HIGH SCHOOL

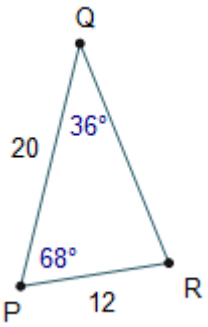
GEOMETRY

ENRICHMENT PACKET

Tinkham Ed. Center **Name_____**
Geometry I Review

Circle each correct answer.
Show your work!

Question 1



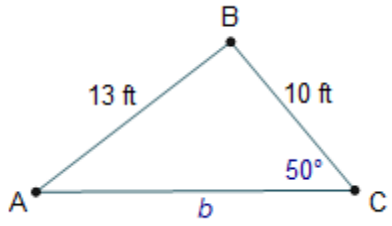
Trigonometric area formula: Area = $\frac{1}{2}ab\sin(C)$

What is the area of triangle PQR? Round to the nearest tenth of a square unit.

- 70.5 square units
- 111.3 square units
- 185.4 square units
- 222.5 square units

Question 2

Triangle ABC is a sketch of a triangular flower bed that has an area of 65.1 square feet.



Trigonometric area formula: Area = $\frac{1}{2}ab\sin(C)$

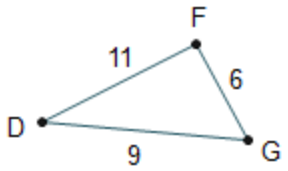
To the nearest foot, what amount of fencing is needed to surround the perimeter of the flower bed?

- 17 feet

33 feet
40 feet

- 50 feet

Question 3



Heron's formula: Area = $\sqrt{s(s-a)(s-b)(s-c)}$

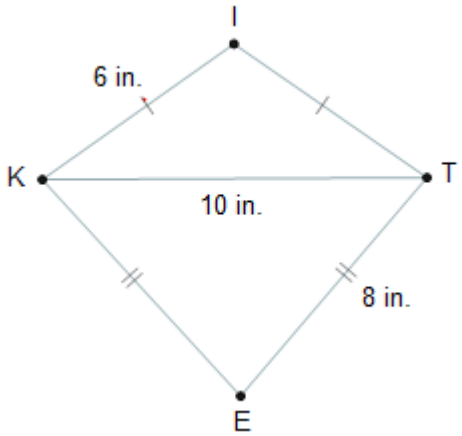
What is the area of triangle DFG? Round to the nearest whole square unit.

27 square units

- 38 square units
- 364 square units
- 728 square units

Question 4

A kite is made up of two isosceles triangles, KIT and KET, with the lengths shown. The top triangle of the kite, ΔKIT, is made from approximately 17 square inches of material.



Heron's formula: Area = $\sqrt{s(s-a)(s-b)(s-c)}$

How much material is used for the entire kite, quadrilateral KITE? Round to the nearest square inch.

- 31 square inches
- 34 square inches
  48 square inches
- 62 square inches

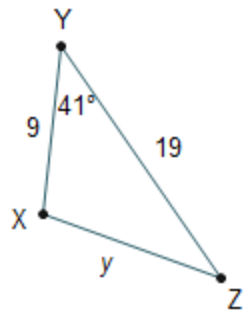
Question 5

The law of cosines for $\triangle RST$ can be set up as $5^2 = 7^2 + 3^2 - 2(7)(3)\cos(S)$. What could be true about $\triangle RST$?

Law of cosines: $a^2 = b^2 + c^2 - 2bc\cos(A)$

- $r = 5$ and $t = 7$
- $r = 3$ and $t = 3$
- $s = 7$ and $t = 5$
  $s = 5$ and $t = 3$

Question 6



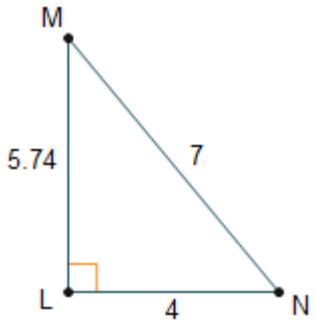
Law of cosines: $a^2 = b^2 + c^2 - 2bc\cos(A)$

Which equation correctly uses the law of cosines to solve for y?

- $9^2 = y^2 + 19^2 - 2(y)(19)\cos(41°)$
- $y^2 = 9^2 + 19^2 - 2(y)(19)\cos(41°)$
- $9^2 = y^2 + 19^2 - 2(9)(19)\cos(41°)$

$y^2 = 9^2 + 19^2 - 2(9)(19)\cos(41°)$

Question 7

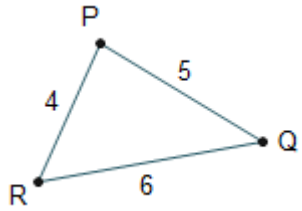


Law of cosines: $a^2 = b^2 + c^2 - 2bc\cos(A)$

What is the measure of $\angle$N to the nearest whole degree?

- 35°
- 45°
- 55°
- 65°

Question 8

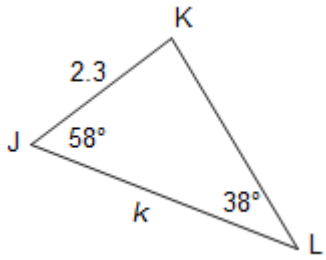


Law of cosines: $a^2 = b^2 + c^2 - 2bc\cos(A)$

Find the measure of $\angle$Q, the smallest angle in a triangle whose sides have lengths 4, 5, and 6. Round the measure to the nearest whole degree.

- 34°
- 41°
- 51°
- 56°

Question 9



Law of sines: $\frac{\sin(A)}{a} = \frac{\sin(B)}{b} = \frac{\sin(C)}{c}$

Which measures are accurate regarding triangle JKL? Select **two** options.

