

سلسلة الطارق في الرياضيات - هيكل Reveal



تم تحميل هذا الملف من موقع المناهج الإماراتية

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

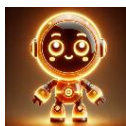
تاريخ إضافة الملف على موقع المناهج: 00:15:01 2026-06-22

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

المزيد من مادة
رياضيات:

إعداد: طارق علي

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

Math Coverage Module 12, 13 and 14

1

مراجعة محلولة للترم الثالث

2

مذكرة مراجعة للترم الثالث

3

الحقيبة التدريبية كراسة تدريبية

4

أسئلة متوقعة للامتحان 2026م بدون حل

5

الطارق

سلسلة

الرياضيات

منطقة طارق أكاديمي للرياضيات

Tarek Academy

هيكل 9 متقدم ريفيل 2026

مرفع تاسع (متقدم) Reveal

طارق علي

أستاذ الرياضيات

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Q1-MCQ 12.1

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.

A) If $n = -12$, then $-n = -(-12) = 12$. Since 12 is positive, the conjecture is false.

B) If $n = -12$, then $-n$ stays negative.

C) $n = -12$ is not a real number.

D) Negative numbers cannot be used as counterexamples.

مثال مضاد
أي
عكس
- → +

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

A) The angles are vertical but not congruent.

B) The angles are not congruent and not vertical.

C) The angles are congruent, but they are not vertical angles.

D) The angles are supplementary.



18. Prime Number Conjecture

← من لتي تبقي : هو فليس وا فقه Prime

Conjecture: If n is a prime number, then $n + 1$ is not prime.

Which of the following is a counterexample to this conjecture?

A) $n = 3$

$$n+1 = 3+1 = 4 \text{ not prime}$$

B) $n = 2$

$$n+1 = 2+1 = 3 \text{ prime}$$

C) $n = 5$

D) $n = 11$

Prime
2
3 ✓
5
7
11
13
17
23

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19. Integer Conjecture

Conjecture: If x is an integer, then $-x$ is positive. $\rightarrow$ ليس $\Rightarrow$ Negative.

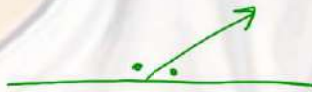
Which value of x serves as a counterexample?

- A) $x = -5 \rightarrow -(-5) = 5 \rightarrow + \alpha$
 B) $x = -10 \rightarrow -(-10) = 10 \rightarrow + \alpha$
 C) $x = 4 \rightarrow -(4) = -4 \checkmark$
 D) $x = -1$

20. Supplementary Angles Conjecture

Conjecture: If $\angle 2$ and $\angle 3$ are supplementary angles, then $\angle 2$ and $\angle 3$ form a linear pair. 180°

Why is this conjecture false? 180°

- A) Because supplementary angles must sum to 90° . α
 B) Because angles in a linear pair are never supplementary. 
 C) Because supplementary angles can be non-adjacent (separated), whereas a linear pair must be adjacent.
 D) Because vertical angles are also supplementary.

21. Points Conjecture

Conjecture: If you have three points A , B , and C , then A , B , and C are noncollinear.

Which situation provides a counterexample to this conjecture?

- A) Points A , B , and C form a triangle.
 B) Points A , B , and C all lie on the same straight line.
 C) Point B is the vertex of an angle.
 D) Points A and C are the same point.

not on the same line.

$\downarrow$ ليس

collinear on the same line

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22. Pythagorean Conjecture



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

Is this conjecture true or false?

A) True; this is the Converse of the Pythagorean Theorem.

B) False; this only works if the triangle is equilateral.

C) False; $(AC)^2$ must be the shortest side.

D) False; the sum must equal zero.

23. Rectangle Area Conjecture

Conjecture: If the area of a rectangle is 20 square meters, then the length is 10 meters and the width is 2 meters.

$$l = 10, w = 2 \rightarrow A = l \times w = 10 \times 2 = 20$$

Which of the following is a valid counterexample?

A) A rectangle with length 10m and width 2m. Same d

B) A rectangle with length 20m and width 1m. $20 \times 1 = 20$

C) A square with side length 5m.

D) A triangle with area 20 square meters.

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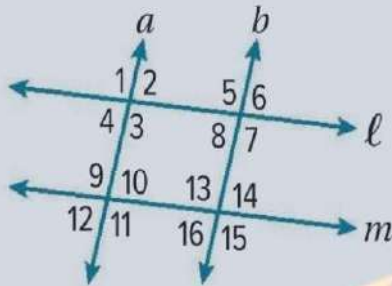
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* Alternate $\angle$ interior $\rightarrow 4, 10$
 exterior $\rightarrow 6, 16$

* Corresponding (same side in, out) $\rightarrow 5, 13$

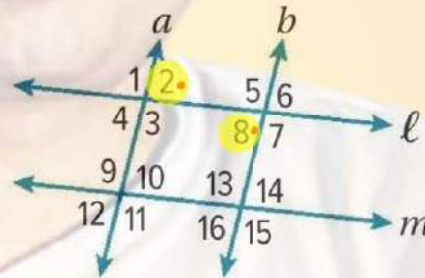
* Consecutive interior (Same side, in) $\rightarrow 8, 13$

Q2-MCQ 12.9

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. $\angle 2 \cong \angle 8$



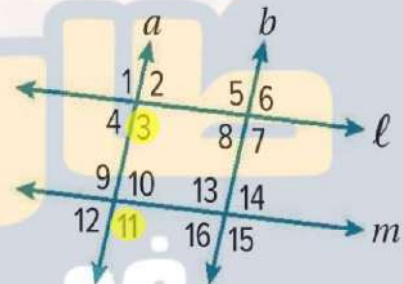
A) Alternate Exterior Angles Converse.

☒ B) Alternate Interior Angles Converse.

C) Converse of the Corresponding Angles Theorem.

D) not parallel.

b $\angle 3 \cong \angle 11$



A) Alternate Exterior Angles Converse.

B) Alternate Interior Angles Converse.

☒ C) Converse of the Corresponding Angles Theorem.

D) not parallel.



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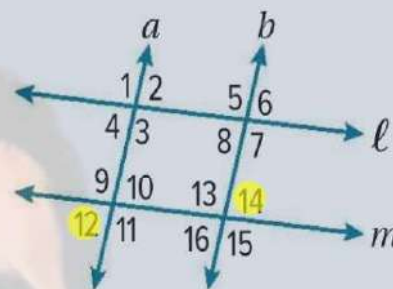
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c. $\angle 12 \cong \angle 14$

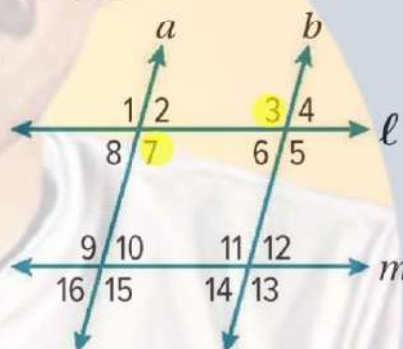
- ☒ A) Alternate Exterior Angles Converse.
☐ B) Alternate Interior Angles Converse.
☐ C) Converse of the Corresponding Angles Theorem.
☐ D) not parallel.



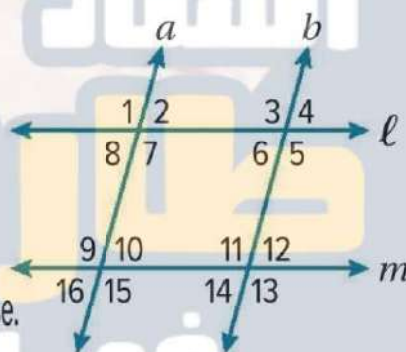
Use the given information to determine which lines, if any, are parallel. State the postulate or theorem that justifies your answer.

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

- a) Lines a and b are parallel by the Consecutive Interior Angles Converse.
b) Lines a and b are parallel by the Alternate Exterior Angles Converse.
☒ c) Lines b and a are parallel by the Alternate Interior Angles Converse.
d) Lines l and m are parallel by the Corresponding Angles Converse.

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

- a) Lines a and b are parallel by the Alternate Interior Angles Converse.
b) Lines l and m are parallel by the Alternate Interior Angles Converse.
☒ c) Lines a and b are parallel by the Corresponding Angles Converse.
d) Lines l and m are parallel by the Consecutive Interior Angles Converse.



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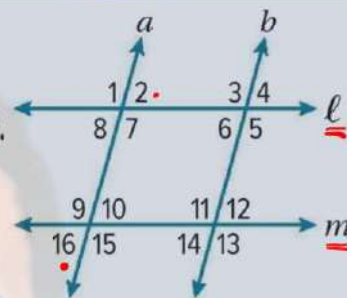
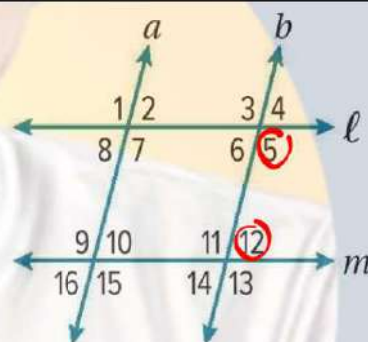
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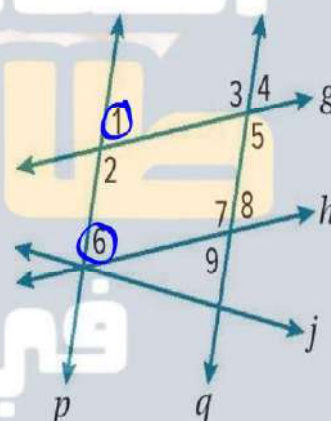
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3. $\angle 2 \cong \angle 16$ a) Lines a and b are parallel by the Alternate Exterior Angles Converse.b) Lines l and m are parallel by the Corresponding Angles Converse.c) Lines a and b are parallel by the Corresponding Angles Converse.✓ d) Lines l and m are parallel by the Alternate Exterior Angles Converse.4. $m\angle 5 + m\angle 12 = 180^\circ$ a) Lines a and b are parallel by the Consecutive Interior Angles Converse.b) Lines l and m are parallel by the Alternate Interior Angles Converse.c) Lines a and b are parallel by the Alternate Exterior Angles Converse.✓ d) Lines l and m are parallel by the Consecutive Interior Angles Converse.

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

5. $\angle 1 \cong \angle 6$ a) Lines g and h are parallel by the Alternate Interior Angles Converse.b) Lines p and q are parallel by the Alternate Interior Angles Converse.✓ c) Lines g and h are parallel by the Corresponding Angles Converse.d) Lines p and q are parallel by the Consecutive Interior Angles Converse.

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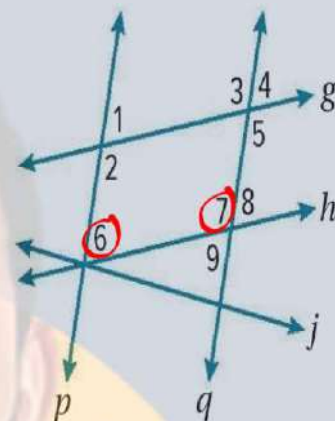
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Given the following information, determine which lines, if any, are parallel. State the theorem that justifies your answer.

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

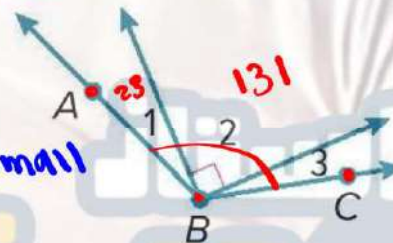


- a) Lines p and q are parallel by the Consecutive Interior Angles Converse.
 b) Lines p and q are parallel by the Alternate Interior Angles Converse.
 c) Lines g and h are parallel by the Alternate Exterior Angles Converse.
 d) Lines p and q are parallel by the Corresponding Angles Converse.

