(5-7)	875,877-880
	18	Write compound statements for conjunctions and disjunctions and determine truth values	Ex1(3,4,6)	711,717
	19	Write compound statements for conjunctions and disjunctions and determine truth values of statements	(1,2,5)	717
	20	Use rotational symmetry to describe the rotations that carry a figure onto itself	(1-6)	829
	21	Use ASA congruence criterion for triangles to solve problems and prove relationships in geometric figure	Ex1(1-6)	863,867
	22	Apply angle relationship theorems to identify parallel lines and find missing values	Ex2(7-12)	777,779
	23	Use the SSS congruence criterion for triangles to solve problems and prove relationships in geometric figures	Ex1(17-20)	855, 861
	24	Prove the Triangle Angle-Sum Theorem and apply the theorem to solve problems	Ex1(1-4)	839,843
	25	Identify hypotheses and conclusions of conditional statements and write related conditionals	Ex3(12-17)	713,717

	1	Disprove conjectures by using counterexamples	(EX5,18-23)	706, 708
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Example 5 Find Counterexamples

Find a counterexample to show that each conjecture is false.

- a. If n is a real number, then $-n$ is a negative number.
- b. If $\angle ABC \cong \angle DBE$, then $\angle ABC$ and $\angle DBE$ are vertical angles.



Determine whether each conjecture is *true* or *false*. Find a counterexample for any false conjecture.

- 18. If n is a prime number, then $n + 1$ is not prime.
- 19. If x is an integer, then $-x$ is positive.
- 20. If $\angle 2$ and $\angle 3$ are supplementary angles, then $\angle 2$ and $\angle 3$ form a linear pair.
- 21. If you have three points A , B , and C , then A , B , and C are noncollinear.
- 22. If in $\triangle ABC$, $(AB)^2 + (BC)^2 = (AC)^2$, then $\triangle ABC$ is a right triangle.
- 23. If the area of a rectangle is 20 square meters, then the length is 10 meters and the width is 2 meters.

Example 5 Find Counterexamples

Find a counterexample to show that each conjecture is false.

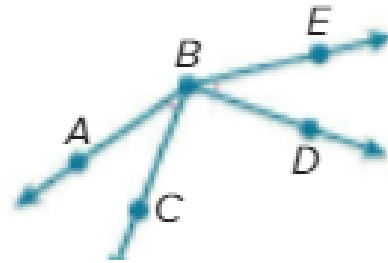
a. If n is a real number, then $-n$ is a negative number.

When n is -4 , $-n$ is $-(-4)$ or 4 , which is a positive number. Because $-n$ is not negative, this is a counterexample.

b. If $\angle ABC \cong \angle DBE$, then $\angle ABC$ and $\angle DBE$ are vertical angles.

When points A , B , and D are noncollinear and points E , B , and C are noncollinear, the conjecture is false.

In the figure, $\angle ABC \cong \angle DBE$, but $\angle ABC$ and $\angle DBE$ are not vertical angles.



Determine whether each conjecture is *true* or *false*. Find a counterexample for any false conjecture.

18. If n is a prime number, then $n + 1$ is not prime. **False; sample answer: If $n = 2$, then $n + 1 = 3$, a prime number.**

19. If x is an integer, then $-x$ is positive. **False; sample answer: Suppose $x = 2$, then $-x = -2$.**

20. If $\angle 2$ and $\angle 3$ are supplementary angles, then $\angle 2$ and $\angle 3$ form a linear pair. **False; see margin for counterexample.**

21. If you have three points A , B , and C , then A , B , and C are noncollinear. **False; see margin for counterexample.**

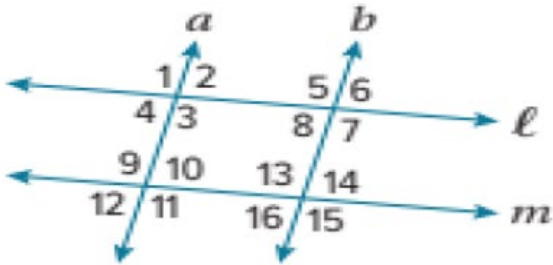
22. If in $\triangle ABC$, $(AB)^2 + (BC)^2 = (AC)^2$, then $\triangle ABC$ is a right triangle. **true**

23. If the area of a rectangle is 20 square meters, then the length is 10 meters and the width is 2 meters. **False; sample answer: The length could be 4 m, and the width could be 5 m.**

2	Apply angle relationship theorems to identify parallel lines and find missing values	(EX1-1-6)	776,779
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Example 1 Identify Parallel Lines

Use the given information to determine which lines, if any, are parallel. State the postulate or theorem that justifies your answer.



a. $\angle 2 \cong \angle 8$

b $\angle 3 \cong \angle 11$

c. $\angle 12 \cong \angle 14$

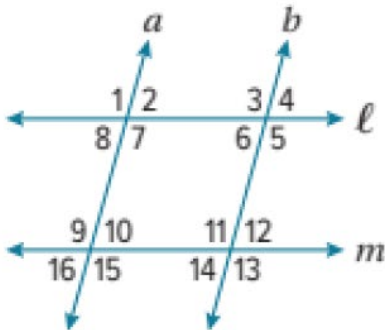
Use the given information to determine which lines, if any, are parallel. State the postulate or theorem that justifies your answer.

1. $\angle 3 \cong \angle 7$

2. $\angle 9 \cong \angle 11$

3. $\angle 2 \cong \angle 16$

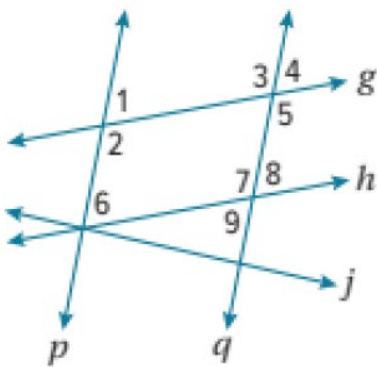
4. $m\angle 5 + m\angle 12 = 180^\circ$



Given the following information, determine which lines, if any, are parallel. State the theorem that justifies your answer.

5. $\angle 1 \cong \angle 6$

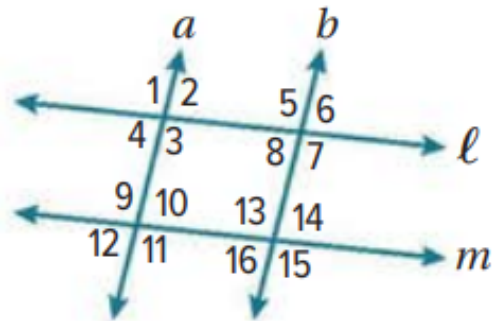
6. $m\angle 7 + m\angle 6 = 180^\circ$



Example 2

Example 1 Identify Parallel Lines

Use the given information to determine which lines, if any, are parallel. State the postulate or theorem that justifies your answer.



a. $\angle 2 \cong \angle 8$

$\angle 2$ and $\angle 8$ are alternate interior angles of lines a and b .

Because $\angle 2 \cong \angle 8$, $a \parallel b$ by the Alternate Interior Angles Converse.

b. $\angle 3 \cong \angle 11$

$\angle 3$ and $\angle 11$ are corresponding angles of lines l and m . Because $\angle 3 \cong \angle 11$, $l \parallel m$ by the Converse of the Corresponding Angles Theorem.

c. $\angle 12 \cong \angle 14$

$\angle 12$ and $\angle 14$ are alternate exterior angles of lines a and b .

Because $\angle 12 \cong \angle 14$, $a \parallel b$ by the Alternate Exterior Angles Converse.

Use the given information to determine which lines, if any, are parallel. State the postulate or theorem that justifies your answer.

1. $\angle 4 \cong \angle 7$

$a \parallel b$; Alternate Interior Angles Converse

2. $\angle 9 \cong \angle 11$

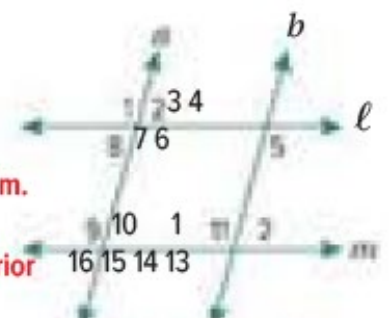
$a \parallel b$; Converse of corresponding Angles Thm.

3. $\angle 2 \cong \angle 16$

$a \parallel m$; Alternate Exterior Angles Converse

4. $m\angle 1 + m\angle 12 = 180^\circ$

$l \parallel m$; Consecutive Interior Angles Converse



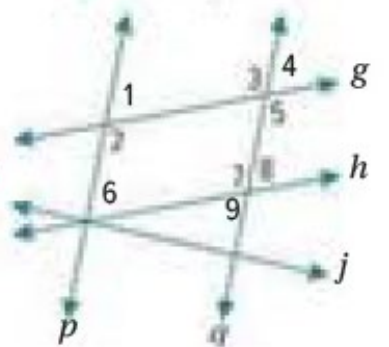
Given the following information, determine which lines, if any, are parallel. State the theorem that justifies your answer.

5. $\angle 1 \cong \angle 4$

$g \parallel h$; Converse of corresponding Angles Thm.

6. $m\angle 7 + m\angle 6 = 180^\circ$

$p \parallel q$; Consecutive Interior Angles Converse



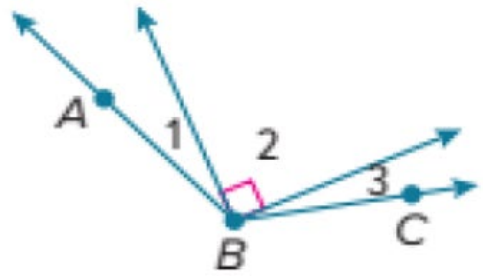
Example 2

3	Prove theorems about angles by using the Angle Addition Postulate	(EX1,1-3)	747,753
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Example 1 Angle Addition Postulate

What is $m\angle 3$ if $m\angle 1 = 23^\circ$ and $m\angle ABC = 131^\circ$?

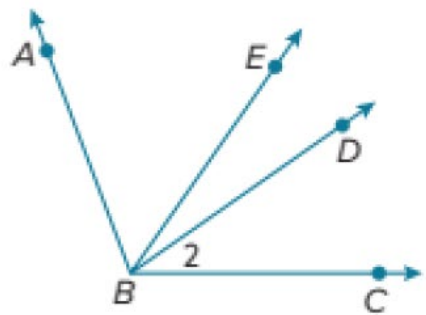
Choose from the reasons provided to justify each step.



Example 1

Find the measure of each angle.

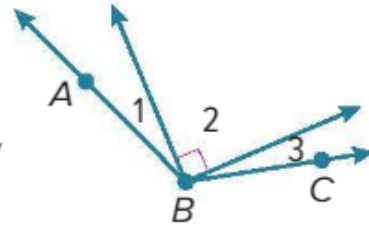
- 1. Find $m\angle ABC$ if $m\angle ABD = 70^\circ$ and $m\angle DBC = 43^\circ$.
- 2. If $m\angle EBC = 55^\circ$ and $m\angle EBD = 20^\circ$, find $m\angle 2$.
- 3. Find $m\angle ABD$ if $m\angle ABC = 110^\circ$ and $m\angle 2 = 36^\circ$.



Example 1 Angle Addition Postulate

What is $m\angle 3$ if $m\angle 1 = 23^\circ$ and $m\angle ABC = 131^\circ$?

Choose from the reasons provided to justify each step.

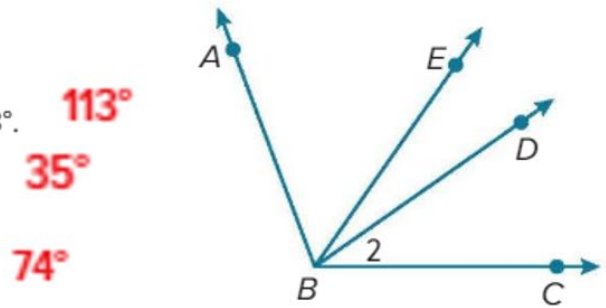


$m\angle 1 + m\angle 2 + m\angle 3 = m\angle ABC$	Angle Addition Postulate
$23^\circ + 90^\circ + m\angle 3 = 131^\circ$	Substitution Property
$113^\circ + m\angle 3 = 131^\circ$	Substitution Property
$113^\circ + m\angle 3 - 113^\circ = 131^\circ - 113^\circ$	Subtraction Property
$m\angle 3 = 18^\circ$	Substitution Property

Example 1

Find the measure of each angle.