- $m\angle K = 94°$
- $k \approx 3.7$ units
- $k \approx 4.6$ units
- KL ≈ 2.5 units
- KL ≈ 3.2 units

Question 10

Law of sines: $\frac{\sin(A)}{a} = \frac{\sin(B)}{b} = \frac{\sin(C)}{c}$

Triangle ABC has measures $a = 2$, $b = 2$, and $m\angle A = 30°$. What is the measure of angle B?

- 15°
- 30°
- 45°
- 60°

Question 11

Law of sines: $\frac{\sin(A)}{a} = \frac{\sin(B)}{b} = \frac{\sin(C)}{c}$

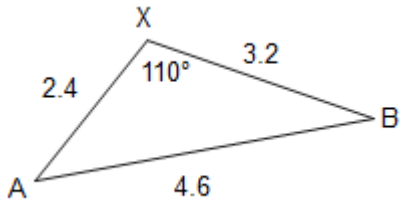
In $\triangle BCD$, $d = 3$, $b = 5$, and $m\angle D = 25°$. What are the possible approximate measures of angle B?

- only 90°
- only 155°

20° and 110°
45° and 135°

Question 12

Two teams are pulling a heavy chest, located at point X. The teams are 4.6 meters away from each other. Team A is 2.4 meters away from the chest, and Team B is 3.2 meters away. Their ropes are attached at an angle of 110°.

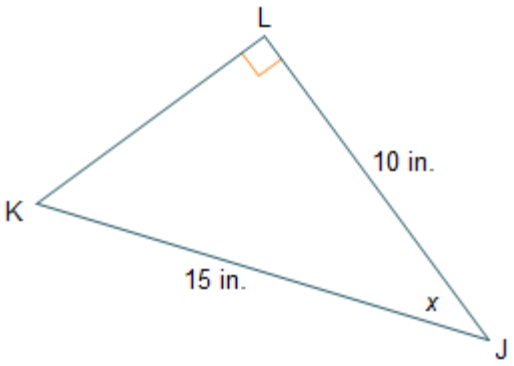


Law of sines: $\frac{\sin(A)}{a} = \frac{\sin(B)}{b} = \frac{\sin(C)}{c}$

Which equation can be used to solve for angle A?

- $\frac{\sin(A)}{2.4} = \frac{\sin(110°)}{4.6}$
- $\frac{\sin(A)}{4.6} = \frac{\sin(110°)}{2.4}$
- $\frac{\sin(A)}{3.2} = \frac{\sin(110°)}{4.6}$
- $\frac{\sin(A)}{4.6} = \frac{\sin(110°)}{3.2}$

Question 13



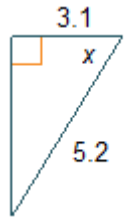
Which equation can be used to find the measure of angle LJK?

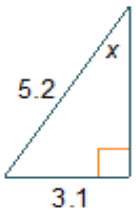
- $\sin(x) = \frac{10}{15}$
- $\sin(x) = \frac{15}{10}$
- $\cos(x) = \frac{10}{15}$
- $\cos(x) = \frac{15}{10}$

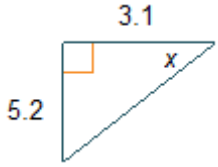
Question 14

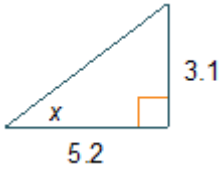
In which triangle is the value of x equal to $\tan^{-1}\left(\frac{3.1}{5.2}\right)$?

(Images may not be drawn to scale.)

- 

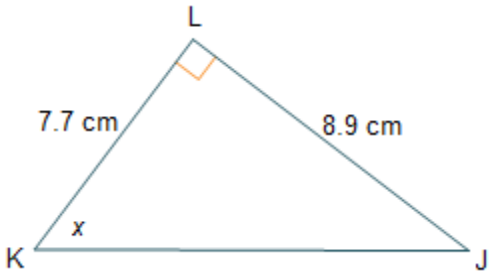
- 

- 

- 

Question 15

The equation $\tan^{-1}\left(\frac{8.9}{7.7}\right) = x$ can be used to find the measure of angle LKJ.



What is the measure of angle LKJ? Round to the nearest whole degree.

- 41°
- 45°
- 49°
- 55°

Question 16

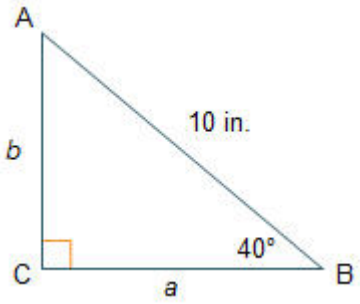
In right triangle XYZ, the right angle is located at vertex Y. The length of line segment XY is 12.4 cm. The length of line segment YZ is 15.1 cm.

Which is the approximate measure of angle YZX?

- 34.8°
- 39.4°
- 50.6°
- 55.2°

Question 17

Which equation can be used to find the length of $\overline{AC}$?



(10)sin(40°) = AC

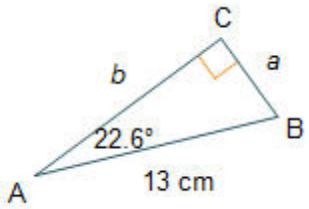
(10)cos(40°) = AC

$\frac{10}{\sin(40°)}$ = AC

$\frac{10}{\cos(40°)}$ = AC

Question 18

Triangle ABC is a right triangle and cos(22.6°)= $\frac{b}{13}$. Solve for *b* and round to the nearest whole number.