Q3-MCQ 12.6

Example 1 Angle Addition Postulate

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



A.20

✓ B.18

C.25

D.13

Big = Sum of Small

$$m\angle 3 = 131 - 23 - 90 = 18$$



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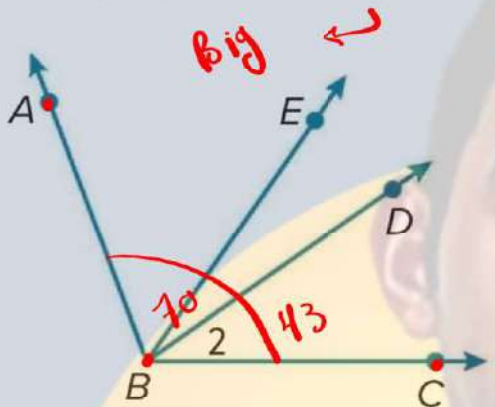
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Find the measure of each angle.

1. Find $m\angle ABC$ if $m\angle ABD = 70^\circ$ and $m\angle DBC = 43^\circ$.



A.20

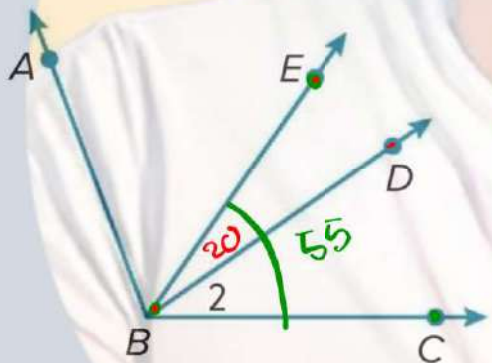
B.18

C.25

D.113

$$43 + 70 = 113$$

2. If $m\angle EBC = 55^\circ$ and $m\angle EBD = 20^\circ$, find $m\angle 2$. → Small → (-)



A.20

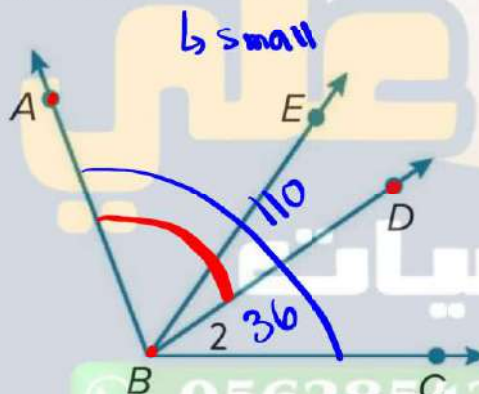
B.35

C.25

D.13

$$55 - 20$$

3. Find $m\angle ABD$ if $m\angle ABC = 110^\circ$ and $m\angle 2 = 36^\circ$.



A.74

B.18

C.25

D.13

$$110 - 36$$

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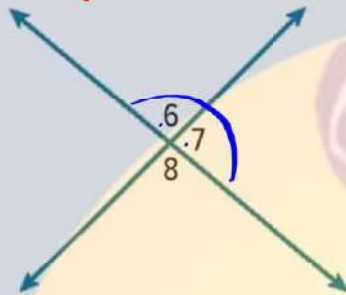
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Q4 -MCQ 12.6

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

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



a) $m\angle 6 = 73^\circ, m\angle 7 = 73^\circ, m\angle 8 = 107^\circ$

☒ b) $m\angle 6 = 73^\circ, m\angle 7 = 107^\circ, m\angle 8 = 73^\circ$

c) $m\angle 6 = 107^\circ, m\angle 7 = 73^\circ, m\angle 8 = 107^\circ$

d) $m\angle 6 = 107^\circ, m\angle 7 = 107^\circ, m\angle 8 = 73^\circ$

$m\angle 6 + m\angle 7 = 180$ Supplement

$2x - 21 + 3x - 34 = 180$

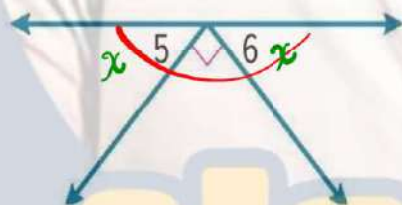
Shift $\rightarrow$ solve $\rightarrow = \boxed{x = 47}$

* $m\angle 6 = 2(47) - 21 = 73^\circ$

* $m\angle 7 = 3(47) - 34 = 107^\circ$

* $m\angle 8 = m\angle 6$ Vertical = 73°

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



a) $m\angle 5 = 90^\circ, m\angle 6 = 90^\circ$

b) $m\angle 5 = 30^\circ, m\angle 6 = 30^\circ$

☒ c) $m\angle 5 = 45^\circ, m\angle 6 = 45^\circ$

d) $m\angle 5 = 60^\circ, m\angle 6 = 60^\circ$

Supplement

* $m\angle 5 + 90 + m\angle 6 = 180$

$x + 90 + x = 180$

$m\angle 5 = m\angle 6 = x = 45$

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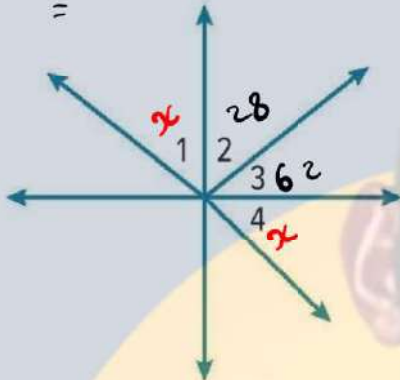
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15. $\angle 2$ and $\angle 3$ are complementary.
 $\angle 1 \cong \angle 4$ and $m\angle 2 = 28^\circ$.



$$A. m\angle 1 = m\angle 4 = 45, m\angle 3 = 60$$

$$B. m\angle 1 = m\angle 4 = 25, m\angle 3 = 60$$

$$C. m\angle 1 = m\angle 4 = 45, m\angle 3 = 62$$

$$D. m\angle 1 = m\angle 4 = 45, m\angle 3 = 59$$

$$* m\angle 2 + m\angle 3 = 90$$

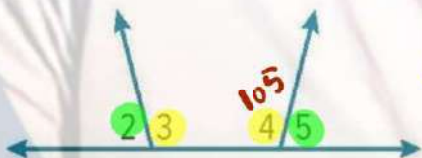
$$28 + m\angle 3 = 90$$

$$\Rightarrow m\angle 3 = 90 - 28 = 62^\circ$$

$$\rightarrow x + x + 28 + 62 = 180 \quad * \text{Supplement}$$

$$m\angle 1 = m\angle 4 = x = 45^\circ$$

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



$$a) m\angle 2 = 75^\circ, m\angle 3 = 75^\circ, m\angle 5 = 105^\circ$$

$$b) m\angle 2 = 105^\circ, m\angle 3 = 75^\circ, m\angle 5 = 105^\circ$$

$$c) m\angle 2 = 75^\circ, m\angle 3 = 105^\circ, m\angle 5 = 75^\circ$$

$$d) m\angle 2 = 105^\circ, m\angle 3 = 105^\circ, m\angle 5 = 75^\circ$$

$$* m\angle 5 = 180 - 105 = 75^\circ \quad \text{Supplement}$$

$$m\angle 2 = m\angle 5 = 75$$

$$m\angle 3 = m\angle 4 = 105$$

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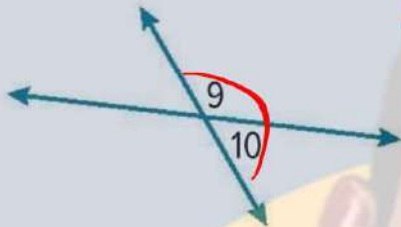
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17. $m\angle 9 = (3x + 12)^\circ$
 $m\angle 10 = (x - 24)^\circ$



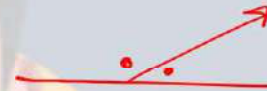
a) $m\angle 9 = 100^\circ, m\angle 10 = 80^\circ$

b) $m\angle 9 = 156^\circ, m\angle 10 = 24^\circ$

c) $m\angle 9 = 90^\circ, m\angle 10 = 90^\circ$

d) $m\angle 9 = 120^\circ, m\angle 10 = 60^\circ$

Supplement



$* 3x + 12 + x - 24 = 180$

$x = 48$

$* m\angle 9 = 3(48) + 12 = 156$

$* m\angle 10 = 48 - 24 = 24$

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



a) $m\angle 3 = 100^\circ, m\angle 4 = 110^\circ$

b) $m\angle 3 = 113^\circ, m\angle 4 = 113^\circ$

c) $m\angle 3 = 90^\circ, m\angle 4 = 80^\circ$

d) $m\angle 3 = 120^\circ, m\angle 4 = 100^\circ$

Vertical are (=)

$2x + 23 = 5x - 112$

$x = 45$

$* m\angle 3 = 2(45) + 23 = 113^\circ$

$* m\angle 4 = 5(45) - 112 = 113^\circ$

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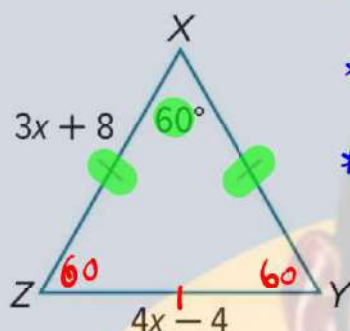
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8. Find the value of x .

Q5 - MCQ 14.6



* equiangler

* equilateral

- a) $x \approx 16.6$

- b) $x \approx 20.8$

- c) $x \approx 28.0$

- ~~d) $x \approx 12$~~

2 sides are =

 $\sqrt{81}$

$$3x + 8 = 4x - 4$$

$$x = 12$$

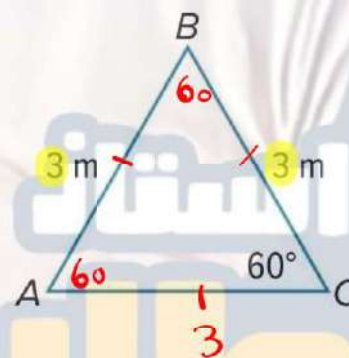
9. Find $m\angle B$ and AC .

- ~~a) $m\angle B = 60^\circ$, $AC = 3\text{ m}$~~

- b) $m\angle B = 30^\circ, AC = 3\sqrt{3} \text{ m}$

- c) $m\angle B = 60^\circ, AC = 3\sqrt{3} \text{ m}$

- d) $m\angle B = 30^\circ, AC = 3 \text{ m}$



if I have 2 sides are $(=)$ and angle

60 Then (i) All sides are =

② All Angles = 60°

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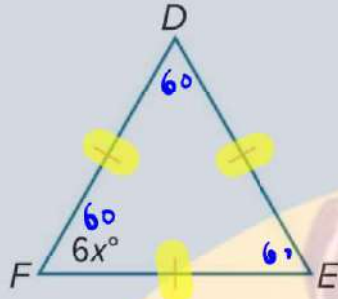
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10. Find the value of x .

$$6x = 60 \rightarrow x = \frac{60}{6} = 10$$

a) $x = 10$

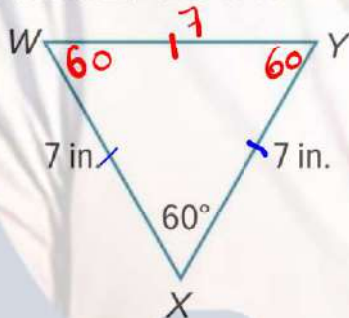
b) $x = 20$

c) $x = 30$

d) $x = 15$

if All
Sides
are
(=)

every
Angle
= 60°

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

a) $m\angle Y = 60^\circ$, $WY = 7$ in.

b) $m\angle Y = 30^\circ$, $WY = 7\sqrt{3}$ in.

c) $m\angle Y = 60^\circ$, $WY = 14$ in.

d) $m\angle Y = 120^\circ$, $WY = 7$ in.

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a) $x=12$

b) $x=30$

c) $x=20$

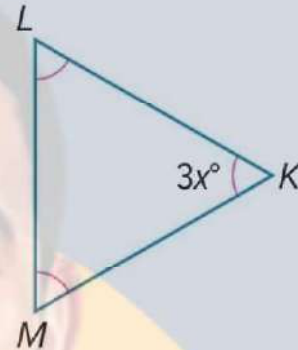
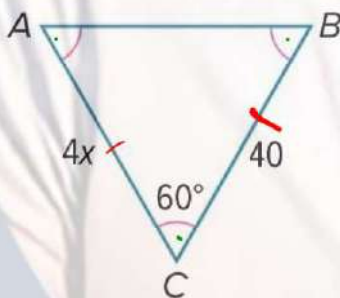
d) $x=60$

if All

Angles are =

then each = 60°

$$3x = 60 \rightarrow x = \frac{60}{3} = 20$$

12. Find the value of x .13. Find the value of x .

a) $x=12$

b) $x=10$

c) $x=20$

d) $x=60$

All Angles are = 60°

All Sides are =

$$4x = 40$$

$$x = \frac{40}{4} = 10$$



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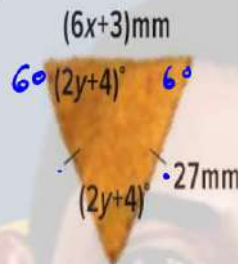
9

متقدم



14. **CHIPS** Some tortilla chips can be modeled by a triangle.