- Find $m\angle ABC$ if $m\angle ABD = 70^\circ$ and $m\angle DBC = 43^\circ$.
- If $m\angle EBC = 55^\circ$ and $m\angle EBD = 20^\circ$, find $m\angle 2$.
- Find $m\angle ABD$ if $m\angle ABC = 110^\circ$ and $m\angle 2 = 36^\circ$.



113°

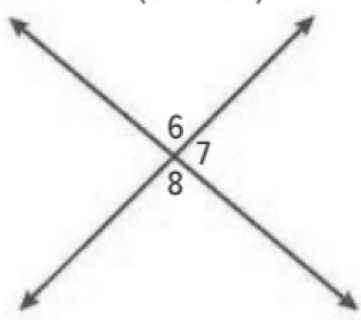
35°

74°

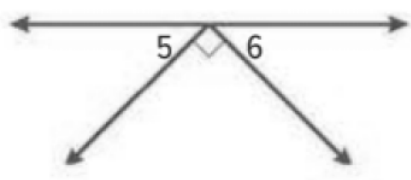
4	Prove theorems about angles by using properties and theorems of angle congruence	(13-18)	754
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Find the measure of each numbered angle and name the theorems that you used to justify your work.

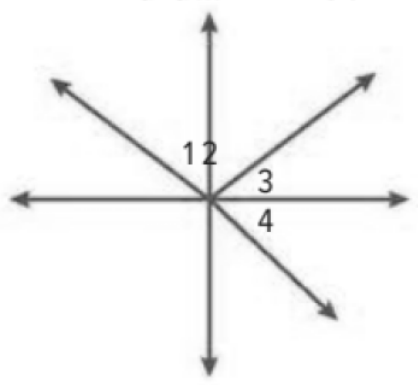
13. $m\angle 6 = (2x - 21)^\circ$
 $m\angle 7 = (3x - 34)^\circ$



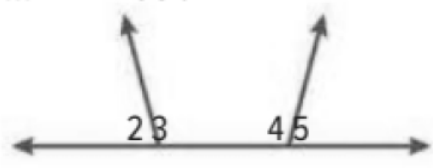
14. $m\angle 5 = m\angle 6$



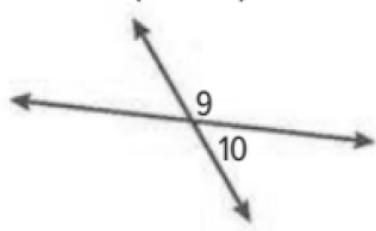
15. $\angle 2$ and $\angle 3$ are complementary.
 $\angle 1 \cong \angle 4$ and $m\angle 2 = 28^\circ$.



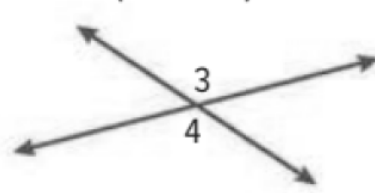
16. $\angle 2$ and $\angle 4$ and $\angle 4$ and $\angle 5$ are supplementary.
 $m\angle 4 = 105^\circ$.



17. $m\angle 9 = (3x + 12)^\circ$
 $m\angle 10 = (x - 24)^\circ$

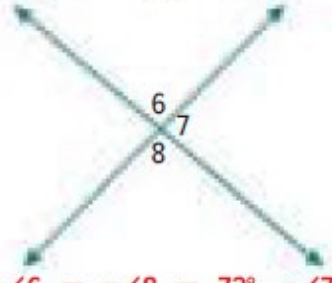


18. $m\angle 3 = (2x + 23)^\circ$
 $m\angle 4 = (5x - 112)^\circ$



Find the measure of each numbered angle and name the theorems that you used to justify your work.

13. $m\angle 6 = (2x - 21)^\circ$
 $m\angle 7 = (3x - 34)^\circ$



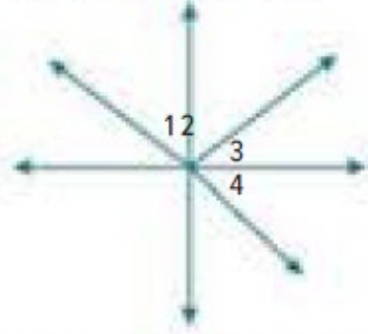
$m\angle 6 = m\angle 8 = 73^\circ$, $m\angle 7 = 107^\circ$
 ($\cong$ Supp. Thm. and Vert. $\angle$ s Thm.)

14. $m\angle 5 = m\angle 6$



$m\angle 5 = m\angle 6 = 45^\circ$
 ($\cong$ Supp. Thm.)

15. $\angle 2$ and $\angle 3$ are complementary.
 $\angle 1 \cong \angle 4$ and $m\angle 2 = 28^\circ$.



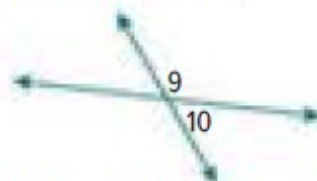
$m\angle 3 = 62^\circ$, $m\angle 1 = m\angle 4 = 45^\circ$
 ($\cong$ Comp. and Supp. Thm.)

16. $\angle 2$ and $\angle 4$ and $\angle 4$ and $\angle 5$
 are supplementary.
 $m\angle 4 = 105^\circ$.



$m\angle 2 = 75^\circ$, $m\angle 3 = 105^\circ$, $m\angle 5 = m\angle 9 = 156^\circ$, $m\angle 10 = 24^\circ = 75^\circ$ ($\cong$ Supp. Thm.)

17. $m\angle 9 = (3x + 12)^\circ$
 $m\angle 10 = (x - 24)^\circ$



($\cong$ Supp. Thm.)

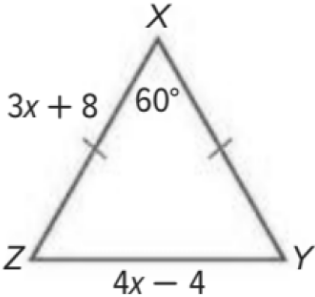
18. $m\angle 3 = (2x + 23)^\circ$
 $m\angle 4 = (5x - 112)^\circ$



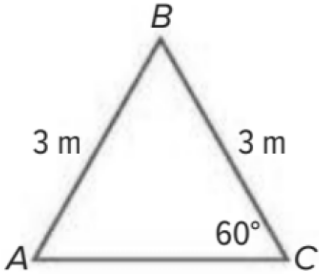
$m\angle 3 = m\angle 4 = 113^\circ$
 (Vert. $\angle$ s Thm.)

5	Solve problems involving equilateral triangles	(8-15)	880
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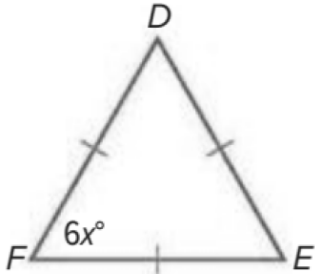
8. Find the value of x .



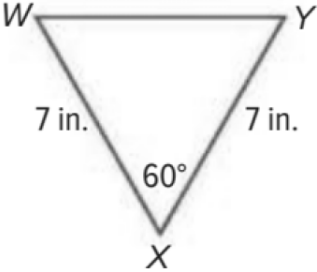
9. Find $m\angle B$ and AC .



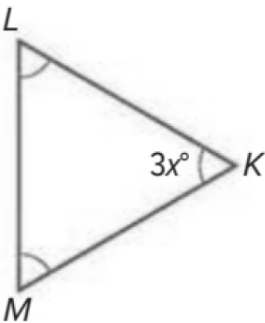
10. Find the value of x .



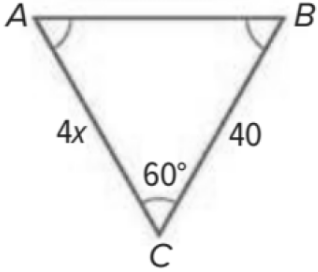
11. Find $m\angle Y$ and WY .



12. Find the value of x .

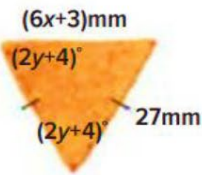


13. Find the value of x .

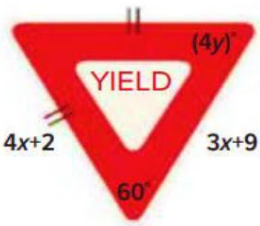


Find the value of each variable.

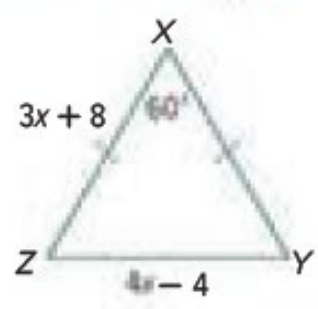
14. **CHIPS** Some tortilla chips can be modeled by a triangle.
- a. Solve for x .
 - b. Solve for y .



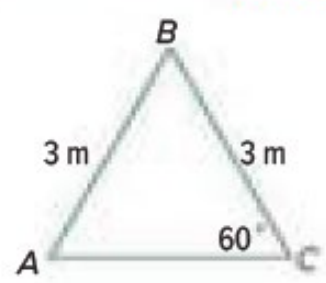
15. **SIGNS** Yield signs notify drivers to slow down and allow oncoming vehicles to proceed first.
- a. Solve for x .
 - b. Solve for y .



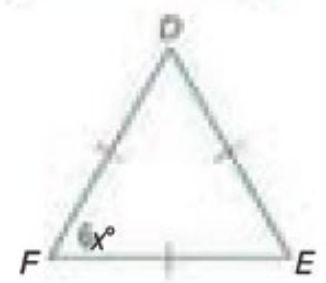
8. Find the value of x **12**



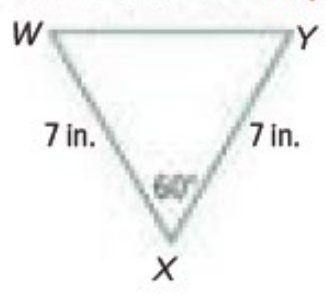
9. Find $m\angle B$ and AC **60° ; 3 m**



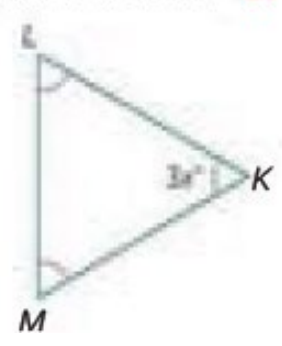
10. Find the value of x **10**



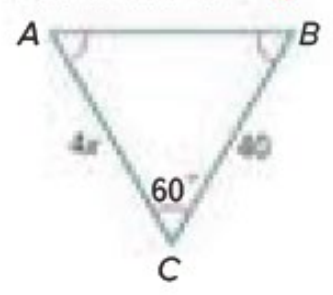
11. Find $m\angle$ and WY **60° ; 7 in.**



12. Find the value of x **20**



13. Find the value of x **10**



Find the value of each variable

14. **CHIPS** Some tortilla chips can be modeled by a triangle.
 a. Solve for x **4**
 b. Solve for y **28**



15. **SIGNS** Yield signs notify drivers to slow down and allow oncoming vehicles to proceed first.
 a. Solve for x **7**
 b. Solve for y **15**



6	Classify lines as parallel, perpendicular, or neither by comparing the slopes of the lines	(1-6)	771
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Determine whether $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ are *parallel*, *perpendicular*, or *neither*. Graph each line to verify your answer.

1. $A(1, 5), B(4, 4), C(9, -10), D(-6, -5)$
2. $A(-6, -9), B(8, 19), C(0, -4), D(2, 0)$
3. $A(4, 2), B(-3, 1), C(6, 0), D(-10, 8)$
4. $A(8, -2), B(4, -1), C(3, 11), D(-2, -9)$
5. $A(8, 4), B(4, 3), C(4, -9), D(2, -1)$
6. $A(4, -2), B(-2, -8), C(4, 6), D(8, 5)$

Example 1

Determine whether $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ are *parallel*, *perpendicular*, or *neither*. Graph each line to verify your answer. See margin for graphs.