Which equation correctly uses the value of *b* to solve for *a*?

tan(22.6°) = $\frac{a}{13}$

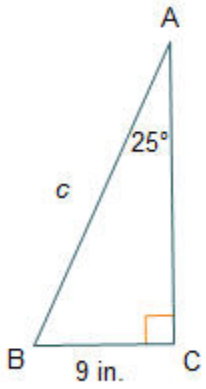
tan(22.6°) = $\frac{13}{a}$

tan(22.6°) = $\frac{a}{12}$

tan(22.6°) = $\frac{12}{a}$

Question 19

The equation $\sin(25°) = \frac{9}{c}$ can be used to find the length of $\overline{AB}$.



What is the length of $\overline{AB}$? Round to the nearest tenth.

- 19.3 in.
- 21.3 in.
- 23.5 in.
- 68.0 in.

Question 20

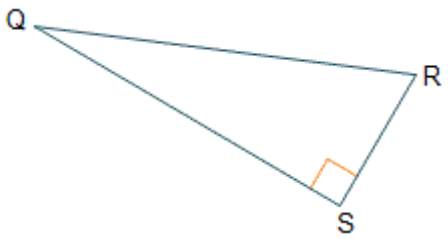
A right triangle has one angle that measure 23°. The adjacent leg measures 27.6 cm and the hypotenuse measures 30 cm.

What is the approximate area of the triangle? Round to the nearest tenth.

Area of a triangle = $\frac{1}{2}bh$

- 68.7 cm^2
- 161.8 cm^2
- 381.3 cm^2
- 450.0 cm^2

Question 21



Which statements are true about triangle QRS? Select **three** options.

The side opposite ∠Q is RS.

- [ ] The side opposite ∠R is RQ.

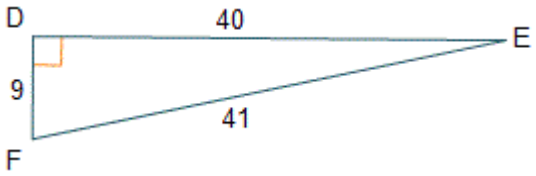
The hypotenuse is QR.

- [ ] The side adjacent to ∠R is SQ.

The side adjacent to ∠Q is QS.

Question 22

Objective: Given an acute angle of a right triangle, write ratios for sine, cosine, and tangent.

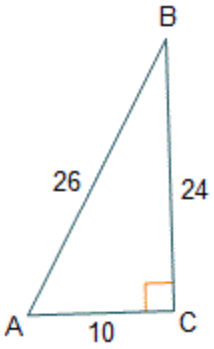


Given right triangle DEF, what is the value of tan(F)?

- $\frac{9}{41}$
- $\frac{40}{41}$
- $\frac{40}{9}$
- $\frac{41}{9}$

Question 23

Objective: Given an acute angle of a right triangle, write ratios for sine, cosine, and tangent.



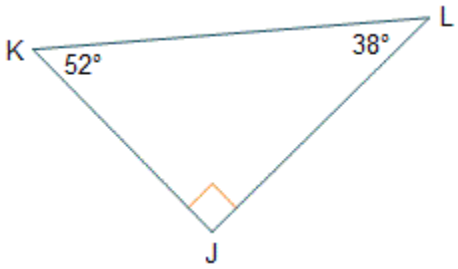
Given right triangle ABC, what is the value of tan(A)?

- $\frac{5}{13}$
- $\frac{12}{13}$
- $\frac{12}{5}$
- $\frac{13}{12}$

Question 24

Objective: Relate trigonometric ratios of similar triangles and the acute angles of a right triangle.

Use the diagram to complete the statement.



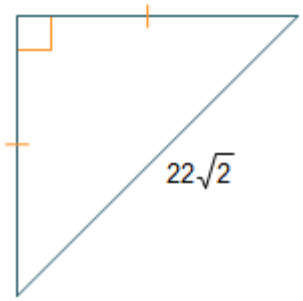
Given △JKL, sin(38°) equals

- cos(38°).
- cos(52°).
- tan(38°).
- tan(52°).

Question 25

Objective: Determine unknown measures of 45°-45°-90° triangles.

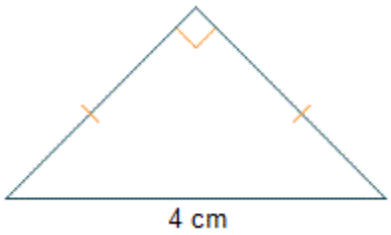
The hypotenuse of a 45°-45°-90° triangle measures $22\sqrt{2}$ units.



What is the length of one leg of the triangle?

- 11 units
- $11\sqrt{2}$ units
- 22 units
- $22\sqrt{2}$ units

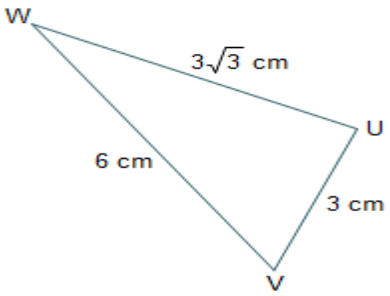
Question 26
Objective: Determine unknown measures of 45°-45°-90° triangles.



The hypotenuse of a 45°-45°-90° triangle measures 4 cm. What is the length of one leg of the triangle?

- 2 cm
- $2\sqrt{2}$ cm
- 4 cm
- $4\sqrt{2}$ cm

Question 27
Objective: Determine unknown measures of 30°-60°-90° triangles.

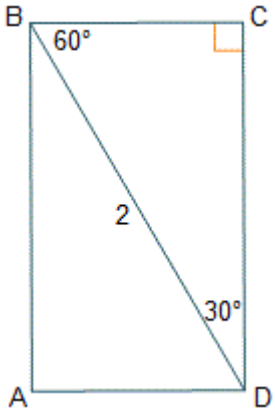


What are the angle measures of triangle VUW?