- a. Solve for x .
b. Solve for y .



a) $x=12, y=28$

☒ b) $x=4, y=28$

c) $x=20, y=20$

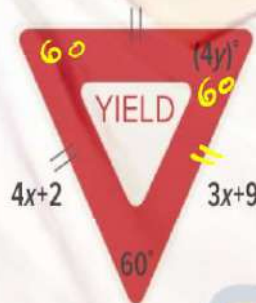
d) $x=60, y=4$

* $6x+3 = 27 \rightarrow \boxed{x = 4}$

* $2y+4 = 60 \rightarrow \boxed{y = 28}$

15. **SIGNS** Yield signs notify drivers to slow down and allow oncoming vehicles to proceed first.

- a. Solve for x .
b. Solve for y .



a) $x=12, y=28$

b) $x=4, y=28$

c) $x=20, y=20$

☒ d) $x=7, y=15$

* $3x+9 = 4x+2 \rightarrow \boxed{x = 7}$

* $4y = 60 \rightarrow \boxed{y = 15}$

$\boxed{y = 15}$



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Q6-MCQ 12-8

Postulate 12.12: Slope Criteria for Parallel and Perpendicular Lines

Slopes of Parallel Lines

are equal

$$m_1 = m_2$$

Slopes of Perpendicular Lines

$$m_1 \cdot m_2 = -1$$

Flip
change sign

$$m (\text{slope}) = \frac{y_2 - y_1}{x_2 - x_1} \quad \text{or} \quad \frac{y_1 - y_2}{x_1 - x_2}$$

Key Concept • Nonvertical Line Equations

* The slope-intercept form of a linear equation is $y = mx + b$, where m is the slope of the line and b is the y-intercept.

$$y = mx + b \quad y = 3x + 8$$

slope

y-intercept

* The point-slope form of a linear equation is $y - y_1 = m(x - x_1)$, where (x_1, y_1) is any point on the line and m is the slope of the line.

$$y - 5 = -2(x - 3)$$

point (3, 5)

slope

Horizontal

Vertical

$$y = \text{عدد}$$

$$x = \text{عدد}$$

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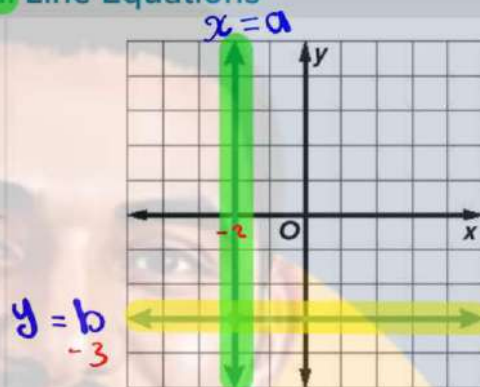
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Key Concept • Horizontal and Vertical Line Equations

The equation of a horizontal line is $y = b$, where b is the y-intercept of the line.

The equation of a vertical line is $x = a$, where a is the x-intercept of the line.

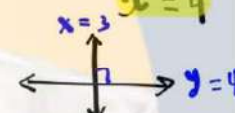


مثال

$$y = -2, x = -3$$

ex $y = 3$
 $x = 4$

are Perpendicular

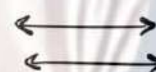


(Same)

$$y = 3, y = -2$$

ex $y = 3$
 $y = -2$

are Parallel



(Same)

$$x = 1, x = 3$$

ex $x = 1$
 $x = 3$

are Parallel



if

$$1) m_1 \neq m_2$$

and

$$2) m_1 \cdot m_2 \neq -1$$

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Neither

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

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

☒ A) Parallel

$$* m_{AB} = \frac{4 - 5}{4 - 1} = -\frac{1}{3}$$

☐ B) Perpendicular

$$* m_{CD} = \frac{-5 - (-10)}{-6 - 9} = -\frac{1}{3}$$

☐ C) Neither

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

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

☒ A) Parallel

$$* m_{AB} = \frac{19 - (-9)}{8 - (-6)} = 2$$

☐ B) Perpendicular

$$* m_{CD} = \frac{0 - (-4)}{2 - 0} = 2$$

☐ C) Neither

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

☐ A) Parallel

$$* m_{AB} = \frac{1 - 2}{-3 - 4} = \frac{1}{7}$$

☐ B) Perpendicular

$$* m_{CD} = \frac{8 - 0}{-10 - 6} = -\frac{1}{2} \neq -1$$

☒ C) Neither

$$\frac{1}{7} \times -\frac{1}{2} = -\frac{1}{14} \neq -1$$

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

A) Parallel

$$* m_{AB} = \frac{-1 - (-2)}{4 - 8} = -\frac{1}{4}$$

✓ B) Perpendicular

$$* m_{CD} = \frac{-9 - 11}{-2 - 3} = 4$$

C) Neither

$$-\frac{1}{4} \times 4 = -1$$

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

A) Parallel

$$* m_{AB} = \frac{3 - 4}{4 - 8} = \frac{1}{4}$$

✓ B) Perpendicular

$$* m_{CD} = \frac{-1 - (-9)}{2 - 4} = -4$$

C) Neither

$$\frac{1}{4} \times -4 = -1$$

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

A) Parallel

$$* m_{AB} = \frac{-8 - (-2)}{-2 - 4} = 1$$

B) Perpendicular

$$* m_{CD} = \frac{5 - 6}{8 - 4} = -\frac{1}{4}$$

✓ C) Neither

$$1 \times -\frac{1}{4} = -\frac{1}{4} \neq -1$$

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Q7-MCQ 12-10

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

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

$$d = |y_2 - y_1|$$

A) 6 units $d = |-1 - 7|$

☒ B) 8 units $= |-8|$

C) 7 units $= 8$

D) 1 unit

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

$$d = |x_2 - x_1|$$

A) 1 unit $d = |5 - -6|$

B) 5 units $= |11|$

☒ C) 11 units $= 11$

D) 6 units

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

2 equation

$$d = \frac{|c_2 - c_1|}{\sqrt{A^2 + B^2}}$$

☒ A) $\sqrt{10}$ units

B) 10 units

C) $\frac{10}{3}$ units

D) 3 units

$$d = \frac{|10 - 0|}{\sqrt{3^2 + (-1)^2}} = \sqrt{10}$$

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12. $y = -5x \rightarrow 5x + y = 0$ (A) 5 units
 $y = -5x + 26 \rightarrow 5x + y - 26 = 0$ (B) $\sqrt{26}$ units

$$d = \frac{|-26 - 0|}{\sqrt{5^2 + 1^2}} = \sqrt{26}$$

A) 5 units

✓ B) $\sqrt{26}$ units

C) 26 units

D) $\sqrt{126}$ units

13. $y = x + 9 \rightarrow x - y + 9 = 0$ (A) 6 units
 $y = x + 3 \rightarrow x - y + 3 = 0$ (B) $3\sqrt{2}$ units

$$d = \frac{|3 - 9|}{\sqrt{(1)^2 + (-1)^2}} = 3\sqrt{2}$$

A) 6 units

✓ B) $3\sqrt{2}$ unitsC) $6\sqrt{2}$ units

D) 3 units

14. $y = -2x + 5 \rightarrow -2x - y + 5 = 0$ (A) $2\sqrt{5}$ units
 $y = -2x - 5 \rightarrow -2x - y - 5 = 0$ (B) 10 units

✓ A) $2\sqrt{5}$ units

B) 10 units

C) 5 units

D) $4\sqrt{5}$ units

$$d = \frac{|-5 - 5|}{\sqrt{(-2)^2 + (-1)^2}} = 2\sqrt{5}$$

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Q8-MCQ 12-8

Example 5 Write Equations of Parallel and Perpendicular Lines Same m
 (Flip) (Change Sign.)

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

A) $y = -\frac{3}{4}x + \frac{15}{4}$

B) $y = \frac{4}{3}x + 10$

C) $y = -\frac{3}{4}x + 9$

D) $y = -\frac{3}{4}x + \frac{33}{4}$

$$y - y_1 = m(x - x_1)$$

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

$$y = -\frac{3}{4}x - \frac{9}{4} + 6$$

$$y = -\frac{3}{4}x + \frac{15}{4}$$

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

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

A) $y = \frac{1}{2}x - \frac{1}{2}$

B) $y = -2x - 18$

C) $y = -2x + 10$

D) $y = 2x + 10$

Flip $m = \frac{2}{1}$ Change Sign $m = -2$

$$y + 4 = -2(x + 7)$$

$$y = -2x - 14 - 4$$

$$y = -2x - 18$$

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23. passes through $(-1, -10)$, parallel to $y = 7$ No $x \rightarrow m = 0$

☒ A) $y = -10$

B) $x = -1$

C) $y = 7x - 3$

D) $y = -x - 10$

$y - y_1 = m(x - x_1)$

$y + 10 = 0(x + 1)$

$y + 10 = 0$

$y = -10$

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

A) $y = \frac{3}{2}x - 7$

B) $y = -\frac{2}{3}x + 2$

☒ C) $y = -\frac{2}{3}x + 6$

D) $y = -\frac{2}{3}x - 2$

$y - 2 = -\frac{2}{3}(x - 6)$

$y = -\frac{2}{3}x + 4 + 2$

$y = -\frac{2}{3}x + 6$

25. passes through $(-2, 2)$, perpendicular to $y = -5x - 8$ Flip $m = \frac{1}{5}$ change sign $m = \frac{1}{5}$

☒ A) $y = \frac{1}{5}x + \frac{12}{5}$

B) $y = -5x - 8$

C) $y = \frac{1}{5}x - \frac{8}{5}$

D) $y = 5x + 12$

$y - 2 = \frac{1}{5}(x + 2)$

$y = \frac{1}{5}x + \frac{2}{5} + 2$

$y = \frac{1}{5}x + \frac{12}{5}$

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Q9-MCQ 13-1

Key Concept • Reflection

Reflection in a Vertical Line

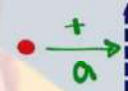
$$x = \text{عدد}$$

$$x = 3$$

* Same distance a

* right (+) , left (-)

* $(x \pm 2a, y)$ a مسافة بين خط ونقطة



Reflection in a Horizontal Line

$$y = \text{عدد}$$

* Same distance a

* up (+) , down (-)

* $(x, y \pm 2a)$ a مسافة بين خط ونقطة



Reflection in $y = x$

Change places

$$(x, y) \rightarrow (y, x)$$

96

Big - Small

المسافة بين الخط والنقطة

طرح القيم بدون

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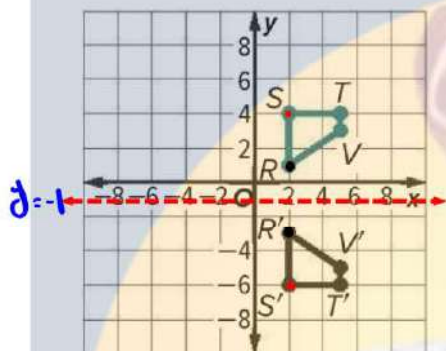
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Example 1 Reflection in a Horizontal or Vertical Line

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 $y = -1$ → Horizontal



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

B) $R'(2, -3)$, $S'(2, -9)$, $T'(5, -9)$, $V'(5, -7)$

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

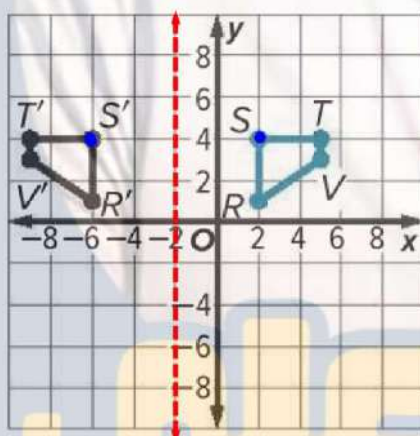
D) $R'(2, -2)$, $S'(2, -5)$, $T'(5, -5)$, $V'(5, -4)$

up ↔ down

R ↔ L

b. in the line $x = -2$

Vertical ↓



A) $R'(-2, 1)$, $S'(-2, 4)$, $T'(-5, 4)$, $V'(-5, 3)$

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

C) $R'(-4, 1)$, $S'(-4, 4)$, $T'(-7, 4)$, $V'(-7, 3)$

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

R → L

Right

↔

Left



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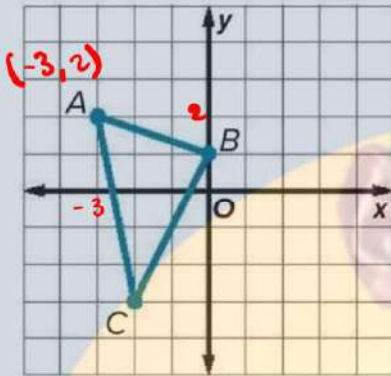
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under the given reflection.