1. $A(1, 5), B(4, 4), C(9, -10), D(-6, -5)$ 2. $A(-6, -9), B(8, 19), C(0, -4), D(2, 0)$

parallel

parallel

3. $A(4, 2), B(-3, 1), C(6, 0), D(-10, 8)$ 4. $A(8, -2), B(4, -1), C(3, 11), D(-2, -9)$

neither

perpendicular

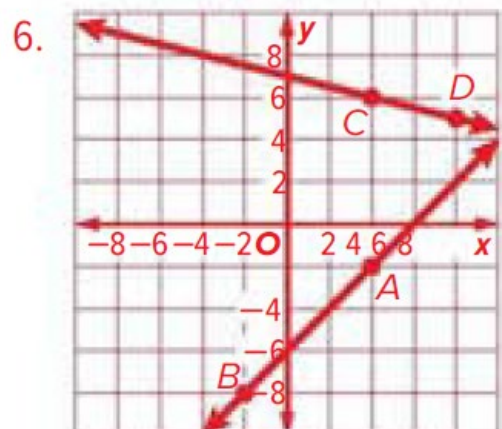
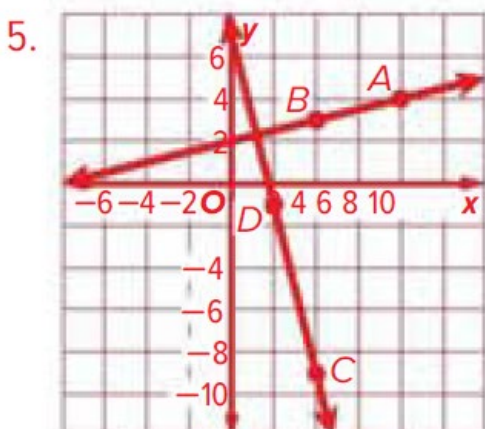
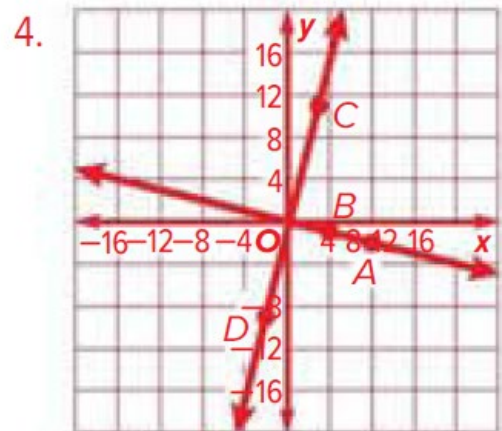
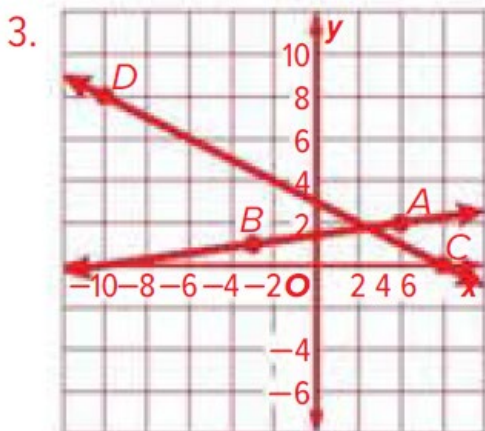
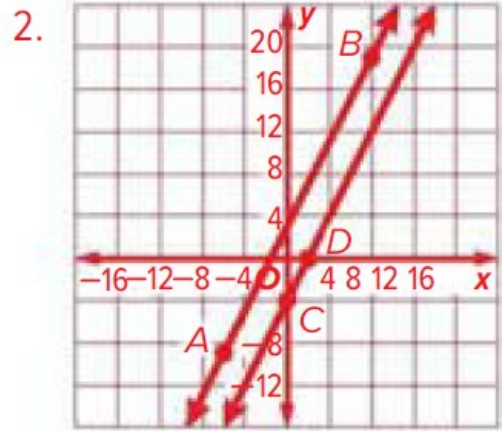
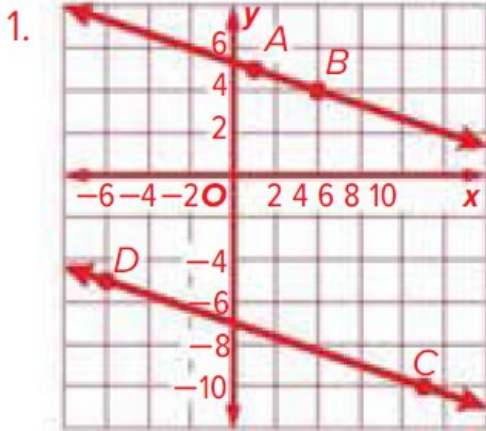
5. $A(8, 4), B(4, 3), C(4, -9), D(2, -1)$

perpendicular

6. $A(4, -2), B(-2, -8), C(4, 6), D(8, 5)$

neither

Answers



7	Find the distance between parallel lines by using perpendicular distance	(9-14)	790
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Find the distance between each pair of parallel lines with the given equations.

9. $y = 7$
 $y = -1$

10. $x = -6$
 $x = 5$

11. $y = 3x$
 $y = 3x + 10$

12. $y = -5x$
 $y = -5x + 26$

13. $y = x + 9$
 $y = x + 3$

14. $y = -2x + 5$
 $y = -2x - 5$

Find the distance between each pair of parallel lines with the given equations.

9. $y = 7$
 $y = -1$
8 units

10. $x = -6$
 $x = 5$
11 units

11. $y = 3x$
 $y = 3x + 10$
 $\sqrt{10}$ or about 3. 16 units

12. $y = -5x$
 $y = -5x + 26$
 $\sqrt{26}$ or about 5. 10 units

13. $y = x + 9$
 $y = x + 3$
 $3\sqrt{2}$ or about 4.24 units

14. $y = -2x + 5$
 $y = -2x - 5$
 $2\sqrt{5}$ or about 4.47 units

15. $y = \frac{1}{4}x + 2$
 $4y - x = -60$
 $4\sqrt{17}$ or about 16.49 units

16. $3x + y = 3$
 $y + 17 = -3x$
 $2\sqrt{10}$ or about 6.32 units

17. $y = -\frac{5}{4}x + 3.5$
 $4y + 10.6 = -5x$
 $\sqrt{14.76}$ or about 3.84 units

8	Classify lines as parallel, perpendicular, or neither by comparing the equations of the lines	(EX5,22-25)	770,772
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Example 5 Write Equations of Parallel and Perpendicular Lines

Write an equation in slope-intercept form for the line parallel to $y = -\frac{3}{4}x + 3$ containing $(-3, 6)$.

The slope of $y = -\frac{3}{4}x + 3$ is $-\frac{3}{4}$, so the slope of the line parallel to it is $-\frac{3}{4}$

$$y = mx + b$$

Slope-intercept form

$$6 = -\frac{3}{4}(-3) + b$$

$$m = -\frac{3}{4} \text{ and } (x, y) = (-3, 6)$$

$$6 = \frac{9}{4} + b$$

Simplify.

$$\frac{15}{4} = b$$

Subtract $\frac{9}{4}$ from each side.

So, the equation is $y = -\frac{3}{4}x + \frac{15}{4}$.

Write an equation in slope-intercept form for each line described.

22. passes through $(-7, -4)$, perpendicular to $y = \frac{1}{2}x + 9$

23. passes through $(-1, -10)$, parallel to $y = 7$

24. passes through $(6, 2)$, parallel to $y = -\frac{2}{3}x + 1$

25. passes through $(-2, 2)$, perpendicular to $y = -5x - 8$

Write an equation in slope-intercept form for each line described.

22. passes through $(-7, -4)$, perpendicular to $y = \frac{1}{2}x + 9$ $y = -2x - 18$

23. passes through $(-1, -10)$, parallel to $y = 7$ $y = -10$

24. passes through $(6, 2)$, parallel to $y = -\frac{2}{3}x + 1$ $y = -\frac{2}{3}x + 6$

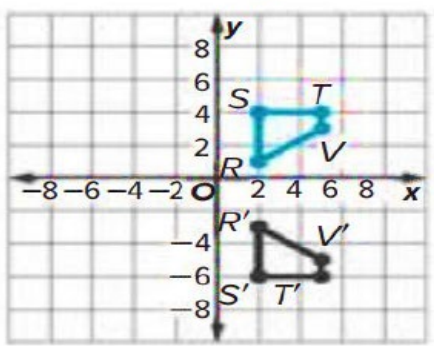
25. passes through $(-2, 2)$, perpendicular to $y = -5x - 8$ $y = \frac{1}{5}x + \frac{12}{5}$

9	Use rigid motions to reflect figures on the coordinate plane and describe the effects of the reflections	(EX1,1-6)	799,801
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Example 1 Reflection in a Horizontal or Vertical Line

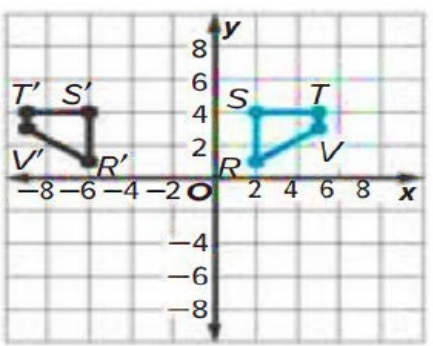
Consider quadrilateral $RSTV$ with vertices at $R(2, 1)$, $S(2, 4)$, $T(5, 4)$, and $V(5, 3)$. Graph the image of quadrilateral $RSTV$ under each reflection. Determine the coordinates of the image.

a. in the line $y = -1$



$R'(2, -3)$, $S'(2, -6)$,
 $T'(5, -6)$, $V'(5, -5)$

b. in the line $x = -2$



$R'(-6, 1)$, $S'(-6, 4)$,
 $T'(-9, 4)$, $V'(-9, 3)$

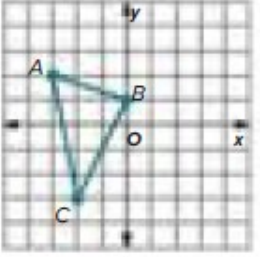
Graph the image of each figure under the given reflection. Determine the coordinates of the image.

- $\triangle ABC$ in the line $y = x$
- trapezoid $DEFG$ in the line $x = -1$
- parallelogram $RSTU$ in the line $y = x$
- square $KLMN$ in the line $y = -2$
- Determine the coordinates of $S(-7, 1)$ after a reflection in the line $y = 3$.
- Determine the coordinates of $Q(6, -4)$ after a reflection in the line $x = 2$.

Examples 1 and 2 1–4. See margin for graphs.

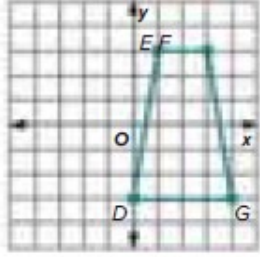
Graph the image of each figure under the given reflection. Determine the coordinates of the image.