- $m\angle V = 30°$, $m\angle U = 60°$, $m\angle W = 90°$
- $m\angle V = 90°$, $m\angle U = 60°$, $m\angle W = 30°$
- $m\angle V = 30°$, $m\angle U = 90°$, $m\angle W = 60°$
- $m\angle V = 60°$, $m\angle U = 90°$, $m\angle W = 30°$

Question 28
Objective: Determine unknown measures of 30°-60°-90° triangles.

The diagonal of rectangle ABCD measures 2 inches in length.



What is the length of line segment AB?

- 1 inch
- $\sqrt{3}$ inches
- 4 inches
- $4\sqrt{3}$ inches

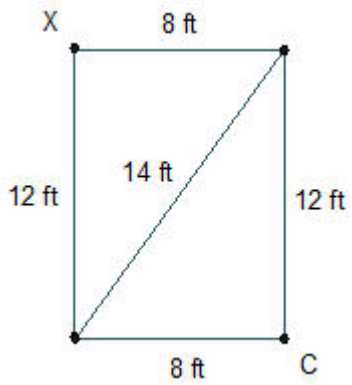
Question 29
Objective: Classify a triangle using the converse of the Pythagorean theorem and triangle inequality theorems.

Which classification **best** represents a triangle with side lengths 10 in., 12 in., and 15 in.?

- acute, because $10^2+12^2>15^2$
- acute, because $12^2+15^2>10^2$
- obtuse, because $10^2+12^2>15^2$
- obtuse, because $12^2+15^2>10^2$

Question 30
Objective: Apply the converse of the Pythagorean theorem and triangle inequality theorems to solve problems.

Joey is building a frame for a sandbox. The sandbox is going to be a quadrilateral that has the lengths shown.



If the diagonal of the sandbox measures 14 feet, which **best** describes the shape of the sandbox?

- a rectangle, because angle C is a right angle
- a rectangle, because angle C and angle X are congruent
- a quadrilateral, because angle C and angle X are acute
- a quadrilateral, because angle C and angle X are obtuse

Question 31

Objective: Determine an unknown side length or range of side lengths of a triangle given its classification.

The lengths of two sides of a right triangle are 5 inches and 8 inches. What is the difference between the two possible lengths of the third side of the triangle? Round your answer to the nearest tenth.

- 3.1 inches
- 3.2 inches
- 10.0 inches
- 15.7 inches

Question 32

Objective: Determine an unknown side length or range of side lengths of a triangle given its classification.

An acute triangle has side lengths 21 cm, x cm, and $2x$ cm. If 21 is one of the shorter sides of the triangle, what is the greatest possible length of the longest side, rounded to the nearest tenth?

- 18.8 cm
- 24.2 cm

- 42.0 cm
- 72.7 cm

Question 33
Objective: Find the coordinates of a point on a directed line segment that partitions the segment into a given ratio.

On a number line, the directed line segment from Q to S has endpoints Q at –14 and S at 2. Point R partitions the directed line segment from Q to S in a 3:5 ratio.

Which expression correctly uses the formula $\left(\frac{m}{m+n}\right)(x_2 - x_1) + x_1$ to find the location of point R?

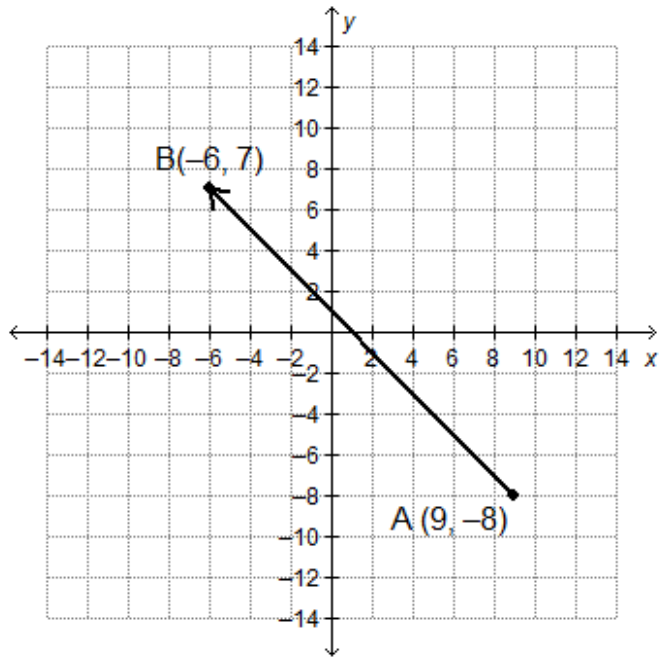
- $\left(\frac{3}{3+5}\right)(2 - (-14)) + (-14)$
- $\left(\frac{3}{3+5}\right)(-14 - 2) + 2$
- $\left(\frac{3}{3+5}\right)(2 - 14) + 14$
- $\left(\frac{3}{3+5}\right)(-14 - 2) - 2$

Question 34
Objective: Find the coordinates of a point on a directed line segment that partitions the segment into a given ratio.

If point P is $\frac{4}{7}$ of the distance from M to N, what ratio does the point P partition the directed line segment from M to N into?

- 4:1
  4:3
- 4:7
- 4:10

Question 35
Objective: Find the coordinates of a point on a directed line segment that partitions the segment into a given ratio.



What are the *x*- and *y*- coordinates of point P on the directed line segment from A to B such that P is $\frac{2}{3}$ the length of the line segment from A to B?