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

change places



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

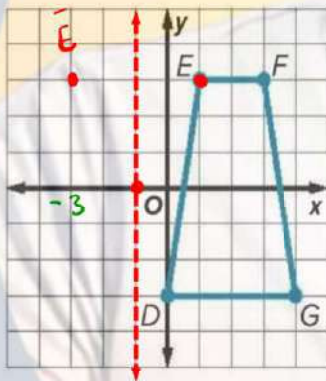
b) $(A'(-3, -3), B'(0, 2), C'(-2, 2))$

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

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

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

vertical



a) $(D'(1, 2), E'(0, -2), F'(-2, -2), G'(-3, 2))$

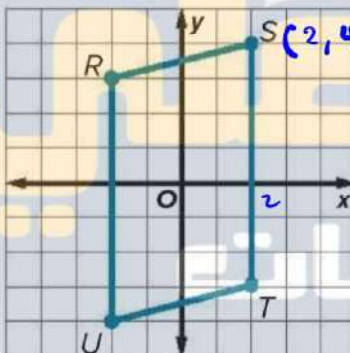
b) $(D'(1, -2), E'(0, 3), F'(-2, 2), G'(-3, -2))$

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

d) $(D'(-3, -2), E'(-2, -2), F'(0, -2), G'(1, -2))$

R $\rightarrow$ L3. parallelogram $RSTU$ in the line $y = x$

change places



a) $(R'(2, -4), S'(3, -2), T'(-1, -1), U'(-2, -3))$

b) $(R'(-4, -2), S'(-2, -3), T'(-1, 1), U'(-3, 2))$

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

d) $(R'(-2, -4), S'(-3, -2), T'(1, -1), U'(2, -3))$



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 $S(2, 4) \rightarrow S'(4, 2)$

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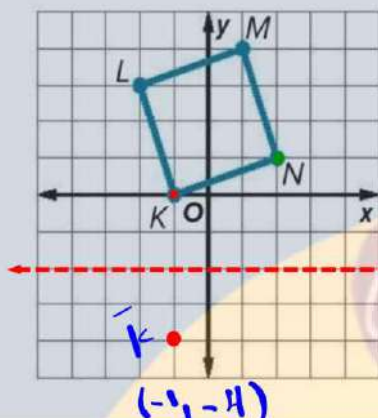
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4. square $KLMN$ in the line $y = -2$ Horizontalup $\rightarrow$ down

- a) $(K'(2, -5), L'(1, -6), M'(0, -5), N'(1, -4))$
 b) $(K'(-1, -4), L'(-2, -7), M'(1, -8), N'(2, -5))$
 c) $(K'(-2, -5), L'(-1, -6), M'(0, -5), N'(-1, -4))$
 d) $(K'(-5, -2), L'(-6, -1), M'(-5, 0), N'(-4, -1))$

5. Determine the coordinates of $S(-7, 1)$ after a reflection in the line $y = 3$.

- a) $(-7, -5)$
 b) $(7, 1)$
 c) $(-7, 5)$
 d) $(5, -7)$
- * $a = \text{Big} - \text{Small} = 3 - 1 = 2$
 * $1 \xrightarrow{+} 3$
 $(x, y + 2a)$
 $(-7, 1 + 2(2)) = (-7, 5)$

6. Determine the coordinates of $Q(6, -4)$ after a reflection in the line $x = 2$.

- a) $(-2, -4)$
 b) $(2, -4)$
 c) $(-7, -4)$
 d) $(5, -4)$
- * $a = \text{Big} - \text{Small} = 6 - 2 = 4$
 * $6 \xrightarrow{-} 2$
 $(x - 2a, y)$
 $(6 - 2(4), -4) = (-2, -4)$

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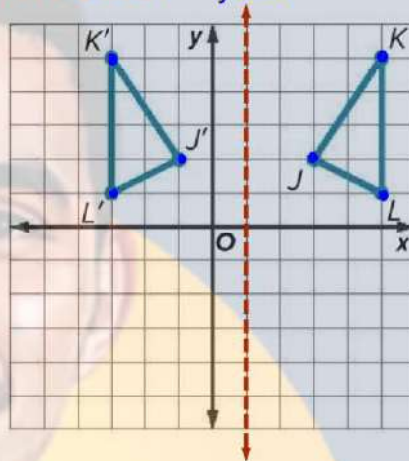
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Q10-MCQ 13.2

Example 1 Determine a Translation Vector $x=1$

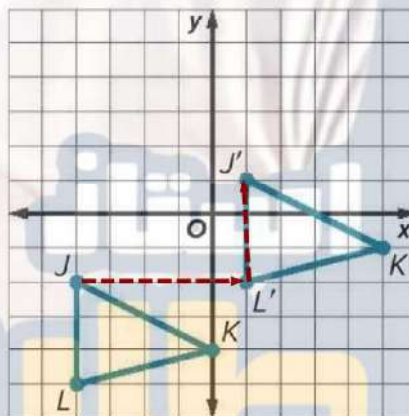
Determine whether a translation maps $\triangle JKL$ onto $\triangle J'K'L'$. If so, find the translation vector. If not, explain why.



- A. Yes; $\langle -4, 0 \rangle$
- B. Yes; $\langle -8, 0 \rangle$
- ☒ C. No; the transformation is a reflection across the line $x = 1$, not a translation.
- D. No; the transformation is a 180° rotation about the origin.

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.



طارق علي

في الرياضيات



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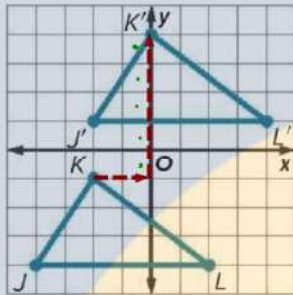
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1. Determine whether a translation maps $\triangle JKL$ onto $\triangle J'K'L'$. If so, find the translation vector. If not, explain why.

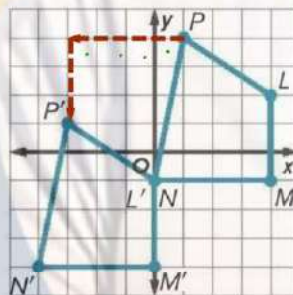
2 Right +
5 up +
 $\langle 2, 5 \rangle$



- A) Yes, the translation vector is $\langle 4, -3 \rangle$
 B) Yes, the translation vector is $\langle 2, 5 \rangle$
 C) No, because the triangles are not congruent.
 D) No, because a rotation is required instead.

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

4 left $\rightarrow$ -
3 down $\rightarrow$ -
 $\langle -4, -3 \rangle$



- A) Yes, the translation vector is $\langle -4, -3 \rangle$.
 B) Yes, the translation vector is $\langle 4, 3 \rangle$.
 C) No, because the quadrilaterals are not congruent.
 D) No, because a reflection is required instead.

Q11-MCQ 13.3

Rotations on the Coordinate Plane (About the Origin)

* keep *

- 90° Rotation $(x, y) \rightarrow (-y, x)$ counterclockwise about the origin,

change sign of y and replace

- 180° Rotation $(x, y) \rightarrow (-x, -y)$

change sign of x and y (same)

- 270° Rotation $(x, y) \rightarrow (y, -x)$ = 90 clockwise

change sign of x and replace

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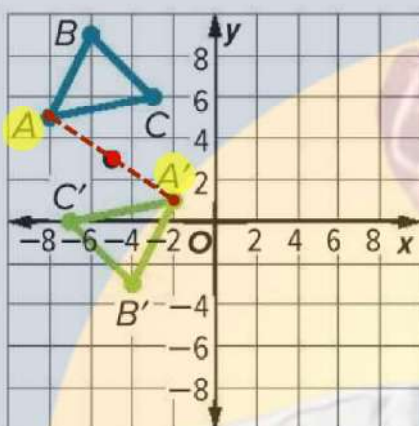
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Example 1 Rotation About a Point That Is Not the Origin

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 $(-5, 3)$.



straight line

- ☒ A. $A'(-2, 1)$, $B'(-4, -3)$, $C'(-7, 0)$
☐ B. $A'(2, -1)$, $B'(4, 3)$, $C'(7, 0)$
☐ C. $A'(-3, 2)$, $B'(-1, -2)$, $C'(-4, -1)$
☐ D. $A'(-2, 5)$, $B'(-4, 9)$, $C'(-7, 6)$

* Rotation clockwise inverse counterclockwise

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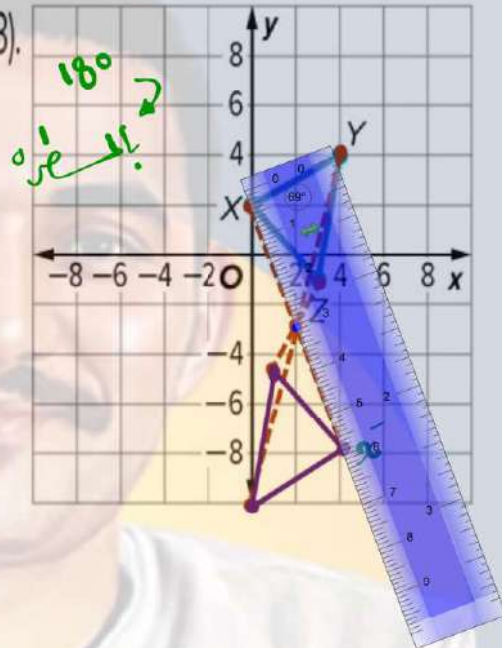
1. Triangle XYZ has vertices $X(0, 2)$, $Y(4, 4)$, and $Z(3, -1)$. Graph $\triangle XYZ$ and its image after a rotation of 180° about $(2, -3)$.

- a) $X'(-2, -8)$, $Y'(0, -10)$, $Z'(1, -5)$
 ✓ b) $X'(4, -8)$, $Y'(0, -10)$, $Z'(1, -5)$
 c) $X'(4, -8)$, $Y'(0, -10)$, $Z'(1, -1)$
 d) $X'(-2, -8)$, $Y'(0, -2)$, $Z'(1, -5)$

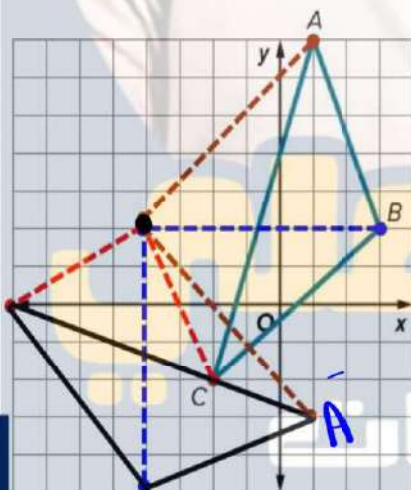
① match by $(2, -3)$

② measure by ruler

③ no straight line



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 $(-4, 2)$.