1. $\triangle ABC$ in the line $y = x$



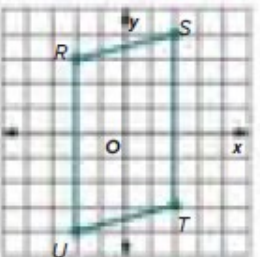
$A'(2, -3), B'(1, 0), C'(-3, -2)$

2. trapezoid $DEFG$ in the line $x = -1$



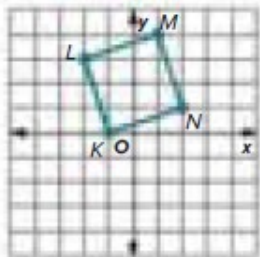
$D'(-2, -3), E'(-3, 3), F'(-5, 3), G'(-6, -3)$

3. parallelogram $RSTU$ in the line $y = x$



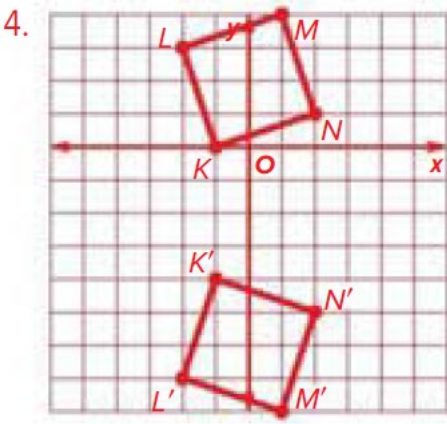
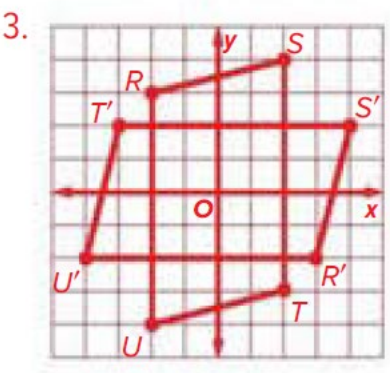
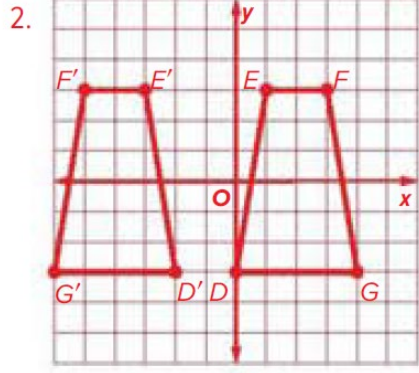
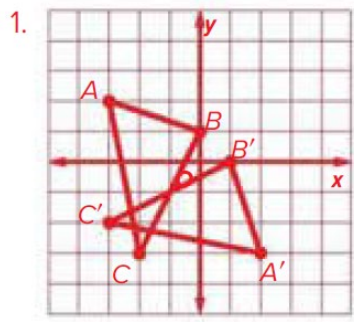
$R'(3, -2), S'(4, 2), T'(-3, 2), U'(-4, -2)$

4. square $KLMN$ in the line $y = -2$



$K'(-1, -4), L'(-2, -7), M'(1, -8), N'(2, -5)$

Answers



10	Determine the translation vector	(EX1,1-2)	803,805
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Example 1 Determine a Translation Vector

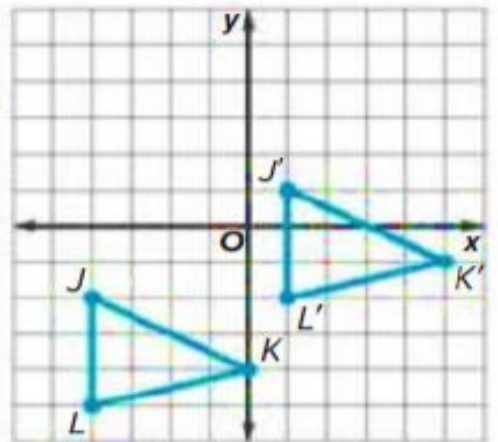
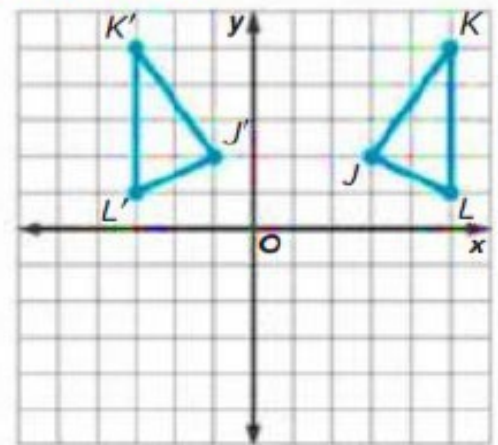
Determine whether a translation maps $\triangle JKL$ onto $\triangle J'K'L'$. If so, find the translation vector. If not, explain why.

$\triangle J'K'L'$ is not a translation of $\triangle JKL$.
 The distances between corresponding vertices are not equal.

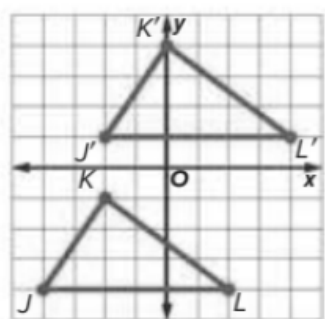
Check

Determine whether a translation maps $\triangle JKL$ onto $\triangle J'K'L'$. If so, find the translation vector. If not, explain why.

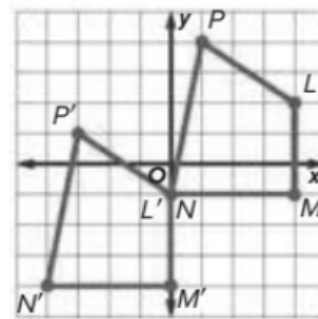
- A yes; $\langle 5, 3 \rangle$
- B yes; $\langle 3, 5 \rangle$
- C No; this is a reflection.
- D No; the triangles are not congruent.



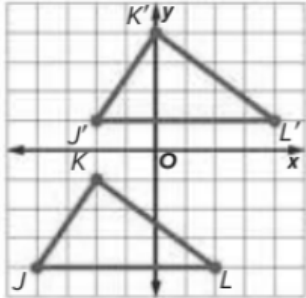
- Determine whether a translation maps $\triangle JKL$ onto $\triangle J'K'L'$. If so, find the translation vector. If not, explain why.



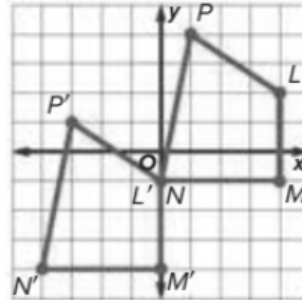
- Determine whether a translation maps quadrilateral $LMNP$ onto quadrilateral $L'M'N'P'$. If so, find the translation vector. If not, explain why.



1. Determine whether a translation maps $\triangle JKL$ onto $\triangle J'K'L'$. If so, find the translation vector. If not, explain why.



2. Determine whether a translation maps quadrilateral $LMNP$ onto quadrilateral $L'M'N'P'$. If so, find the translation vector. If not, explain why.



Answers

- $\triangle J'K'L'$ is a translation of $\triangle JKL$. This translation vector can be represented as $\langle 2, 5 \rangle$.
- Quadrilateral $LMNP$ is a translation of quadrilateral $L'M'N'P'$. This translation vector can be represented as $\langle -4, -3 \rangle$.

11	Use rigid motions to rotate figures about points that are not the origin and describe the effects of the rotations	(EX1,1-4)	807-809
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Example 1 Rotation About a Point That Is Not the Origin

Triangle ABC has vertices $A(-8, 5)$, $B(-6, 9)$, and $C(-3, 6)$. Graph $\triangle ABC$ and its image after a rotation of 180° about $(-5, 3)$.

Step 1 Graph $\triangle ABC$.

Step 2 Map the center of rotation to the origin.

To map the center of rotation to the origin, translate the center of rotation along the vector $\langle 5, -3 \rangle$. Then translate the vertices of $\triangle ABC$ along the same vector.

$$(x, y) \rightarrow (x + 5, y - 3)$$

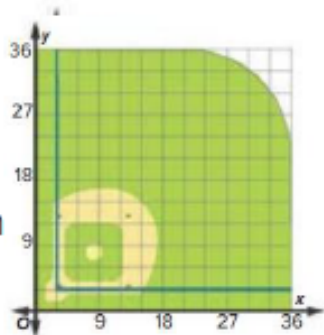
$$A(-8, 5) \rightarrow (-3, 2) \quad B(-6, 9) \rightarrow (-1, 6) \quad C(-3, 6) \rightarrow (2, 3)$$

1. Triangle XYZ has vertices $X(0, 2)$, $Y(4, 4)$, and $Z(3, -1)$. Graph $\triangle XYZ$ and its image after a rotation of 180° about $(2, -3)$.

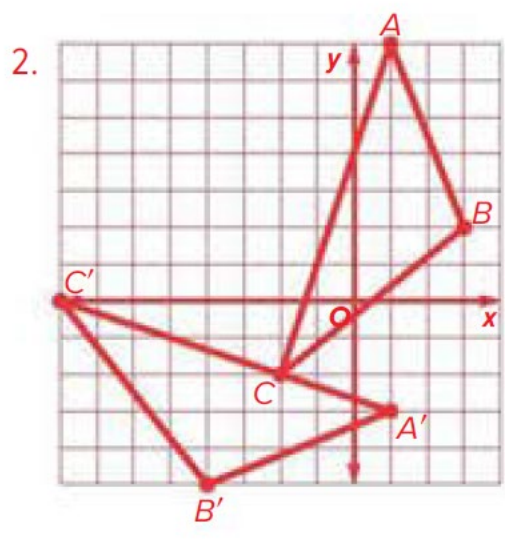
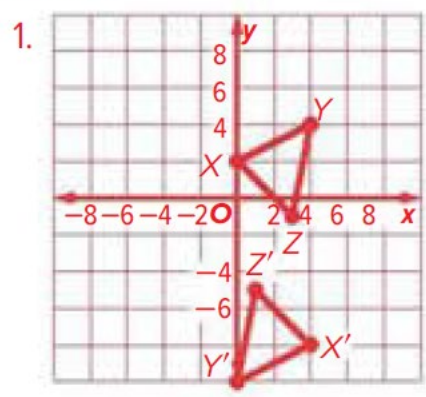
2. Triangle ABC has vertices $A(1, 7)$, $B(3, 2)$, and $C(-2, -2)$. Graph $\triangle ABC$ and its image after a rotation of 270° counterclockwise about $(-4, 2)$.

3. Triangle FGH has vertices $F(-3, 4)$, $G(2, 0)$, and $H(-1, 2)$. Graph $\triangle FGH$ and its image after a rotation of 180° about $(-3, -6)$.

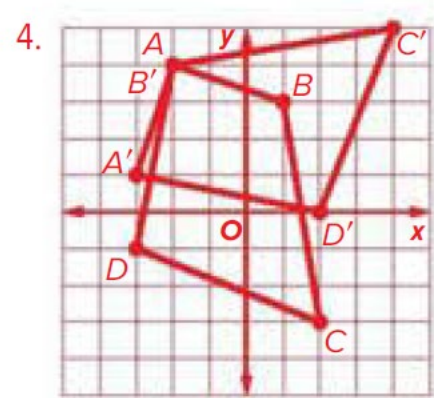
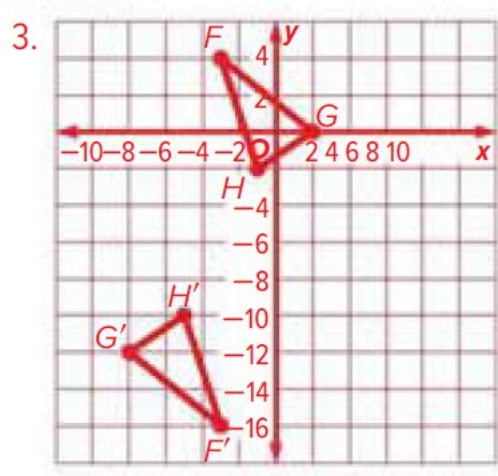
4. Quadrilateral $ABCD$ has vertices $A(-2, 4)$, $B(1, 3)$, $C(2, -3)$, and $D(-3, -1)$. Graph quadrilateral $ABCD$ and its image after a rotation of 90° counterclockwise about $(-1, 2)$.