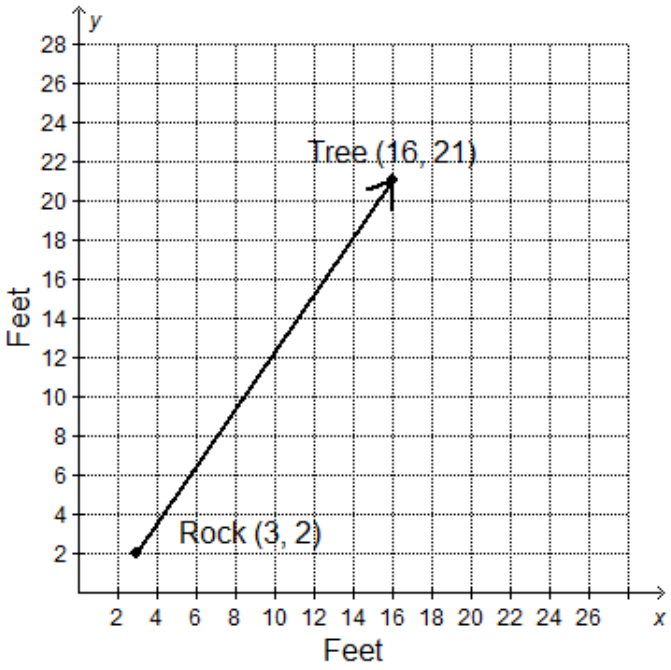
$$x = \left(\frac{m}{m+n}\right)(x_2 - x_1) + x_1$$

$$y = \left(\frac{m}{m+n}\right)(y_2 - y_1) + y_1$$

- (2, –1)
- (4, –3)
- (–1, 2)
- (3, –2)

Question 36

Objective: Model and solve real-world problems involving directed line segments.



A treasure map says that a treasure is buried so that it partitions the distance between a rock and a tree in a 5:9 ratio. Marina traced the map onto a coordinate plane to find the exact location of the treasure.

$$x = \left(\frac{m}{m+n}\right)(x_2 - x_1) + x_1$$

$$y = \left(\frac{m}{m+n}\right)(y_2 - y_1) + y_1$$

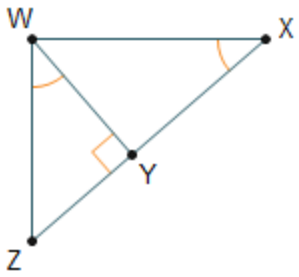
What are the coordinates of the treasure? If necessary, round the coordinates to the nearest tenth.

- (11.4, 14.2)
  (7.6, 8.8)
- (5.7, 7.5)
- (10.2, 12.6)

Question 37

Objective: Identify similar right triangles formed by an altitude and write a similarity statement.

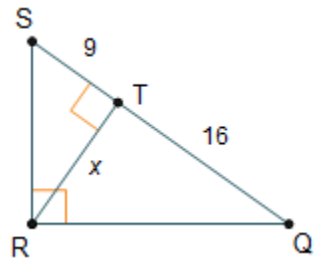
$\overline{WY}$ is an altitude in triangle WXZ.



If ΔYWZ ~ ΔYXW, what is true about $\angle$XWZ?

- $\angle$XWZ is an obtuse angle.
- $\angle$XWZ is a right angle.
- $\angle$XWZ is congruent to $\angle$WXY.
- $\angle$XWZ is congruent to $\angle$XZW.

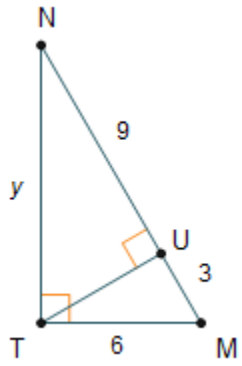
Question 38
Objective: Identify similar right triangles formed by an altitude and write a similarity statement.



What is the value of *x*?

- 12 units
- 15 units
- 20 units
- 25 units

Question 39
Objective: Apply the Pythagorean theorem to find side lengths of a right triangle.

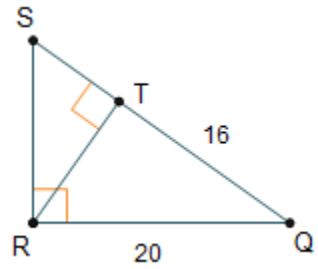


What is the value of y?

- $3\sqrt{3}$ units
- $6\sqrt{3}$ units
- $9\sqrt{3}$ units
- $12\sqrt{3}$ units

Question 40

Objective: Apply the Pythagorean theorem to find side lengths of a right triangle.

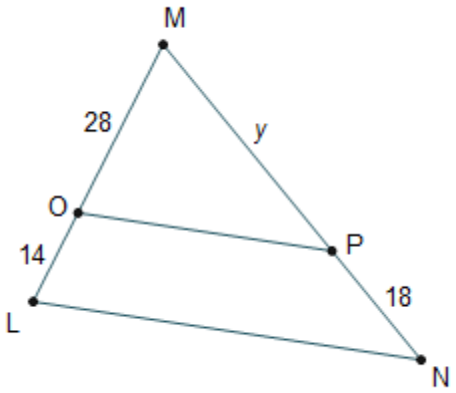


What is the length of $\overline{SR}$?

- 9 units
- 12 units
- 15 units
- 18 units

Question 41

Objective: Solve for unknown measures of similar triangles using the side-splitter theorem and its converse.

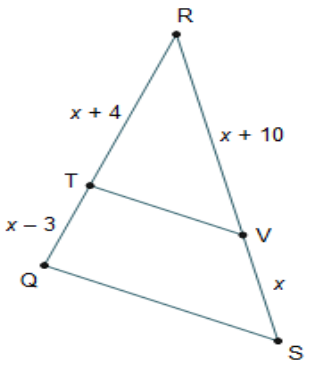


Which value of *y* would make $\overline{OP} \parallel \overline{LN}$?

- 16
- 24
- 32
- 36

Question 42

Objective: Solve for unknown measures of similar triangles using the side-splitter theorem and its converse.