- a) $A'(3, 12)$, $B'(0, 7)$, $C'(4, 2)$

- b) $A'(3, 12)$, $B'(0, 1)$, $C'(4, 6)$

- c) $A'(12, 3)$, $B'(7, 0)$, $C'(2, 4)$

- ✓ d) $A'(1, -3)$, $B'(-4, -5)$, $C'(-8, 0)$

① match and measure distance by ruler

② 270° counterclockwise = 90° clockwise (right Angle)
 protractor

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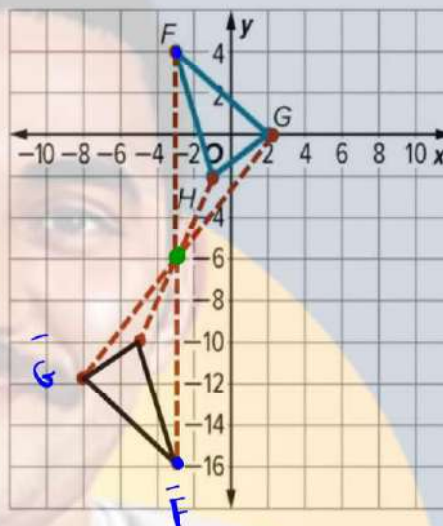
3. Triangle FGH has vertices $F(-3, 4)$, $G(2, 0)$, and $H(-1, -2)$. Graph $\triangle FGH$ and its image after a rotation of 180° about $(-3, -6)$.

- a) $F'(-3, -16)$, $G'(-8, -12)$, $H'(-5, -10)$
 b) $F'(-3, -16)$, $G'(-8, -6)$, $H'(-5, -10)$
 c) $F'(3, -16)$, $G'(-8, -12)$, $H'(5, -10)$
 d) $F'(-3, -10)$, $G'(-8, -12)$, $H'(-5, -10)$

* match

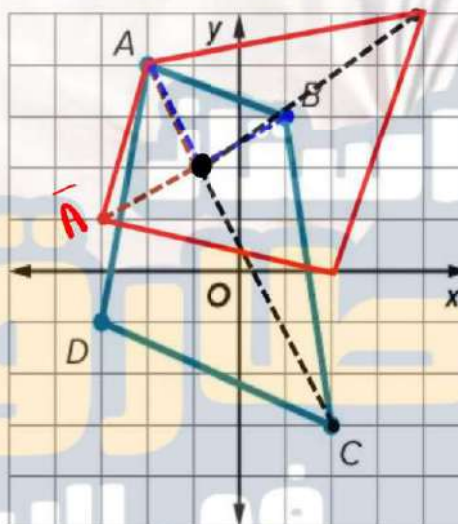
* measure distance (ruler)

Straight line



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 $(-1, 2)$.

- a) $A'(-1, 7)$, $B'(-2, 4)$, $C'(5, 3)$, $D'(3, 0)$
 b) $A'(-1, -1)$, $B'(-2, 1)$, $C'(5, 0)$, $D'(3, 2)$
 c) $A'(-3, 1)$, $B'(-2, 4)$, $C'(4, 5)$, $D'(2, 0)$
 d) $A'(7, -1)$, $B'(4, -2)$, $C'(3, 5)$, $D'(0, 3)$



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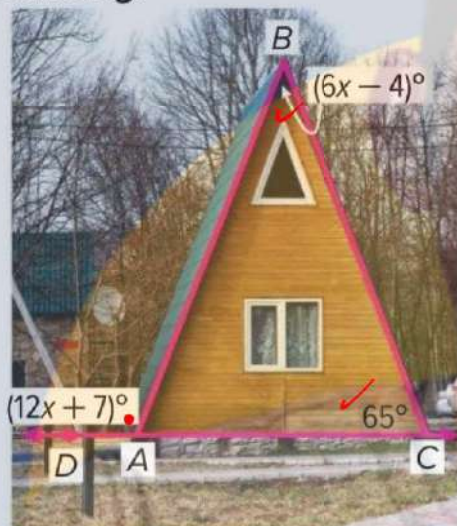
متقدم



Q12-MCQ 14.1

Example 2 Use the Exterior Angle Theorem

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



exterior Angle = Sum of
2 opposite Angles

A. 50° B. 65° ✓ C. 115° D. 125°

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

أولاً:

$$x = 9$$

$$m\angle DAB = 12(9) + 7 = 115$$

PUZZLES Find the measure of $\angle XYZ$ created by the triangle.

A. 115

✓ B. 90

C. 60

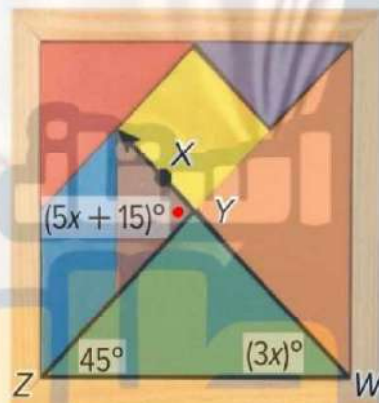
D. 120

$$5x + 15 = 3x + 45$$

$$x = 15$$

$$m\angle XYZ =$$

$$5(15) + 15 = 90$$



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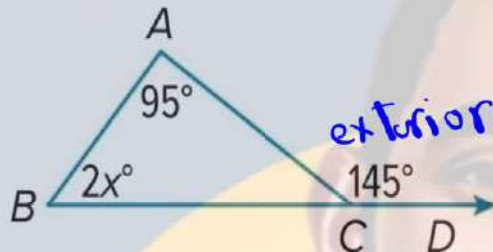
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Find each measure.

5. $m\angle ABC$ 

$$145 = 2x + 95$$

$$x = 25$$

exterior

$$* m\angle ABC =$$

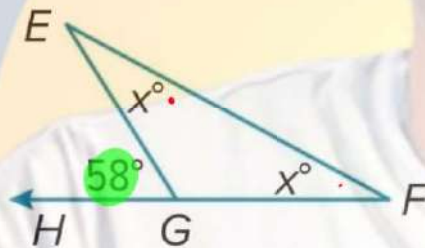
$$2x = 2(25)$$

A.115

B.29

✓ C.50

D.98

6. $m\angle F$ 

$$58 = x + x$$

$$x = 29$$

$$* m\angle F = x = 29$$

A.115

✓ B.29

C.50

D.98

7. **TOWERS** A lookout tower sits on a network of struts and posts. Leslie measured three 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 $m\angle 1$?

A.115

B.29

C.50

✓ D.98

$$m\angle 1 = m\angle 2 + m\angle 3$$

$$7x - 7 = 4x + 2 + 2x + 6$$

$$x = 15$$

$$m\angle 1 = 7(15) - 7$$



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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 $m\angle 1$?

A.28

$$* 116 = 8x + 7x - 4$$

B.64

$$x = 8$$

C.90

$$* m\angle 1 = 8(8)$$

D.120

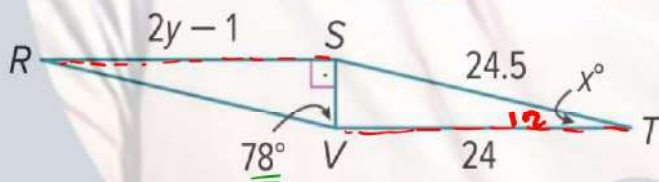
$$= 64$$



Q13-MCQ 14-2

Example 2 Use Corresponding Parts of Congruent Triangles

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



$$A. x = 12, y = 12.5$$

$$B. x = 78, y = 12.5$$

$$C. x = 12, y = 12$$

$$D. x = 24, y = 12.75$$

$$\begin{aligned} * m\angle T &= m\angle R = x \\ &= 180 - 90 - 78 \\ &= 12 \end{aligned}$$

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

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Example 2

In the diagram, $\triangle ABC \cong \triangle FDE$.6. Find the value of x .

A) 10

B) 20

☒ C) 36

D) 44

① Find y

$$m\angle B = m\angle D$$

$$y = 48$$

② Find x

$$m\angle F = m\angle A = 24$$

$$m\angle A = 180 - 108 - 48 = 24$$

$$\rightarrow 2x - y = 24$$

$$\rightarrow 2x - 48 = 24$$

$$x = 36$$

 shift
 solve
 $\rightarrow =$
7. Find the value of y .

A) 10

B) 20

C) 36

☒ D) 48

$$m\angle B = m\angle D$$

$$48 = y$$



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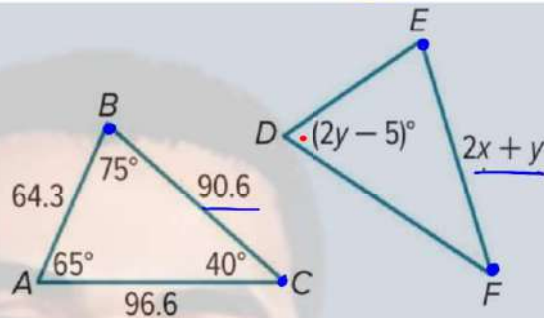
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In the diagram, $\triangle ABC \cong \triangle DEF$.

10. Find the value of x .



A) 27.8

B) 5

C) 36

D) 44

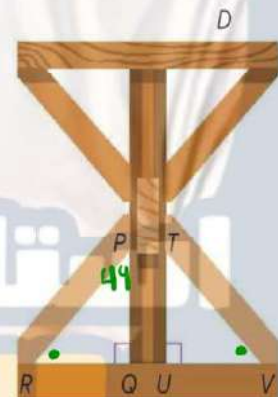
① Find y $m\angle A = m\angle D \rightarrow 2y - 5 = 65$
 $y = 35 \leftarrow$ الـ y !

② Find x

$$2x + y = 90.6 \rightarrow 2x + 35 = 90.6$$

$$x = 27.8$$

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 $m\angle TVU$?



A. 120

B. 116

C. 41

D. 35

$$m\angle V = m\angle R$$

$$m\angle R = 180 - 90 - 49$$

or

$$90 - 49 = 41$$

$$m\angle V = m\angle R = 41$$

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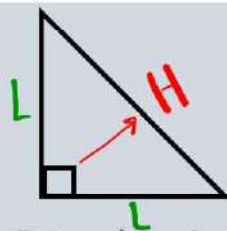
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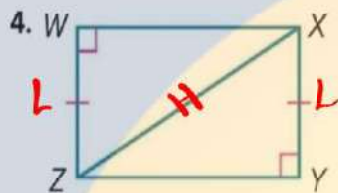
متقدم

**Q14-MCQ 14-5**

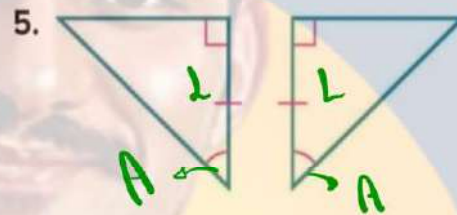
HL, LL, LA, HA

L → leg
H → Hyp
A → Angle

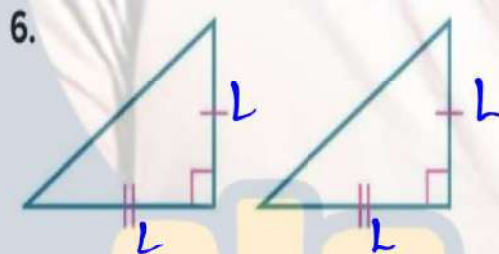
Determine whether each pair of triangles is congruent. If yes, include the theorem that applies.



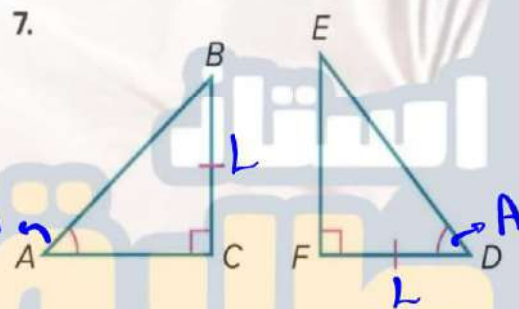
- A) Yes; LL
~~B) Yes; HL~~
 C) No; not enough information
 D) Yes; SAS



- ~~A) Yes; LA~~
 B) Yes; HL
 C) No; not enough information
 D) Yes; SAS



- ~~A) Yes; LL~~
 B) Yes; HL
 C) No; not enough information
 D) Yes; SAS



- A) Yes; LL
 B) Yes; HL
~~C) No; not enough information~~
 D) Yes; SAS

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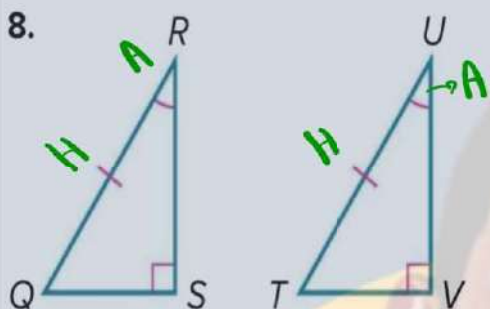
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8.