Answers



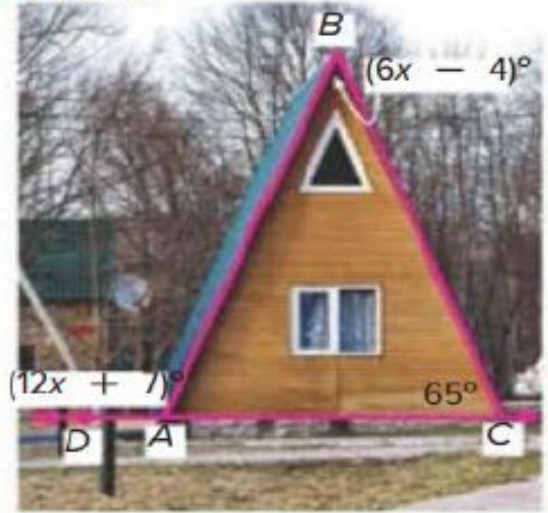
Answers



12	Prove the Exterior Angle Theorem and apply the theorem to solve problems	(EX2,5-8)	841,843
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Example 2 Use the Exterior Angle Theorem

ARCHITECTURE Find the measure of $\angle DAB$ in the front face of the building.



$$m\angle DAB = m\angle ABC + m\angle BCA$$

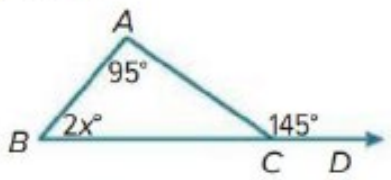
$$12x + 7 = 6x - 4 + 65$$

$$x = 9$$

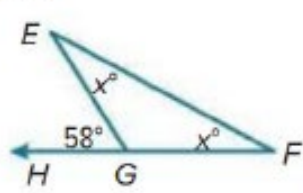
$$m\angle DAB = 12(9) + 7 \text{ or } 115^\circ$$

Find each measure.

5. $m\angle ABC$



6. $m\angle F$



7. **TOWERS** A lookout tower sits on a network of struts and posts. Leslie measured two angles on the tower. If $m\angle 1 = (7x - 7)^\circ$, $m\angle 2 = (4x + 2)^\circ$, and $m\angle 3 = (2x + 6)^\circ$, what is $m\angle 1$?

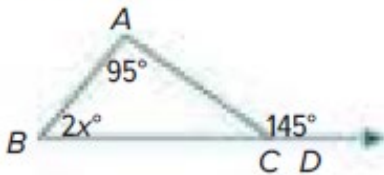


8. **GARDENING** A gardener uses a grow light to grow vegetables indoors. If $m\angle 1 = (8x)^\circ$ and $m\angle 2 = (7x - 4)^\circ$, what is $m\angle 1$?

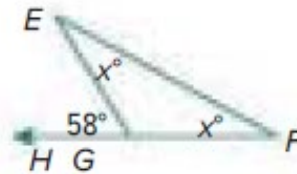


Find each measure.

5. $m\angle ABC$ 50°



6. $m\angle F$ 29°



7. **TOWERS** A lookout tower sits on a network of struts and posts. Leslie measured two angles on the tower. If $m\angle 1 = (7x - 7)^\circ$, $m\angle 2 = (4x + 2)^\circ$, and $m\angle 3 = (2x + 6)^\circ$, what $98^\circ m\angle 1$?



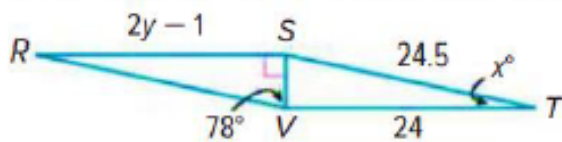
8. **GARDENING** A gardener uses a grow light to grow vegetables indoors. If $m\angle 1 = (8x)^\circ$ and $m\angle 2 = (7x - 4)^\circ$, what is $m\angle 1$? 64°



13	Use congruence criterion of corresponding congruent parts of triangles to solve problems	(EX2,6,7,10-13)	848,851,852
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Example 2 Use Corresponding Parts of Congruent Triangles

In the diagram, $\triangle RSV \cong \triangle TVS$. Find the values of x and y .



Part A Find the value of x .

$$\begin{aligned} \angle T &\cong \angle R \\ m\angle T &= m\angle R \\ &= 180^\circ - 90^\circ - 78^\circ \\ &= 12^\circ \end{aligned}$$

The value of x is 12.

Part B Find the value of y .

$$\begin{aligned} \overline{RS} &\cong \overline{TV} \\ RS &= TV \\ 2y - 1 &= 24 \\ y &= 12.5 \end{aligned}$$

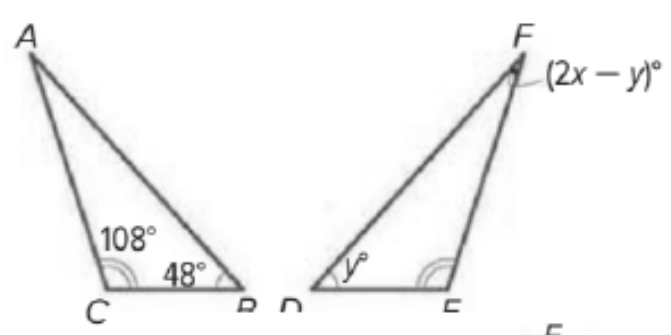
The value of y is 12.5.

Example 2

In the diagram, $\triangle ARC \cong \triangle FDE$.

6. Find the value of

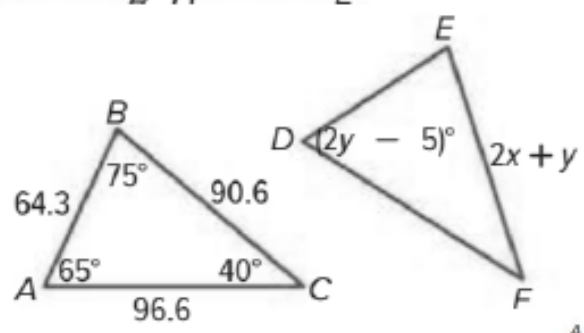
7. Find the value of y . 48



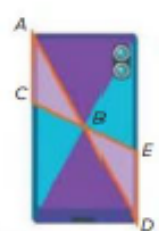
In the diagram, $\triangle ABC \cong \triangle DEF$.

10. Find the value of x .

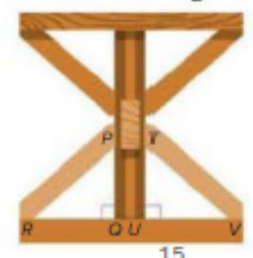
11. Find the value of y .



12. **DESIGN** Camila is designing a new image for her cell phone case. If $m\angle ABC = 35^\circ$, $m\angle BAC = 29^\circ$, and $\angle ACB \cong \angle DEB$, what is $m\angle DEB$?

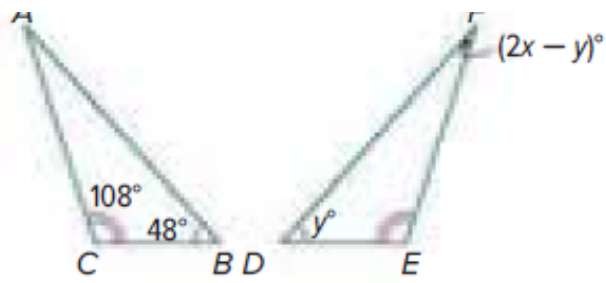


13. **CARPENTRY** Mr. Lewis is building a rustic dining table. Instead of having four legs, the table has a set of supports at each end. If $\angle PRQ \cong \angle TVU$ and $m\angle RPQ = 49^\circ$, what is $m\angle TVU$?



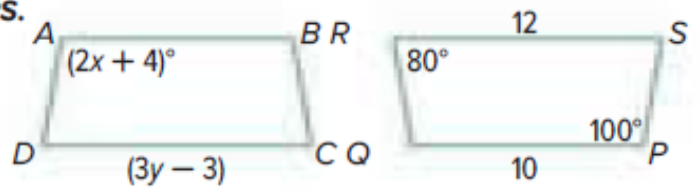
In the diagram, $\triangle ABC \cong \triangle FDE$.

6. Find the value of x . **36**
7. Find the value of y . **48**



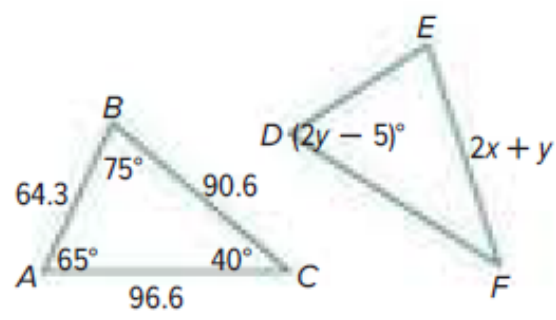
In the diagram, polygon $ABCD \cong$ polygon $PQRS$.

8. Find the value of x . **48**
9. Find the value of y . **5**



In the diagram, $\triangle ABC \cong \triangle DEF$.

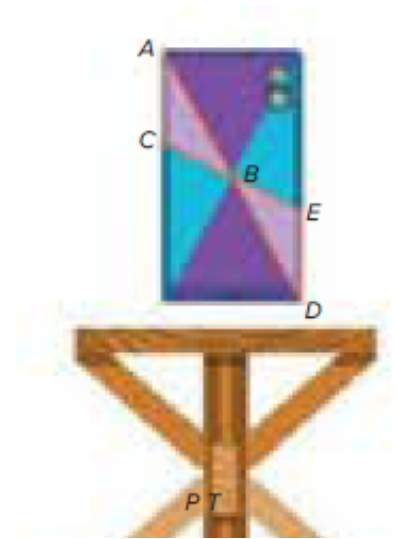
10. Find the value of x . **27.8**
11. Find the value of y . **35**



Example 3

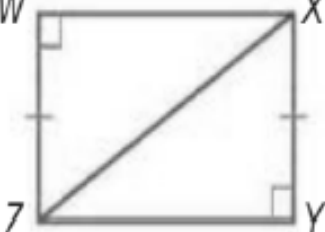
12. **DESIGN** Camila is designing a new image for her cell phone case. If $m\angle ABC = 35^\circ$, $m\angle BAC = 29^\circ$, and $\angle ACB \cong \angle DEB$, what is $m\angle DEB$? **116°**

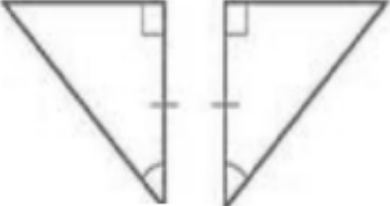
13. **CARPENTRY** Mr. Lewis is building a rustic dining table. Instead of having four legs, the table has a set of supports at each end. If $\angle PRQ \cong \angle TVU$ and $m\angle RPQ = 49^\circ$, what is $m\angle TVU$? **41°**

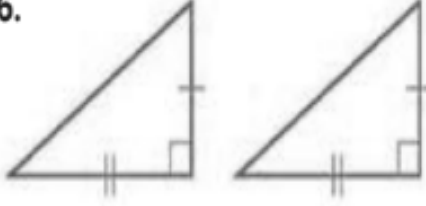


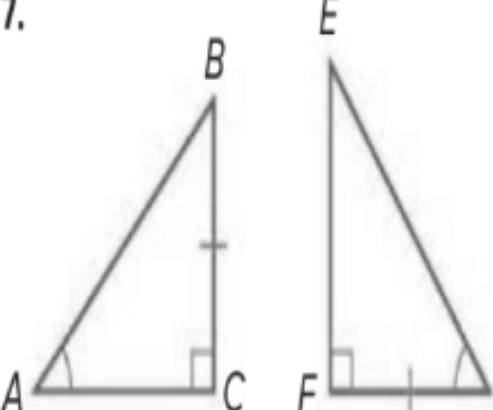
14	Use the right triangle congruence theorems to prove relationships in geometric figures	(4-9)	873
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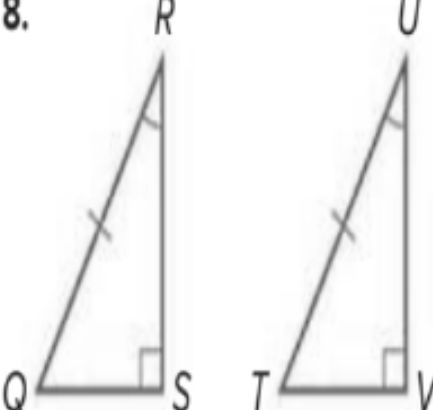
Determine whether each pair of triangles is congruent. If yes, include the theorem that applies.