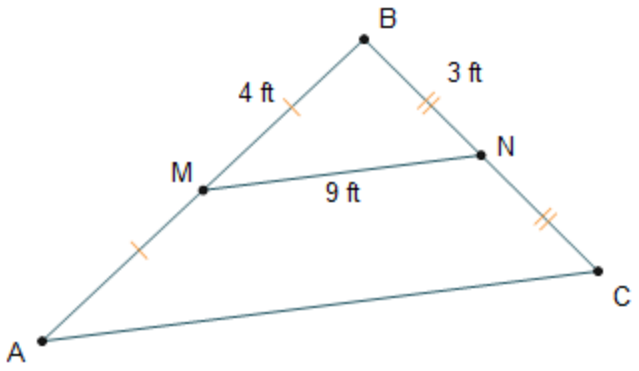


Which value of *x* would make $\overline{TV} \parallel \overline{QS}$?

- 3
- 8
- 10
- 11

Question 43

Objective: Solve for unknown measures of similar triangles using the triangle mid - segment theorem.



What is the length of $\overline{AC}$?

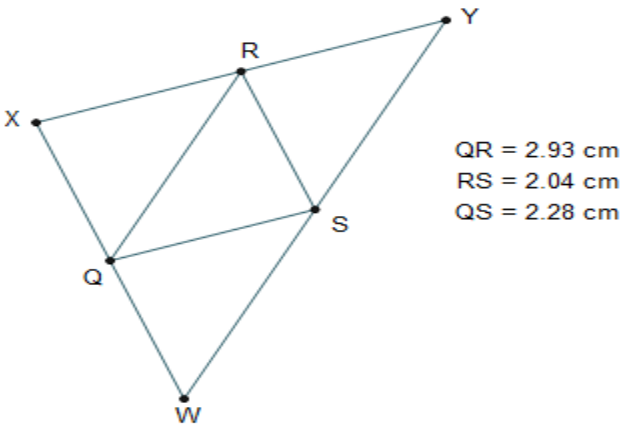
- 3 ft
- 4 ft
- 9 ft

18 ft

Question 44

Objective: Solve for unknown measures of similar triangles using the triangle mid-segment theorem.

$\overline{QR}$, $\overline{RS}$, are $\overline{SQ}$ mid-segments of ΔWXY.



QR = 2.93 cm
RS = 2.04 cm
QS = 2.28 cm

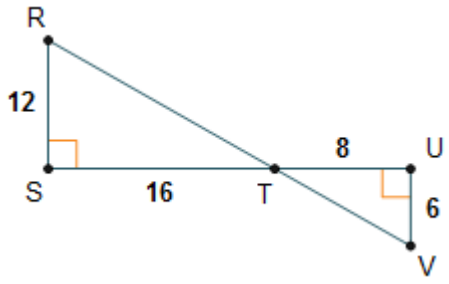
What is the perimeter of ΔWXY?

- 11.57 cm
- 12.22 cm
- 12.46 cm

14.50 cm

Question 45

Objective: Identify the sides and angle that can be used to prove triangle similarity using SSS similarity theorem and SAS similarity theorem.



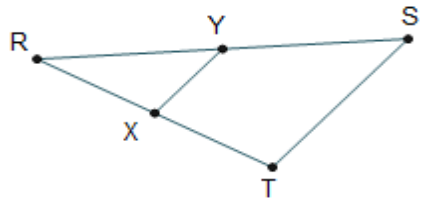
Which statements can be concluded from the diagram and used to prove that the triangles are similar by the SAS similarity theorem?

- $\frac{RS}{VU} = \frac{ST}{UT}$ and $\angle S \cong \angle U$
- $\frac{RS}{VU} = \frac{ST}{UT} = \frac{RT}{VT}$
- $\frac{RS}{VU} = \frac{TU}{TS}$ and $\angle S \cong \angle U$
- $\frac{RS}{VU} = \frac{TU}{TS} = \frac{RT}{VT}$

Question 46

Objective: Identify the sides and angle that can be used to prove triangle similarity using SSS similarity theorem and SAS similarity theorem.

Consider $\triangle RST$ and $\triangle RYX$.

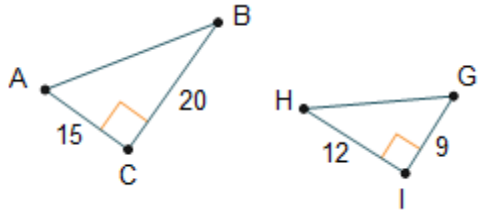


If the triangles are similar, which must be true?

- $\frac{RY}{YS} = \frac{RX}{XT} = \frac{XY}{TS}$
- $\frac{RY}{RS} = \frac{RX}{RT} = \frac{XY}{TS}$
- $\frac{RY}{RS} = \frac{RX}{RT} = \frac{RS}{RY}$
- $\frac{RY}{RX} = \frac{RS}{RT} = \frac{XY}{TS}$

Question 47
Objective: Identify the sides and angle that can be used to prove triangle similarity using SSS similarity theorem and SAS similarity theorem.

Consider the two triangles.

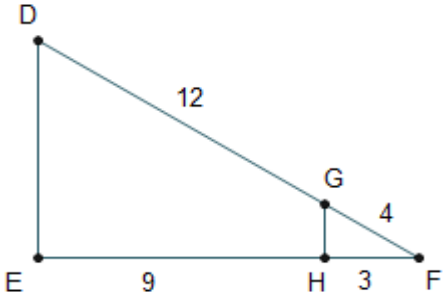


To prove that the triangles are similar by the SAS similarity theorem, it needs to be shown that

- $\angle C \cong \angle C$
- $\angle C \cong \angle G$
- $\frac{AC}{GI} = \frac{HI}{BC}$
- $\frac{AC}{GI} = \frac{BC}{HI}$

Question 48
Objective: Identify the sides and angle that can be used to prove triangle similarity using SSS similarity theorem and SAS similarity theorem.