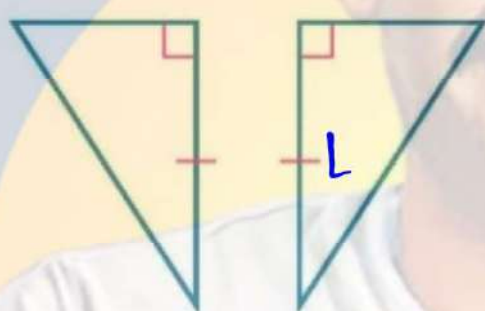
A) Yes; LL

✓ B) Yes; HA

C) No; not enough information

D) Yes; SAS

9.



A) Yes; LL

B) Yes; HL

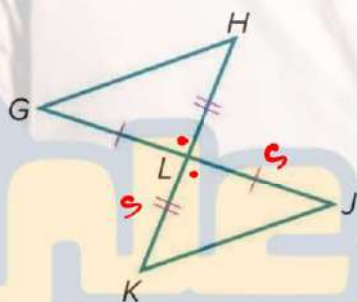
✓ C) No; not enough information

D) Yes; SAS

Q15-MCQ 14-3

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

17.



A.SSS

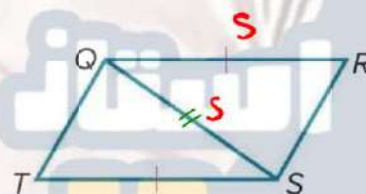
✓ B.SAS

C.ASA

D.AAS

vertical
Angle

18.



A.SSS

B.SAS

C.ASA

✓ D. Not enough information

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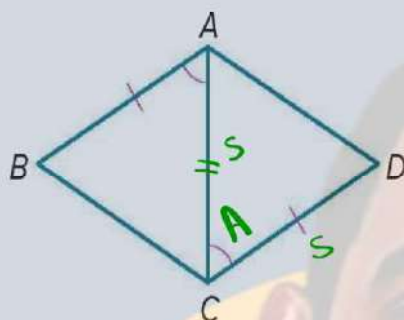
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19.



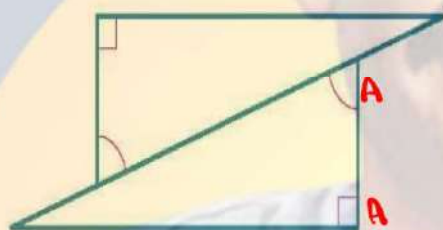
A.SSS

✓ B.SAS

C.ASA

D.Not enough information

20.



A.SSS

B.SAS

C.ASA

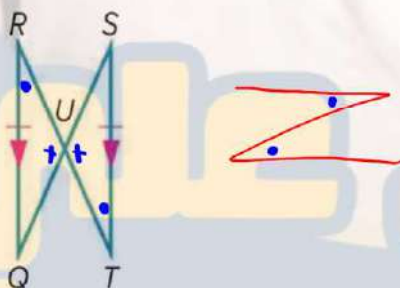
✓ D.Not enough information

Q16-MCQ 14.4**Example 3** Use AAS to Prove Triangles Congruent

Complete the flow proof.

Given: $RQ \cong ST$, $RQ \parallel ST$ Prove: $\triangle RUQ \cong \triangle TUS$

Which statement is justified by reason | and ||?

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

Given

i

Alternate Interior Angles Theorem

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

Given

 $\triangle RUQ \cong \triangle TUS$

AAS

ii

Vertical Angles Theorem

a) I: $\angle RQS \cong \angle TSQ$ II: $\angle RUQ \cong \angle TUS$ ✓c) I: $\angle RUQ \cong \angle TUS$ II: $\angle RQS \cong \angle TSQ$ b) I: $\angle RQS \cong \angle RTS$ II: $\angle TSQ \cong \angle QRT$ ✗d) I: $\angle TSQ \cong \angle QRT$ II: $\angle RQS \cong \angle RTS$ ✗

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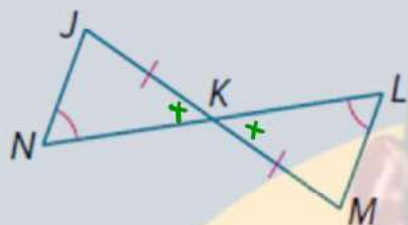
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Given: $\overline{JK} \cong \overline{MK}$, $\angle N \cong \angle L$ Prove: $\triangle JKN \cong \triangle MKL$

Which reason is justified by statement “?”

 $\angle N \cong \angle L$

Given

 $\overline{JK} \cong \overline{MK}$

Given

 $\angle JKN \cong \angle MKL$

?

 $\triangle JKN \cong \triangle MKL$

AAS

a) Reflexive Property

b) Vertical Angles Theorem

c) Definition of Angle Bisector

d) Alternate interior angle

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

Which reason is justified by statement “?”



Proof: It is given that $\angle E \cong \angle G$ and $\overline{DE} \parallel \overline{FG}$. Considering $\overline{DF}$ as the transversal that cuts through parallel segments $\overline{DE}$ and $\overline{FG}$, by the Alternate Interior Angles Theorem, $\angle DFG \cong \angle FDE$. $\overline{DF} \cong \overline{DF}$ by the ?. *Same*
Therefore, $\triangle DFG \cong \triangle FDE$ by AAS.

a) Reflexive Property

b) Vertical Angles Theorem

c) Definition of segment Bisector

d) Definition of Midpoint



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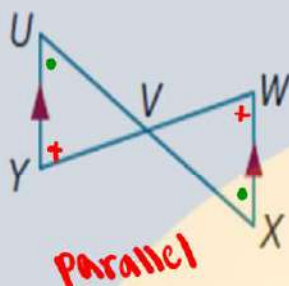
متقدم



Given: V is the midpoint of $\overline{YW}$; $\overline{UY} \parallel \overline{XW}$.

Prove: $\triangle UYV \cong \triangle XWV$

Which reason is justified by statement “?”



Statements	Reasons
1. V is the midpoint of $\overline{YW}$; $\overline{UY} \parallel \overline{XW}$	1. Given
2. $\overline{YV} \cong \overline{WV}$	2. Midpoint Theorem
3. $\angle VWX \cong \angle VYU$	3. ?
4. $\angle VUY \cong \angle VWX$	4. ?
5. $\triangle UYV \cong \triangle XWV$	5. AAS

a) Reflexive Property

b) Vertical Angles Theorem

c) Definition of Angle Bisector

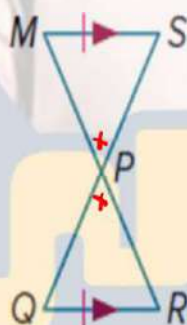
d) Alternate interior angle

✓ 3, 4

Given: $\overline{MS} \cong \overline{RQ}$, $\overline{MS} \parallel \overline{RQ}$

Prove: $\triangle MSP \cong \triangle RQP$

Which reason is justified by statement “?”



Statements	Reasons
1. $\overline{MS} \cong \overline{RQ}$, $\overline{MS} \parallel \overline{RQ}$	1. Given
2. $\angle SPM \cong \angle QRP$	2. ?
3. $\angle SMP \cong \angle QRP$	3. Alternate Interior Angles Theorem
4. $\triangle MSP \cong \triangle RQP$	4. AAS

a) Reflexive Property

b) Vertical Angles Theorem

c) Definition of Angle Bisector

d) Alternate interior angle

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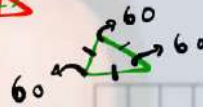
Q17-MCQ 14.6

Example 2 Find Missing Measures in Isosceles Triangles

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

* isosceles $\triangle$

* equilateral



Part A Determine side relationships.

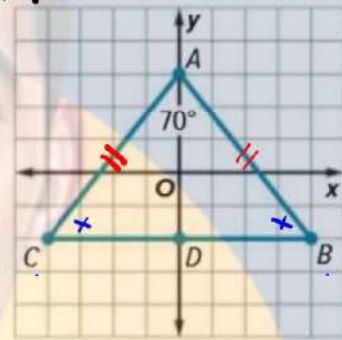
Use the Distance Formula to determine the measures of the sides of $\triangle ABC$. The coordinates of $\triangle ABC$ are $A(0, 3)$, $B(4, -2)$, and $C(-4, -2)$.

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

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

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

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



$$x = \frac{180 - 70}{2} = 55^\circ = m\angle B = m\angle C$$

5. Refer to the figure.

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

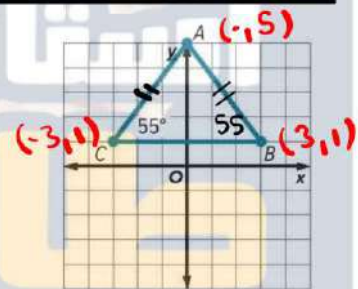
a. Find the measures of the sides of $\triangle ABC$. Show your work.

b. Find $m\angle A$. Show your work.

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

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

$$BC = \sqrt{(3+3)^2 + (1-1)^2} = 6$$



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isosceles



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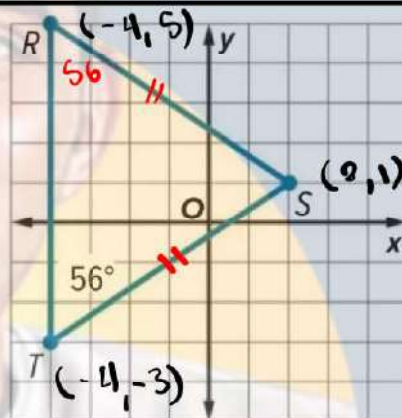
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(A) 55° ☒ (B) 70° (C) 110° (D) 125°

$$\textcircled{B} \ m\angle A = 180 - 55 - 55 = 70$$

6. Find SR , ST , RT , $m\angle TRS$, and $m\angle RST$. Round to the nearest tenth, if necessary.

(A) $m\angle TRS = 38^\circ$, $m\angle RST = 90^\circ$ (B) $m\angle TRS = 52^\circ$, $m\angle RST = 38^\circ$ (C) $m\angle TRS = 38^\circ$, $m\angle RST = 52^\circ$ ☒ (D) $m\angle TRS = 56^\circ$, $m\angle RST = 68^\circ$ 

$$*RS = \sqrt{(-4-2)^2 + (5-1)^2} = 7.2$$

$$*ST = \sqrt{(2+4)^2 + (1+3)^2} = 7.2$$

$$*RT = \sqrt{(-4+4)^2 + (-5+3)^2} = 2$$

isosceles

$$*m\angle R = 56$$

$$*m\angle S = 180 - 56 - 56 = 68$$



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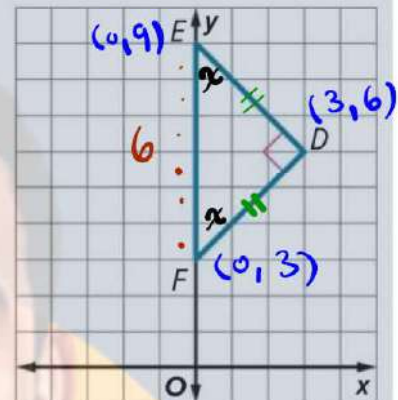
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7. Find the measures of $\angle DEF$ and $\angle EFD$.
Round to the nearest tenth, if necessary.