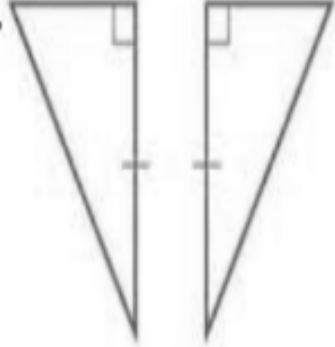
4. 

5. 

6. 

7. 

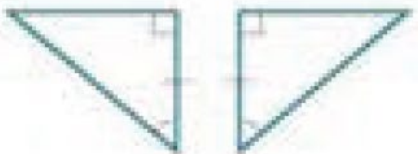
8. 

9. 

Determine whether each pair of triangles is congruent. If yes, include the theorem that applies.

4. 

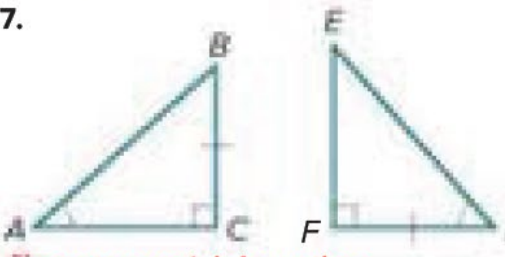
Yes; HL

5. 

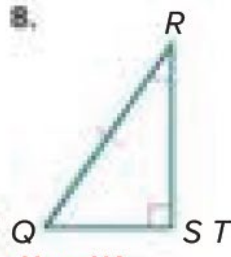
Yes; LA

6. 

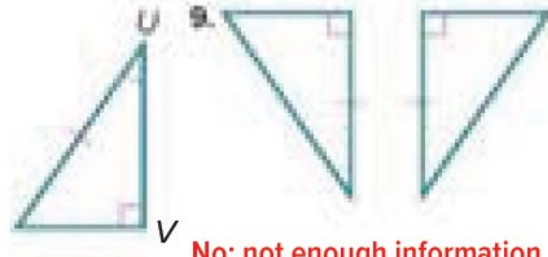
Yes; LL

7. 

No; not enough information

8. 

Yes; HA

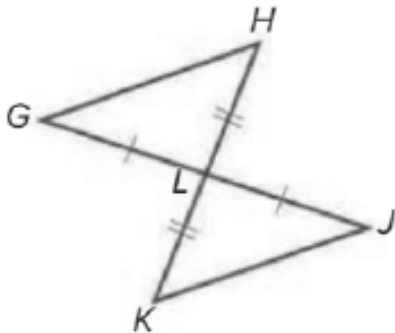
9. 

No; not enough information

15	Use the SAS congruence criterion for triangles to solve problems	(17-20)	861
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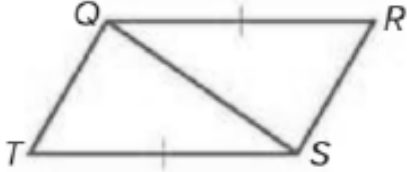
Explain whether there is enough information given in each figure to prove that the triangles are congruent using SSS or SAS.

17.



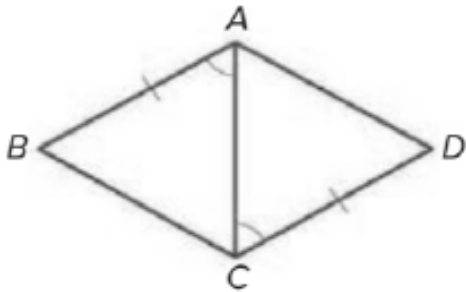
17. Yes; sample answer: $\angle GLH$ and $\angle JLK$ are vertical angles, so they are congruent. Therefore, $\triangle GLH \cong \triangle JLK$ by the SAS Congruence Postulate.

18.



18. No; sample answer: It is not known whether $\overline{QT} \cong \overline{SR}$, so you cannot use SSS, and none of the angles are known to be congruent, so you cannot use SAS.

19.



19. Yes; sample answer: The triangles share the side $\overline{AC}$, so they have two pairs of congruent sides. The given congruent angles are included angles, so $\triangle ABC \cong \triangle CDA$ by SAS.

20.



20. No; both triangles must have three pairs of congruent angles from the Third Angles Theorem, but no side lengths are known.

16	Use the AAS congruence criterion for triangles to prove relationships in geometric figures	theorem,Ex3(12-15)	865,866,869
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Example 3 Use AAS to Prove Triangles Congruent

Choose the correct statements and reasons to complete the flow proof.

Given: $\overline{RQ} \cong \overline{ST}$ and $\overline{RQ} \parallel \overline{ST}$

Prove: $\triangle RUQ \cong \triangle TUS$

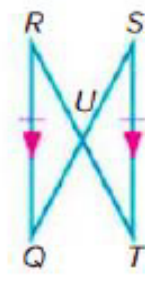
$\overline{RQ} \parallel \overline{ST}$
 Given

$\angle RQS \cong \angle TSQ$
 Alternate Interior Angles Theorem

$\overline{RQ} \cong \overline{ST}$
 Given

$\angle RUQ \cong \angle TUS$
 Vertical Angles Theorem

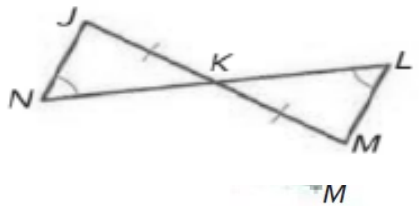
$\triangle RUQ \cong \triangle TUS$
 AAS



Write the specified type of proof.

12. flow proof

Given: $\overline{JK} \cong \overline{MK}$, $\angle N \cong \angle L$
 Prove: $\triangle JKN \cong \triangle MKL$

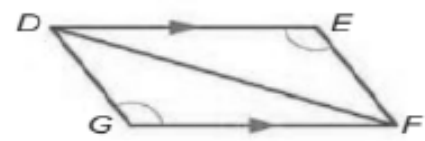


Proof:



13. paragraph proof

Given: $\overline{DE} \parallel \overline{FG}$, $\angle E \cong \angle G$
 Prove: $\triangle DFG \cong \triangle FDE$



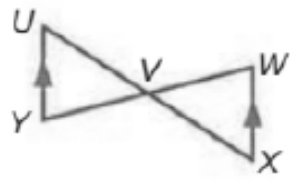
Proof:

It is given that $\angle E \cong \angle G$ and $\overline{DE} \parallel \overline{FG}$.
 By the Alternate Interior Angles Theorem, $\angle DFG \cong \angle FDE$. $\overline{DF} \cong \overline{DF}$ by the Reflexive Property of Congruence. Therefore, $\triangle DFG \cong \triangle FDE$ by AAS.

16	Use the AAS congruence criterion for triangles to prove relationships in geometric figures	theorem,Ex3(12-15)	865,866,869
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14. two-column proof

Given: V is the midpoint of $\overline{YW}$; $\overline{UY} \parallel \overline{XW}$,
Prove: $\triangle U V Y \cong \triangle X V W$



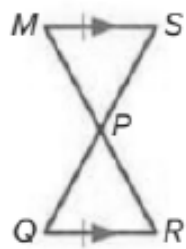
Proof:

Statements (Reasons)

1. V is the midpoint of $\overline{YW}$, and $\overline{UY} \parallel \overline{XW}$. (Given)
2. $\overline{YV} \cong \overline{VW}$ (Midpoint Theorem)
3. $\angle V W X \cong \angle V Y U$ (Alternate Interior Angles Thm.)
4. $\angle V U Y \cong \angle V X W$ (Alternate Interior Angles Thm.)
5. $\triangle U V Y \cong \triangle X V W$ (AAS)

15. two-column proof

Given: $\overline{MS} \cong \overline{RQ}$,
 $\overline{MS} \parallel \overline{RQ}$,
Prove: $\triangle M S P \cong \triangle R Q P$



Proof:

Statements (Reasons)

1. $\overline{MS} \cong \overline{RQ}$, $\overline{MS} \parallel \overline{RQ}$ (Given)
2. $\angle S P M \cong \angle Q P R$ (Vertical Angles Thm.)
3. $\angle S M P \cong \angle Q R P$ (Alternate Interior Angles Thm.)
4. $\triangle M S P \cong \triangle R Q P$ (AAS)

17	Solve problems involving isosceles triangles	Theorem, Ex2(5-7)	875,877-880
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Example 2 Find Missing Measures in Isosceles Triangles

Find $m\angle B$ and $m\angle C$.

Part A Determine side relationships.

Use the Distance Formula to determine the measures of the sides of $\triangle ABC$. The coordinates of $\triangle ABC$ are $A(0, 3)$, $B(-4, -2)$, and $C(4, -2)$.

$AB = \sqrt{[0 - (-4)]^2 + [3 - (-2)]^2}$ or $\sqrt{41}$ units

$AC = \sqrt{[0 - 4]^2 + [3 - (-2)]^2}$ or $\sqrt{41}$ units

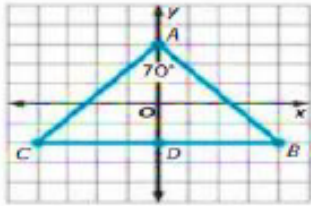
$CB = \sqrt{[4 - (-4)]^2 + [-2 - (-2)]^2}$ or 8 units

So, $\triangle ABC$ is an isosceles triangle with $\overline{AB} \cong \overline{AC}$.

Part B Determine the angle measures.

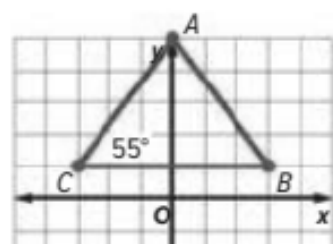
Because $\overline{AB} \cong \overline{AC}$, we know that $\angle C \cong \angle B$ by the Isosceles Triangle Theorem.

$m\angle A + m\angle B + m\angle C = 180^\circ$ Triangle Angle-Sum Theorem
 $m\angle A + 2m\angle B = 180^\circ$ Definition of congruent
 $70^\circ + 2m\angle B = 180^\circ$ Substitute.
 $m\angle B = m\angle C = 55^\circ$ Solve.



5. Refer to the figure.

- a. Find the measures of the sides of $\triangle ABC$. Show your work.
- b. Find $m\angle A$. Show your work.



5a. The coordinates of $\triangle ABC$ are $A(0, 5)$, $B(3, 1)$, and $C(-3, 1)$.

$AC = \sqrt{[0 - (-3)]^2 + (5-1)^2}$ or 5 units

$AB = \sqrt{(0-3)^2 + (5-1)^2}$ or 5 units

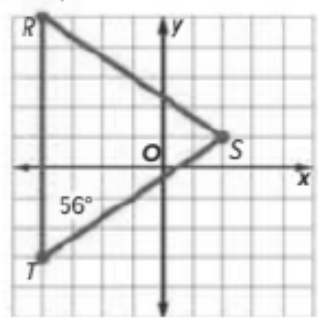
$BC = 6$ units

So, $\triangle ABC$ is an isosceles triangle with $\overline{AB} \cong \overline{AC}$.

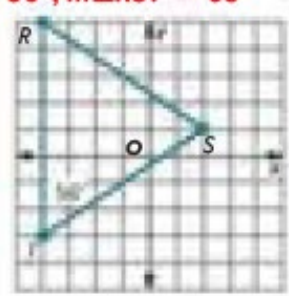
5b. Because $\overline{AB} \cong \overline{AC}$, we know that $\angle C \cong \angle B$ by the Isosceles Triangle Theorem.

$m\angle A + m\angle B + m\angle C = 180^\circ$ Triangle Angle-Sum Theorem
 $m\angle A + 2m\angle C = 180^\circ$ Definition of congruent
 $m\angle A + 2(55) = 180^\circ$ Substitute.
 $m\angle A + 110 = 180^\circ$ Multiply.
 $m\angle A = 70^\circ$ Solve.