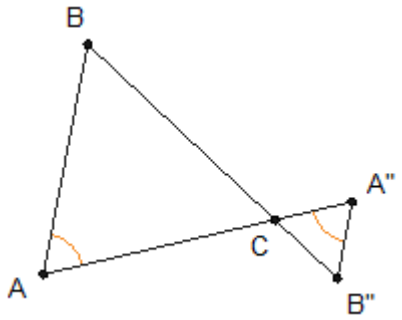
In the diagram, DG = 12, GF = 4, EH = 9, and HF = 3.



To prove that △DFE ~ △GFH by the SAS similarity theorem, it can be stated that $\frac{DF}{GF} = \frac{EF}{HF}$ and

- ∠DFE is 4 times greater than ∠GFH.
- ∠FHG is $\frac{1}{4}$ the measure of ∠FED.
  ∠DFE is congruent to ∠GFH.
- ∠FHG is congruent to ∠EFD

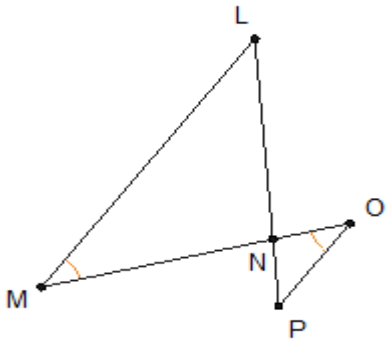
Question 49
Objective: Identify the composition of similarity transformations in a mapping of two triangles.



Which transformations could have occurred to map △ABC to △A"B"C?

- a rotation and a reflection
- a translation and a dilation
- a reflection and a dilation
  a dilation and a rotation

Question 50
Objective: Identify the composition of similarity transformations in a mapping of two triangles.



Why is the information in the diagram enough to determine that $\triangle LMN \sim \triangle PON$ using a rotation about point N and a dilation?

- because both triangles appear to be equilateral
because$\angle MNL$ and $\angle ONP$ are congruent angles
- because one pair of congruent corresponding angles is sufficient to determine similar triangles
- because both triangles appear to be isosceles, $\angle MLN \cong \angle LMN$, and $\angle NOP \cong \angle OPN$

Question 51
Objective: Identify the composition of similarity transformations in a mapping of two triangles.

Which **best** explains why all equilateral triangles are similar?

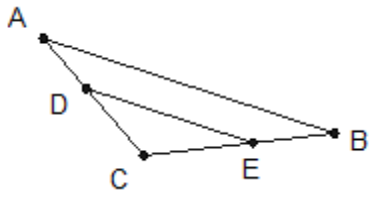
- All equilateral triangles can be mapped onto each other using dilations.
- All equilateral triangles can be mapped onto each other using rigid transformations.
All equilateral triangles can be mapped onto each other using combinations of dilations and rigid transformations.
- All equilateral triangles are congruent and therefore similar, with side lengths in a 1:1 ratio.

Question 52
Objective: Complete the steps to prove triangles are similar using the AA similarity theorem.

Read the proof.

Given: $\overline{AB} \parallel \overline{DE}$

Prove: $\triangle ACB \sim \triangle DCE$



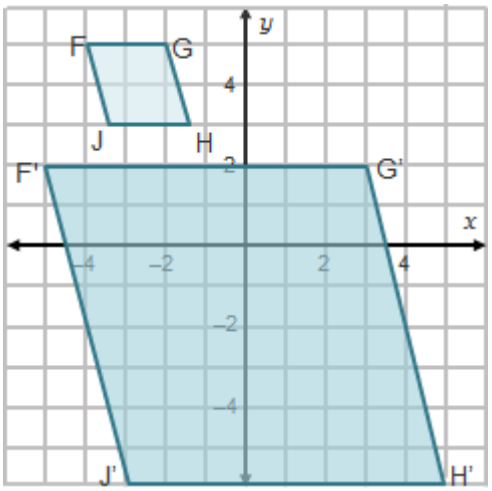
We are given $\overline{AB} \parallel \overline{DE}$. Because the lines are parallel and segment CB crosses both lines, we can consider segment CB a transversal of the parallel lines. Angles CED and CBA are corresponding angles of transversal $\overline{CB}$ and are therefore congruent, so $\angle CED \cong \angle CBA$. We can state $\angle C \cong \angle C$ using the reflexive property. Therefore, $\triangle ACB \sim \triangle DCE$ by the:

AA similarity theorem.

- SSS similarity theorem.
- AAS similarity theorem.
- ASA similarity theorem.

Question 53
Objective: Verify the properties of dilations, including the scale factor and slopes of corresponding line segments.

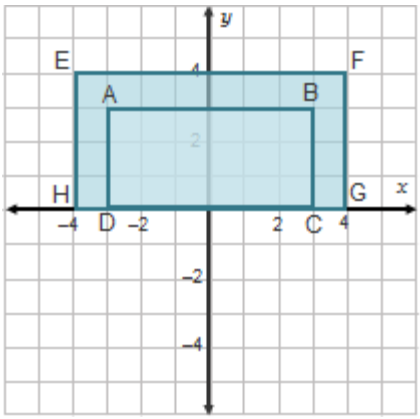
Parallelogram FGHJ was dilated and translated to form similar parallelogram F'G'H'J'.



What is the scale factor of the dilation?

- $\frac{1}{8}$
- $\frac{1}{4}$
- 4
- 8

Question 54
Objective: Verify the properties of dilations, including the scale factor and slopes of corresponding line segments.



Is rectangle EFGH the result of a dilation of rectangle ABCD with a center of dilation at the origin? Why or why not?