- (A) $\angle DEF = 45^\circ$, $\angle EFD = 45^\circ$
(B) $\angle DEF = 67.5^\circ$, $\angle EFD = 67.5^\circ$
(C) $\angle DEF = 22.5^\circ$, $\angle EFD = 22.5^\circ$
(D) $\angle DEF = 90^\circ$, $\angle EFD = 45^\circ$

$$*ED = \sqrt{(0-3)^2 + (9-6)^2} = 2\sqrt{2}$$

$$*FD = \sqrt{(3-0)^2 + (6-3)^2} = 2\sqrt{2} \quad *EF = 6$$

Isosceles

$$*m\angle F = m\angle E = \frac{180 - 90}{2} = 45^\circ$$

Q18-MCQ 12.2

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
- (A) True; because both p and r are true
(B) False; because p is false even though r is true
(C) True; because r is true only
(D) False; because r is false and p is true

$p \rightarrow$ False

$r \rightarrow$ True



* and

* ٻه

شرط ٻن

ٻن ٻن

ان ٻن

both are ✓

ٻن ٻن

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p : The figure is a trapezoid. ✗

✓ q : The figure has four congruent sides.

✓ r : The figure has four right angles.

b. ^{not} $\sim p \wedge q$

$\sim p \rightarrow \text{True}$

$q \rightarrow \text{True}$

$\wedge \rightarrow \text{True}$

(A) False; because $\sim p$ is false and q is true

(B) False; because both $\sim p$ and q are false

✓ (C) True; because both $\sim p$ and q are true

(D) True; because p alone 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. $q \vee \sim r$

(A) False; because both q and $\sim r$ are false

✓ (B) True; because both q and $\sim r$ are true

(C) False; because q is false only

(D) True; because q is false and $\sim r$ is true

$q \rightarrow \text{True}$, $\sim r \rightarrow \text{True}$

4. $r \vee q$

p : $-3 - 2 = -5$ ✓

✓ q : Vertical angles are congruent.

r : $2 + 8 > 10$ ✗

$r \rightarrow \text{False}$

$q \rightarrow \text{True}$

(A) False; because both r and q are false

(B) True; because both r and q are true

✓ (C) True; because at least one (q) is true

(D) False; because r is false only

* $\vee$
* or

True أم لا

$\rightarrow \vee, \text{or} \rightarrow \text{True}$

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

$$p: -3 - 2 = -5 \quad \checkmark$$

 $q: \text{Vertical angles are congruent.} \quad \checkmark$

$$r: 2 + 8 > 10 \quad \times$$

 $\sim r \rightarrow \text{True.}$
 $\sim p \rightarrow \text{False}$

✓

- (A) False; because both $\sim r$ and $\sim p$ are false
- (B) True; because both $\sim r$ and $\sim p$ are true
- ~~(C)~~ True; because $\sim r$ is true even though $\sim p$ is false
- (D) False; because $\sim p$ is false only

Q19-MCQ 12.2

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

$$p: -3 - 2 = -5 \quad \checkmark$$

 $q: \text{Vertical angles are congruent.} \quad \checkmark$

$$r: 2 + 8 > 10 \quad \times$$

 $p \rightarrow \text{True}$
 $q \rightarrow \text{True}$
1. p and q

- ~~(A)~~ True; because both p and q are true
- (B) False; because p is false
- (C) False; because q is false
- (D) True; because r is false

2. $p \wedge r$

$$p: -3 - 2 = -5 \quad \checkmark$$

 $q: \text{Vertical angles are congruent.} \quad \checkmark$

$$r: 2 + 8 > 10 \quad \times$$

- (A) True; because both p and r are true
- (B) True; because p is true only
- ~~(C)~~ False; because r is false even though p is true
- (D) False; because both p and r are false

 $p \rightarrow \text{True.}$
 $r \rightarrow \text{False.}$
 $\boxed{D}$


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

- (A) True; because both $\sim p$ and $\sim q$ are true
- ~~(B)~~ False; because both $\sim p$ and $\sim q$ are false
- (C) True; because $\sim p$ is true only
- (D) False; because $\sim q$ is true only

$$p: -3 - 2 = -5 \checkmark$$

 $q: \text{Vertical angles are congruent.} \checkmark$

$$r: 2 + 8 > 10 \text{ ✗}$$

 $\sim p \rightarrow \text{False}$
 $\sim q \rightarrow \text{False}$

Q20-MCQ 13.6

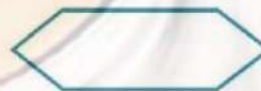
Determine whether each figure has a line of symmetry. If so, draw the lines of symmetry and state how many lines of symmetry it has.

1.



- (A) No lines of symmetry
- (B) 1 line of symmetry
- (C) 2 lines of symmetry
- ~~(D)~~ 3 lines of symmetry

2.



- (A) No lines of symmetry
- (B) 1 line of symmetry
- ~~(C)~~ 2 lines of symmetry
- (D) 3 lines of symmetry

3.



- ~~(A)~~ No lines of symmetry
- (B) 1 line of symmetry
- (C) 2 lines of symmetry
- (D) 3 lines of symmetry

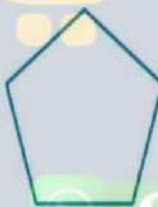
4.



need to
parallel

- ~~(A)~~ No lines of symmetry
- (B) 1 line of symmetry
- (C) 2 lines of symmetry
- (D) 3 lines of symmetry

5.



- (A) No lines of symmetry
- (B) 1 line of symmetry
- ~~(C)~~ 5 lines of symmetry
- (D) 3 lines of symmetry

6.



- (A) No lines of symmetry
- ~~(B)~~ 8 line of symmetry
- (C) 7 lines of symmetry
- (D) 6 lines of symmetry

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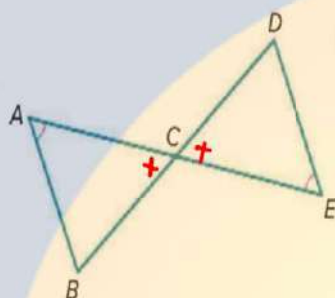
Q21-MCQ 14.4

EX.1

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

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

Which reason is justified by statement “?”



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. ?
5. $\triangle ACB \cong \triangle ECD$	5. ASA

a) Reflexive Property

b) Vertical Angles Theorem ✓

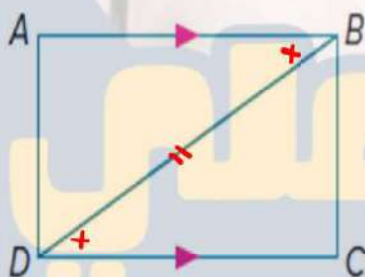
c) Definition of Angle Bisector

d) Alternate interior angle

Given: $\overline{AB} \parallel \overline{CD}$, $\angle CBD \cong \angle ADB$.

Prove: $\triangle ABD \cong \triangle CDB$.

Which reason is justified by statement “?”



Statements	Reasons
1. $\overline{AB} \parallel \overline{CD}$	1. Given
2. $\angle CBD \cong \angle ADB$	2. Given
3. $\angle ABD \cong \angle CDB$	3. ?
4. $\overline{BD} \cong \overline{BD}$	4. Reflexive Property of Congruence
5. $\triangle ABD \cong \triangle CDB$	5. ASA

a) Reflexive Property

b) Vertical Angles Theorem

c) Definition of Angle Bisector

d) Alternate interior angle ✓

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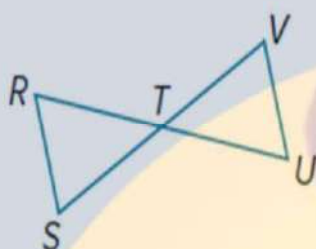
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Given: $\angle S \cong \angle V$, T is the midpoint of $\overline{SV}$.Prove: $\triangle RTS \cong \triangle UTU$

Which reason is justified by statement “?”



Statements	Reasons
1. $\angle S \cong \angle V$	1. Given
2. T is the midpoint of $\overline{SV}$.	2. Given
3. $\overline{ST} \cong \overline{TV}$	3. ?
4. $\angle RTS \cong \angle VTU$	4. Vertical Angles Theorem
5. $\triangle RTS \cong \triangle UTU$	5. ASA

a) Given

b) Definition of Midpoint ✓

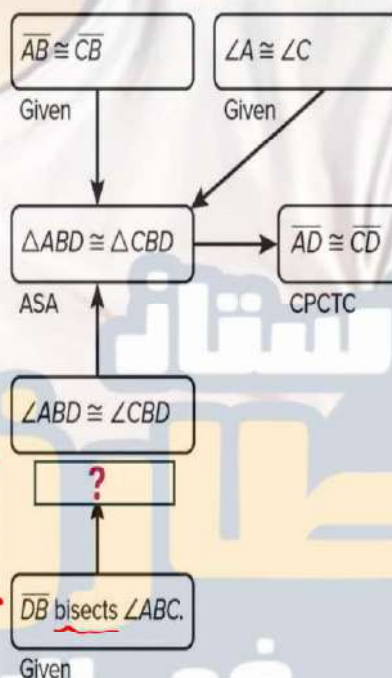
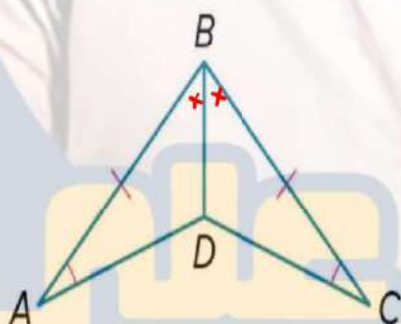
c) Reflexive Property

d) Alternate interior angle

Complete the flow proof.

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

Which reason is justified by statement “?”



a) Reflexive Property

b) Vertical Angles Theorem

c) Definition of Angle Bisector ✓

d) Alternate interior angle

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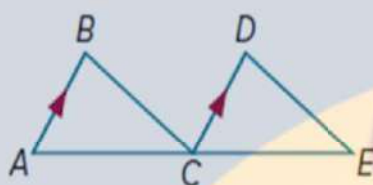
متقدم



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

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

Which reason is justified by statement “?”



Proof: It is given that $\angle E \cong \angle BCA$ and $\overline{CD}$ bisects $\overline{AE}$. Since $\overline{CD}$ bisects $\overline{AE}$, by the definition of bisector, $\overline{AC} \cong \overline{CE}$. We are also given that $\overline{AB} \parallel \overline{CD}$. By considering segment $\overline{AE}$ as the transversal, we can use this to determine that $\angle A$ is congruent to $\angle DCE$ by the ?. From this we know that $\triangle ABC \cong \triangle CDE$ by the ASA Congruence Postulate.

a) Corresponding angles



b) Vertical Angles Theorem

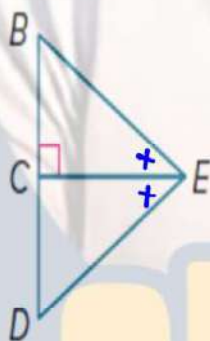
c) Definition of Angle Bisector

d) Alternate interior angle

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

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

Which reason is justified by statement “?”



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 ? tells us that $\overline{EC} \cong \overline{EC}$. By Angle-Side-Angle Congruence Postulate, $\triangle ECB \cong \triangle ECD$.

a) Reflexive Property



b) Vertical Angles Theorem

c) Definition of segment Bisector

d) Definition of Midpoint



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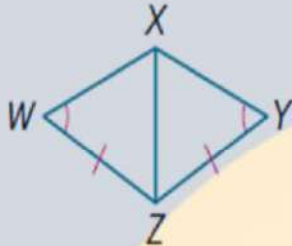
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Given: $\angle W \cong \angle Y$, $\overline{WZ} \cong \overline{YZ}$, and $\overline{XZ}$ bisects $\angle WZY$ Prove: $\triangle XWZ \cong \triangle XYZ$

Which reason is justified by statement “?”

**Proof:** It is given that $\angle W \cong \angle Y$, $\overline{WZ} \cong \overline{YZ}$, and $\overline{XZ}$ bisects $\angle WZY$.Therefore, $\angle WZX \cong \angle YZX$ by the ?.We can now state that $\triangle XWZ \cong \triangle XYZ$ by applying the Angle-Side-Angle Congruence Postulate.

a) Reflexive Property

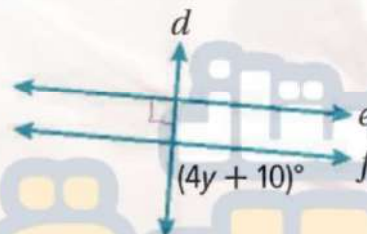
b) Vertical Angles Theorem

c) Definition of angle Bisector ✓

d) Alternate interior angle

Q22-MCQ 12.9**Example 2** Use Angle RelationshipsFind the value of y so that $e \parallel f$.

$$4y + 10 = 90$$

shift $\rightarrow$ solve $\rightarrow =$ 

A.40

B.30

C.20 ✓

D.45

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

7.