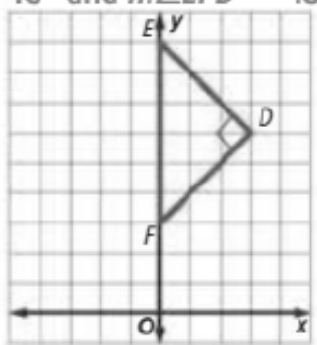
6. Find SR , ST , RT , $m\angle TRS$, and $m\angle RST$. Round to the nearest tenth, if necessary.
 $SR = 7.2$ units; $ST = 7.2$ units; $RT = 8$ units;
 $m\angle TRS = 56^\circ$; $m\angle RST = 68^\circ$



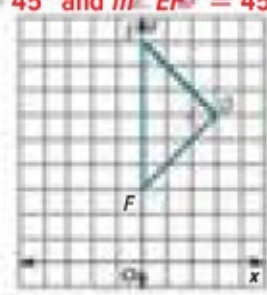
- Find SR , ST , RT , $m\angle TRS$ and $m\angle RST$. Round to the nearest tenth, if necessary.
 $SR = 7.2$ units; $ST = 7.2$ units; $RT = 8$ units;
 $m\angle TRS = 56^\circ$; $m\angle RST = 68^\circ$



7. Find the measures of $\angle DEF$ and $\angle EFD$.
 Round to the nearest tenth, if necessary.
 $m\angle DEF = 45^\circ$ and $m\angle EFD = 45^\circ$



7. Find the measures of $\angle DEF$ and $\angle EFD$.
 Round to the nearest tenth, if necessary.
 $m\angle DEF = 45^\circ$ and $m\angle EFD = 45^\circ$



7. $m\angle DEF = 45^\circ$ and $m\angle EFD = 45^\circ$

18	Write compound statements for conjunctions and disjunctions and determine truth values	Ex1(3,4,6)	711,717
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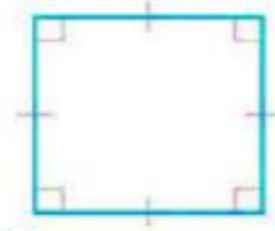
Example 1 Truth Values of Conjunctions

Use the statements to write a compound statement for each conjunction. Then find the truth values. Explain your reasoning.

p : The figure is a trapezoid.

q : The figure has four congruent sides.

r : The figure has four right angles.



a. p and r

p and r : The figure is a trapezoid, and the figure has four right angles. Although r is true, p is false. So, p and r is false.

b. $\sim p \wedge q$

$\sim p \wedge q$: The figure is not a trapezoid, and the figure has four congruent sides. Both $\sim p$ and q are true, so $\sim p \wedge q$ is true.

Use the statements to write a compound statement for each conjunction or disjunction. Then find the truth values. Explain your reasoning.

p : $-3 - 2 = -5$

q : Vertical angles are congruent.

r : $2 + 8 > 10$

3. $q \vee \sim r$

3. Vertical angles are congruent, or $2 + 8 \leq 10$; q is true, and $\sim r$ is true, so $q \vee \sim r$ is true.

4. $r \vee q$

4. $2 + 8 > 10$, or vertical angles are congruent; r is false, and q is true, so $r \vee q$ is true.

6. $\sim r \vee \sim p$

6. $2 + 8 \leq 10$ or $-3 - 2 \neq -5$; $\sim r$ is true, and $\sim p$ is false, so $\sim r \vee \sim p$ is true.

19	Write compound statements for conjunctions and disjunctions and determine truth values of statements	(1,2,5)	717
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Use the statements to write a compound statement for each conjunction or disjunction. Then find the truth values. Explain your reasoning.

- $p: -3 - 2 = -5$
 q : Vertical angles are congruent.
 $r: 2 + 8 > 10$

1. p and q

2. $p \wedge r$

1. $-3 - 2 = -5$, and vertical angles are congruent; p is true, and q is true, so p and q is true.

2. $p \wedge r$

2. $-3 - 2 = -5$, and $2 + 8 > 10$; p is true, and r is false, so $p \wedge r$ is false.

5. $\sim p \wedge \sim q$

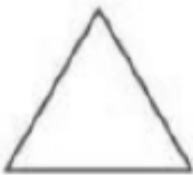
5. $-3 - 2 \neq -5$, and not all vertical angles are not congruent; $\sim p$ is false, and $\sim q$ is false, so $\sim p \wedge \sim q$ is false.

20	Use rotational symmetry to describe the rotations that carry a figure onto itself	(1-6)	829
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Example 1

Determine whether each figure has a line of symmetry. If so, draw the lines of symmetry and state how many lines of symmetry it has.

1.



2.



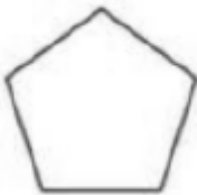
3.



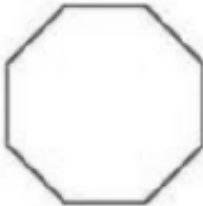
4.



5.



6.



Determine whether each figure has a line of symmetry. If so, draw the lines of symmetry and state how many lines of symmetry it has. 1–2, 5–6. See margin for graphs.

1. yes; 3



2. yes; 2



3. no



4. no



5. yes; 5

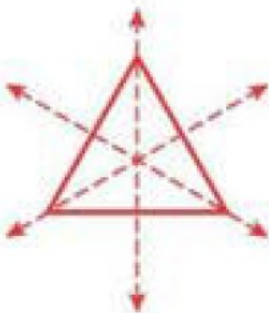


6. yes; 8

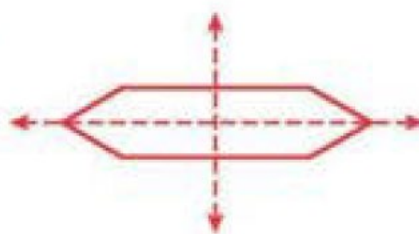


Answers

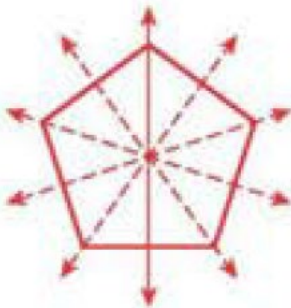
1.



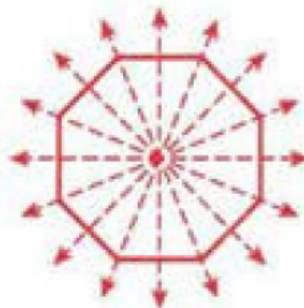
2.



5.



6.



21	Use ASA congruence criterion for triangles to solve problems and prove relationships in geometric figure	Ex1(1-6)	863,867
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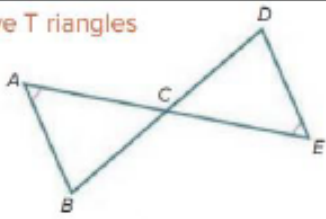
Example 1 Use ASA to Prove T riangles Congruent

Complete the two-column proof.

Given: $\angle BAC \cong \angle DEC$;
 $\overline{BD}$ bisects $\overline{AE}$.

Prove: $\triangle ACB \cong \triangle ECD$

Statements	Reasons
1. $\angle BAC \cong \angle DEC$	1. Given
2. $\overline{BD}$ bisects $\overline{AE}$	2. Given
3. $\overline{AC} \cong \overline{EC}$	3. Definition of segment bisector
4. $\angle ACB \cong \angle ECD$	4. Vertical Angles Theorem
5. $\triangle ACB \cong \triangle ECD$	5. ASA

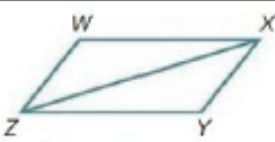


Complete the two-column proof.

Given: $\overline{WX} \parallel \overline{YZ}$ and $\overline{WZ} \parallel \overline{YX}$

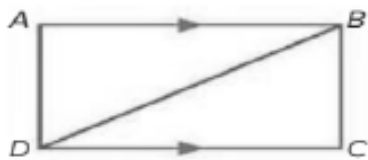
Prove: $\triangle WXZ \cong \triangle YZX$

Statements	Reasons
1. ?	1. Given
2. $\overline{WZ} \parallel \overline{YX}$	2. ?
3. $\angle WXZ \cong \angle YZX$	3. ?
4. ?	4. Alternate Interior Angles Theorem
5. ?	5. Reflexive Property of Congruence
6. $\triangle WXZ \cong \triangle YZX$	6. ?



1. two-column proof

Given: $\overline{AB} \parallel \overline{CD}$, $\angle CBD \cong \angle ADB$
Prove: $\triangle ABD \cong \triangle CDB$

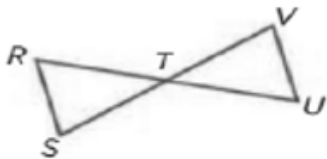


1. Proof:

- Statements (Reasons)
- 1. $\overline{AB} \parallel \overline{CD}$ (Given)
 - 2. $\angle CBD \cong \angle ADB$ (Given)
 - 3. $\angle ABD \cong \angle CDB$ (Alternate Interior Angles Theorem)
 - 4. $\overline{BD} \cong \overline{BD}$ (Reflexive Property of Congruence)
 - 5. $\triangle ABD \cong \triangle CDB$ (ASA)

2. two-column proof

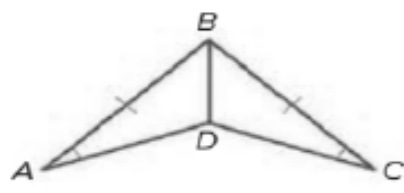
Given: $\angle S \cong \angle V$, and T is the midpoint of $\overline{SV}$.
Prove: $\triangle RTS \cong \triangle UTV$



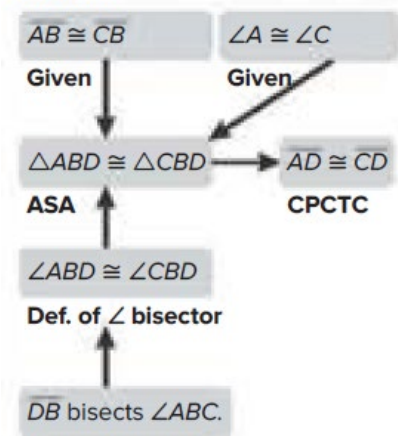
3. flow proof

Given: $\overline{AB} \cong \overline{CB}$, $\angle A \cong \angle C$, and
 $\overline{DB}$ bisects $\angle ABC$.

Prove: $\overline{AD} \cong \overline{CD}$



3. Proof:



4. paragraph proof

Given: $\overline{CD}$ bisects $\overline{AE}$, $\overline{AB} \parallel \overline{CD}$, and
 $\angle E \cong \angle BCA$.

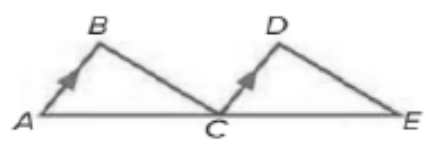
Prove: $\triangle ABC \cong \triangle CDE$



4. paragraph proof

Given: $\overline{CD}$ bisects $\overline{AE}$, $\overline{AB} \parallel \overline{CD}$, and
 $\angle E \cong \angle BCA$.

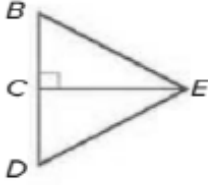
Prove: $\triangle ABC \cong \triangle CDE$



5. paragraph proof

Given: $\overline{CE}$ bisects $\angle BED$; $\angle BCE$
 and $\angle ECD$ are right angles.

Prove: $\triangle ECB \cong \triangle ECD$

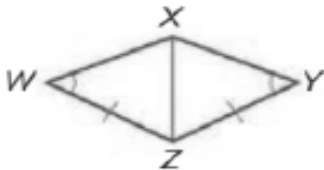


5. Proof: We are given that $\overline{CE}$ bisects $\angle BED$ and that $\angle BCE$ and $\angle ECD$ are right angles. Because all right angles are congruent, $\angle BCE \cong \angle ECD$. By the definition of angle bisector, $\angle BEC \cong \angle DEC$. The Reflexive Property tells us that $\overline{EC} \cong \overline{EC}$. By the Angle-Side-Angle Congruence Postulate, $\triangle ECB \cong \triangle ECD$.

6. paragraph proof

Given: $\angle W \cong \angle Y$, $\overline{WZ} \cong \overline{YZ}$ and
 $\overline{XZ}$ bisects $\angle WZY$.