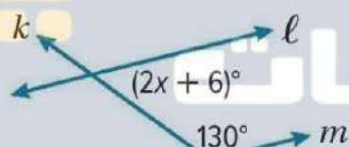
$$2x + 6 + 130 = 180$$

A.40

B.30

C.22 ✓

D.45

shift $\rightarrow$ solve $\rightarrow =$

consecutive interior

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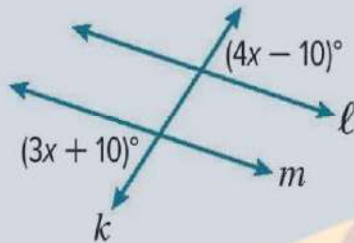
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8.



Alternate exterior

$$4x - 10 = 3x + 10$$

$$x = 20$$

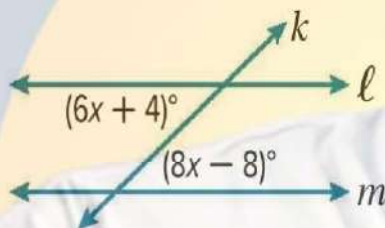
A.40

☒ B.20

C.22

D.45

9.



Alternate interior

$$6x + 4 = 8x - 8$$

$$x = 6$$

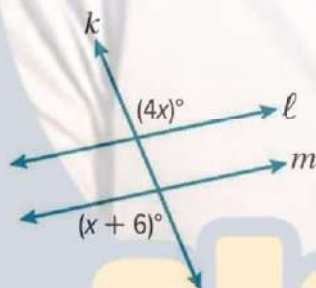
☒ A.6

B.3

C.2

D.4

10.



Alternate exterior

$$4x = x + 6$$

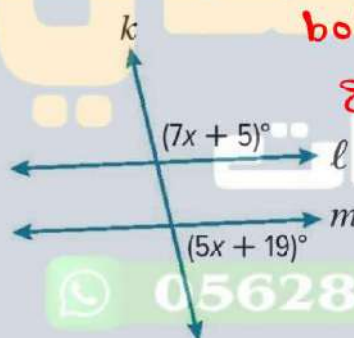
$$x = 2$$

A.4

B.3

☒ C.2

D.5



both are out, in same side supplementary

$$7x + 5 + 5x + 19 = 180$$

$$x = 13$$

A.14

☒ B.13

C.12

D.15

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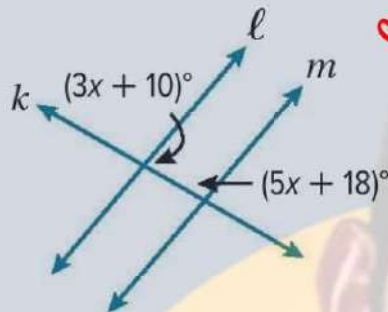
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12.

consecutive interior
or supplementary

$$3x + 10 + 5x + 18 = 180$$

$$x = 19$$

A.40

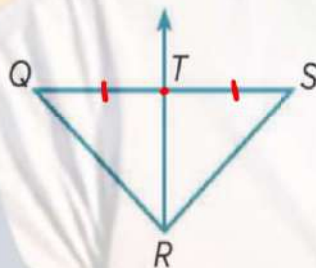
B.20

✓ C.19

D.14

EX.1**Q23-MCQ 14.3**Given: $\triangle QRS$ is isosceles with $\overline{QR} \cong \overline{SR}$. $\overline{RT}$ bisects $\overline{QS}$ at point T .Prove: $\triangle QRT \cong \triangle SRT$

Which reason is justified by statement “?”



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

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

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

?

$\triangle QRT \cong \triangle SRT$
SSS

a) All Right Angles are Congruent

b) Vertical Angles Theorem

c) Definition of segment Bisector ✓

d) Given



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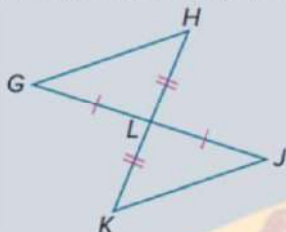
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17. Determine which congruence theorem can be used to prove the triangles congruent .



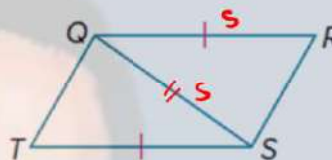
a) SSS

~~b) SAS~~

c) ASA

d) AAS

18. Determine which congruence theorem can be used to prove the triangles congruent .



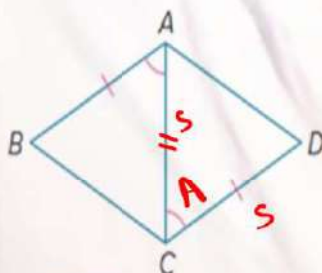
a) SSS

b) SAS

c) ASA

~~d) Can't be determined~~

19. Determine which congruence theorem can be used to prove the triangles congruent .



a) SSS

~~b) SAS~~

c) ASA

d) Can't be determined

20. Determine which congruence theorem can be used to prove the triangles congruent .



a) SSS

b) SAS

c) ASA

~~d) Can't be determined~~

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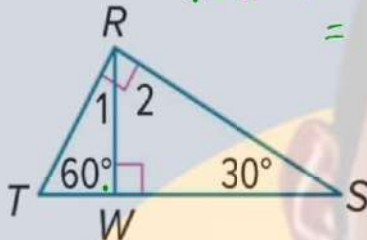
متقدم



Q24-MCQ 14.1

Find the measure of each numbered angle.

1.



$$* m\angle 1 = 90 - 60 = 30$$

$$A) m\angle 1 = 30^\circ, m\angle 2 = 60^\circ$$

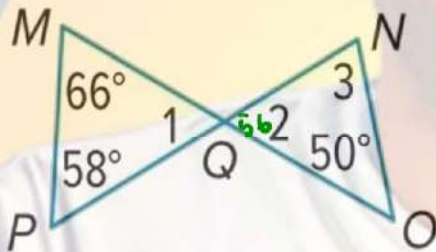
$$B) m\angle 1 = 45^\circ, m\angle 2 = 45^\circ$$

$$C) m\angle 1 = 60^\circ, m\angle 2 = 30^\circ$$

$$D) m\angle 1 = 30^\circ, m\angle 2 = 30^\circ$$

$$* m\angle 2 = 90 - 30 = 60$$

2.



$$* m\angle 1 = m\angle 2 \text{ vertical} \\ = 180 - 66 - 58 = 56$$

$$* m\angle 3 = 180 - 50 - 56 = 74$$

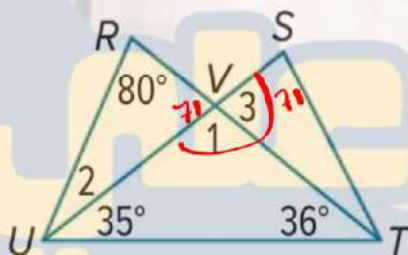
$$A) m\angle 3 = 56^\circ$$

$$B) m\angle 3 = 58^\circ$$

$$C) m\angle 3 = 66^\circ$$

$$D) m\angle 3 = 74^\circ$$

3.



$$A) m\angle 1 = 71^\circ$$

$$B) m\angle 1 = 109^\circ$$

$$C) m\angle 1 = 114^\circ$$

$$D) m\angle 1 = 145^\circ$$

$$180 - 36 - 35 = 109$$

$$A) m\angle 2 = 29^\circ$$

$$B) m\angle 2 = 35^\circ$$

$$C) m\angle 2 = 45^\circ$$

$$D) m\angle 2 = 65^\circ$$

$$* m\angle 3 = 180 - 109 = 71^\circ$$

$$* m\angle 2 = 180 - 80 - 71 = 29$$

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4.



$$* m\angle 1 = m\angle 2 = x$$

$$* x + x + 146 = 180 \quad \text{or}$$

$$x = m\angle 1 = m\angle 2 = \frac{180 - 146}{2} = 17^\circ$$

$$\checkmark A) m\angle 1 = 17^\circ, m\angle 2 = 17^\circ$$

$$B) m\angle 1 = 34^\circ, m\angle 2 = 34^\circ$$

$$C) m\angle 1 = 24^\circ, m\angle 2 = 24^\circ$$

$$D) m\angle 1 = 16^\circ, m\angle 2 = 16^\circ$$

Q25-MCQ 12.2

Example 3 Identify the Hypothesis and Conclusion

بشرط

Identify the hypothesis and conclusion of each conditional statement.

بعد then

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.

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Statement: Get a free water bottle with a one-year membership.

a) **Hypothesis:** You get a free water bottle.

Conclusion: You sign up for a one-year membership.

If-then form: If you get a free water bottle, then you have a one-year membership.

✓ b) **Hypothesis:** You have a one-year membership.

Conclusion: You get a free water bottle.

If-then form: If you have a one-year membership, then you get a free water bottle.

c) **Hypothesis:** A water bottle is free.

Conclusion: The membership lasts for one year.

If-then form: If a water bottle is free, then the membership is for one year.

Statement: : Everybody at the party received a gift.

✓ a) **Hypothesis:** A person is at the party.

Conclusion: The person received a gift.

If-then form: If a person is at the party, then they received a gift.

b) **Hypothesis:** A person received a gift.

Conclusion: The person is at the party.

If-then form: If a person received a gift, then they are at the party.

c) **Hypothesis:** It is a party.

Conclusion: Everybody receives gifts.

If-then form: If it is a party, then everybody receives a gift.





Statement: The intersection of two planes is a line.

a) **Hypothesis:** Two planes intersect.

Conclusion: Their intersection is a line.

If-then form: If two planes intersect, then their intersection is a line.

b) **Hypothesis:** A geometric figure is a line.

Conclusion: It is formed by two intersecting planes.

If-then form: If a figure is a line, then it is the intersection of two planes.

c) **Hypothesis:** Two lines intersect.

Conclusion: They form a plane.

If-then form: If two lines intersect, then they form a plane.

Statement: The area of a circle is $A = \pi r^2$.

a) **Hypothesis:** The area is $A = \pi r^2$

Conclusion: The figure is a circle.

If-then form: If the area is $A = \pi r^2$ then the figure is a circle.

b) **Hypothesis:** A figure has a radius r .

Conclusion: It is a circle.

If-then form: If a figure has a radius r , then it is a circle with area $A = \pi r^2$

c) **Hypothesis:** A geometric figure is a circle with radius r .

Conclusion: Its area is $A = \pi r^2$

If-then form: If a geometric figure is a circle with radius r then its area is $A = \pi r^2$



Mr. Tarek Ali

منصة طارق أكاديمي

سلسلة الطارق في الرياضيات

9

متقدم



Statement: A right angle measures 90 degrees.

a) **Hypothesis:** An angle is a right angle.

Conclusion: Its measure is 90 degrees.

If-then form: If an angle is a right angle, then its measure is 90 degrees.

b) **Hypothesis:** An angle measures 90 degrees.

Conclusion: It is a right angle.

If-then form: If an angle measures 90 degrees, then it is a right angle.

c) **Hypothesis:** The measure is 90 degrees.

Conclusion: The shape is an angle.

If-then form: If a measure is 90 degrees, then the shape is a right angle.

استاذ
طارق علي
في الرياضيات



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منصة طارق أكاديمي للرياضيات

Tarek Academy

IN

Math

MATH

خاص بالمنصة

خاص بجميع الجروبات و القنوات

استاذ / طارق علي

Formulas and diagrams on the chalkboard include:

- $[a + b]$
- $\pi = 3.14$
- $A = \frac{ab + c}{d}$
- $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
- $a^2 + b^2 = c^2$, $c = \sqrt{a^2 + b^2}$
- $c^2 + a^2 = b^2$, $c^2 - b^2 = a^2$
- $a^2 = 2a$
- $f(a + b) = c$
- $(x + y)^2 - (x - y)^2 + 2c = 1$
- $\frac{a}{c} = \frac{HB}{a}$
- $Me =$
- 90°