Prove: $\triangle XWZ \cong \triangle XYZ$

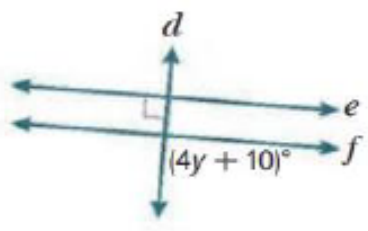


22	Apply angle relationship theorems to identify parallel lines and find missing values	Ex2(7-12)	777,779
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Example 2 Use Angle Relationships

Find the value of y so that $e \parallel f$.

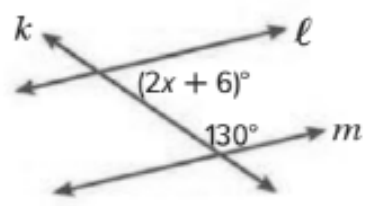
From the figure, you know that line d is perpendicular to line e . For lines e and f to be parallel, line f must also be perpendicular to line d . If line f is perpendicular to line d , then $(4y + 10) = 90^\circ$. Solve for y .



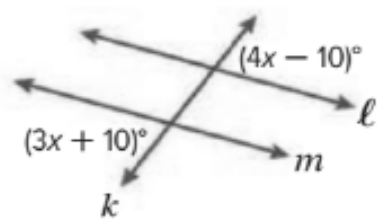
$90 = 4y + 10$ Definition of perpendicular
 $80 = 4y$ Subtract 10 from each side.
 $20 = y$ Divide each side by 4.

Find the value of x so that $\ell \parallel m$.

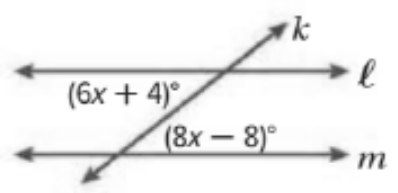
7.



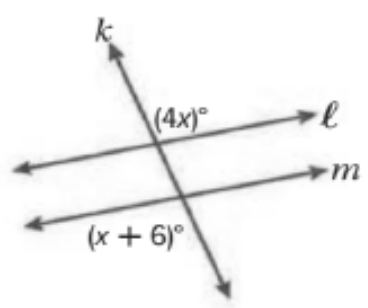
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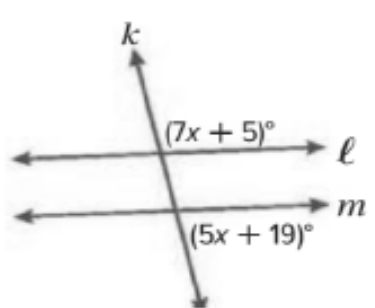
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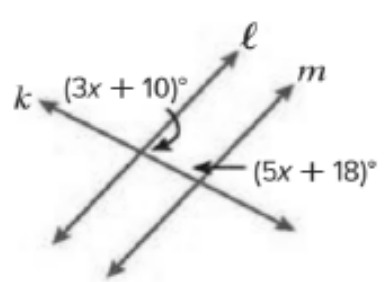
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11.

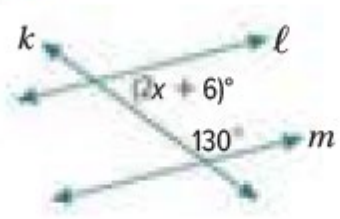


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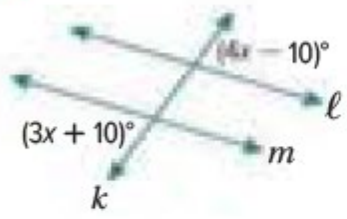


Find the value of x so that $\ell \parallel m$.

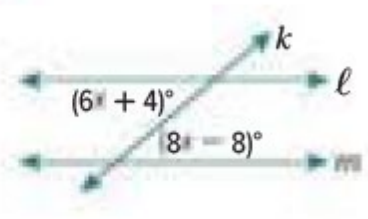
7. 22



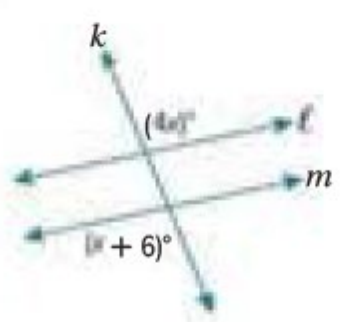
8. 20



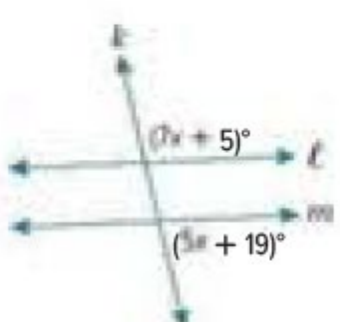
9. 8



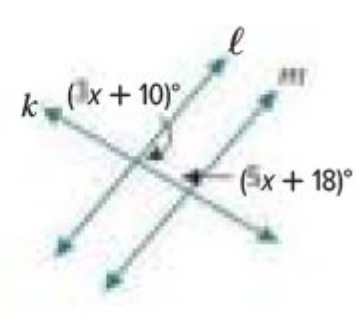
10. 2



11. 13



12. 19



23	Use the SSS congruence criterion for triangles to solve problems and prove relationships in geometric figures	Ex1(17-20)	855, 861
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Example 1 Use SSS to Prove Triangles Congruent
 Write a flow proof to show that $\triangle QRT \cong \triangle SRT$.

Given: $\triangle QRS$ is isosceles with $\overline{QR} \cong \overline{SR}$. $\overline{RT}$ bisects $\overline{QS}$ at point T .

Prove: $\triangle QRT \cong \triangle SRT$

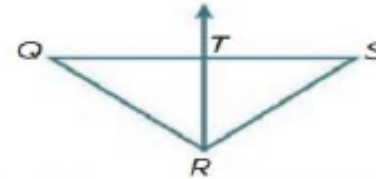
Proof:

$\triangle QRS$ is isosceles with $\overline{QR} \cong \overline{SR}$.
Given

$\overline{RT}$ bisects $\overline{QS}$ at point T .
Given

$\overline{QT} \cong \overline{ST}$
Definition of segment bisector

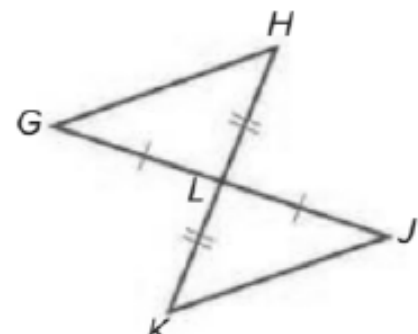
$\triangle QRT \cong \triangle SRT$
SSS



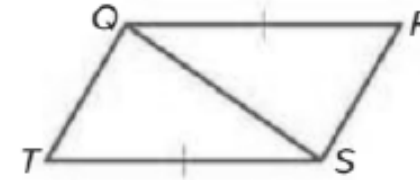
$\overline{RT} \cong \overline{RT}$
Reflexive Property of Congruence

Explain whether there is enough information given in each figure to prove that the triangles are congruent using SSS or SAS.

17.

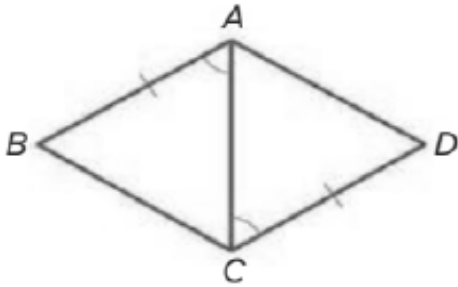


18.



17. Yes; sample answer: $\angle GLH$ and $\angle JLK$ are vertical angles, so they are congruent. Therefore, $\triangle GLH \cong \triangle JLK$ by the SAS Congruence Postulate.
18. No; sample answer: It is not known whether $\overline{QT} \cong \overline{SR}$, so you cannot use SSS, and none of the angles are known to be congruent, so you cannot use SAS.

19.



20.

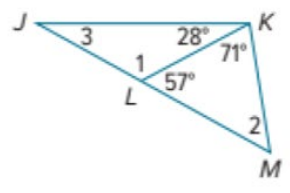


19. Yes; sample answer: The triangles share the side $\overline{AC}$, so they have two pairs of congruent sides. The given congruent angles are included angles, so $\triangle ABC \cong \triangle CDA$ by SAS.
20. No; both triangles must have three pairs of congruent angles from the Third Angles Theorem, but no side lengths are known.

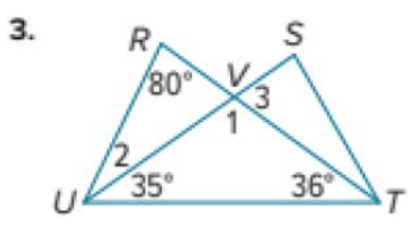
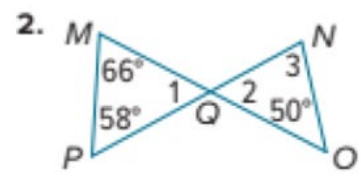
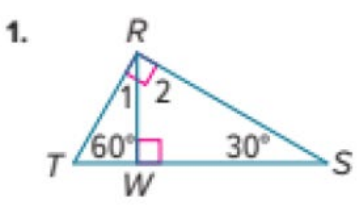
24	Prove the Triangle Angle-Sum Theorem and apply the theorem to solve problems	Ex1(1-4)	839,843
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Apply Example 1 Use the Triangle Angle-Sum Theorem

Find the measure of each numbered angle.

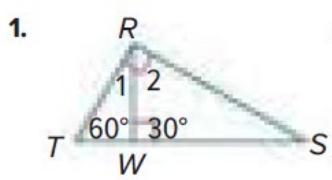


Find the measure of each numbered angle.

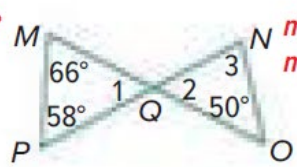


Example 1

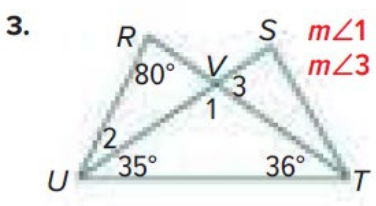
Find the measure of each numbered angle.



$m\angle 1 = 30^\circ, m\angle 2 = 62^\circ$



$m\angle 1 = 56^\circ, m\angle 2 = 56^\circ$
 $m\angle 3 = 74^\circ$



$m\angle 1 = 109^\circ, m\angle 2 = 29^\circ,$
 $m\angle 3 = 71^\circ$



$m\angle 1 = m\angle 2 = 17^\circ$

25	Identify hypotheses and conclusions of conditional statements and write related conditionals	Ex3(12-17)	713,717
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Example 3 Identify the Hypothesis and Conclusion

Identify the hypothesis and conclusion of each conditional statement.

a. If a polygon has six sides, then it is a hexagon.

Hypothesis: A polygon has six sides.

Conclusion: The polygon is a hexagon.

b. Another performance will be scheduled if the first one is sold out.

Notice that the word *if* appears in the second portion of the sentence.

Hypothesis: The first performance is sold out.

Conclusion: Another performance will be scheduled.

Identify the hypothesis and conclusion for each conditional statement. Then write each statement in if-then form.

12. Get a free water bottle with a one-year membership.
13. Everybody at the party received a gift.
14. The intersection of two planes is a line.
15. The area of a circle is πr^2
16. Collinear points lie on the same line.
17. A right angle measures 90 degrees.

12. H: you buy a 1-year membership; C: you get a free water bottle; If you buy a 1-year membership, then you get a free water bottle.
13. H: you were at the party; C: you received a gift; If you were at the party, then you received a gift.
14. H: two planes intersect; C: the intersection is a line; If two planes intersect, then the intersection is a line.
15. H: a figure is a circle; C: the area is πr^2 ; If a figure is a circle, then the area is πr^2 .
16. H: points are collinear; C: they lie on the same line; If points are collinear, then they lie on the same line.
17. H: an angle is right; C: the angle measures 90° ; If an angle is right, then the angle measures 90° .