Yes, because corresponding sides are parallel and have lengths in the ratio $\frac{4}{3}$.

Yes, because both figures are rectangles and all rectangles are similar.

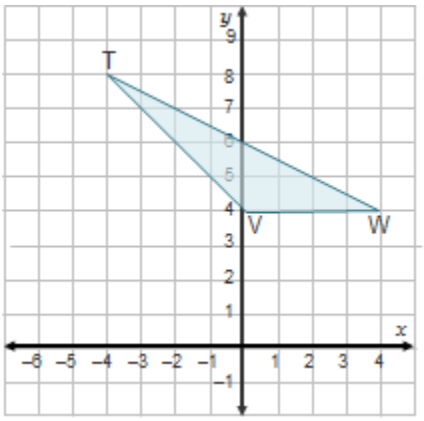
No, because the center of dilation is not at (0, 0).

No, because corresponding sides have different slopes.

Question 55

Objective: Find the coordinates of the vertices of an image or pre-image of a dilated polygon given the scale factor.

Triangle TVW is dilated according to the rule $D_{O,\frac{3}{4}}(x,y) \rightarrow \left(\frac{3}{4}x, \frac{3}{4}y\right)$ to create the image triangle T'V'W', which is not shown.



What are the coordinates of the endpoints of the segment T'V'?

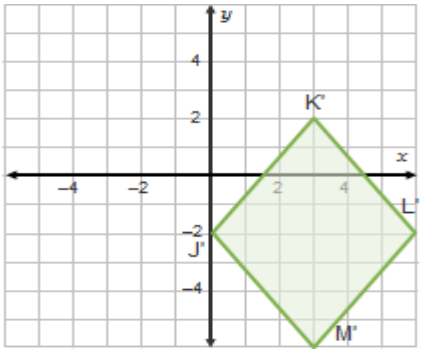
T'(-3, 6) and V'(0, 3)

T'(-3, 6) and V'(0, 1)

- T'(-1, 2) and V'(0, 3)
- T'(-1, 2) and V'(0, 1)

Question 56
Objective: Find the coordinates of the vertices of an image or pre-image of a dilated polygon given the scale factor.

Quadrilateral JKLM was dilated according to the rule $D_{O,\frac{1}{2}}(x,y) \rightarrow \left(\frac{1}{2}x, \frac{1}{2}y\right)$ to create the image quadrilateral J'K'L'M', which is shown on the graph.



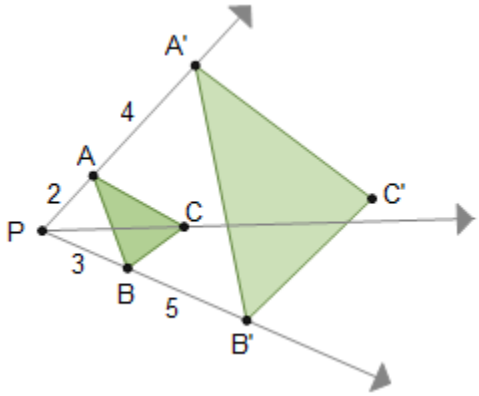
What are the coordinates of vertex J of the pre-image?

(0, -4)
- (0, -1)
- (0, 0)
- (0, 4)

Question 57
Objective: Determine the unknown measures of an image or pre-image of a dilated figure given the scale factor.
If an image of a triangle is congruent to the pre-image, what is the scale factor of the dilation?

- 0.1
- $\frac{1}{2}$
- 1
- 10

Question 58
Objective: Calculate and interpret the scale factor for dilations of figures.



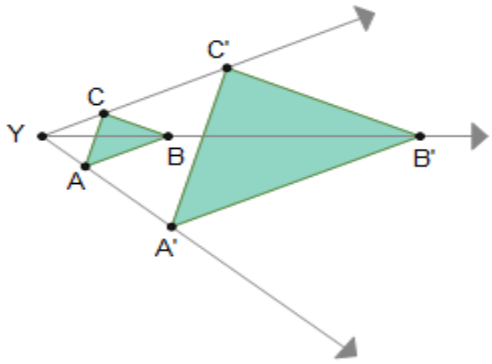
Is triangle A'B'C' a dilation of triangle ABC? Explain.

- Yes, it is an enlargement with a scale factor of 3.
- Yes, it is an enlargement with a scale factor of $\frac{8}{3}$.
- No, it is not a dilation because the points of the image are not moved away from the center of dilation proportionally.
- No, it is not a dilation because the sides of the image are proportionally reduced from the pre-image.

Question 59

Objective: Determine the unknown measures of an image or pre-image of a dilated figure given the scale factor.

Triangle ABC was dilated using the rule $D_{Y,\frac{5}{4}}$.

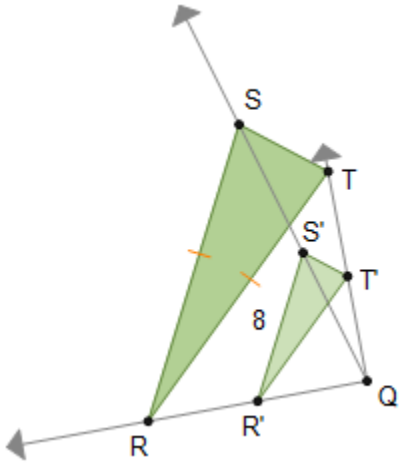


If CA = 8, what is C'A'?

- 10 units
- 12 units
- 16 units
- 20 units

Question 60
Objective: Determine the unknown measures of an image or pre-image of a dilated figure given the scale factor.

Triangle RST was dilated by a scale factor of $\frac{1}{2}$. The image, triangle R'S'T', is an isosceles triangle, with each leg measuring 8 units.

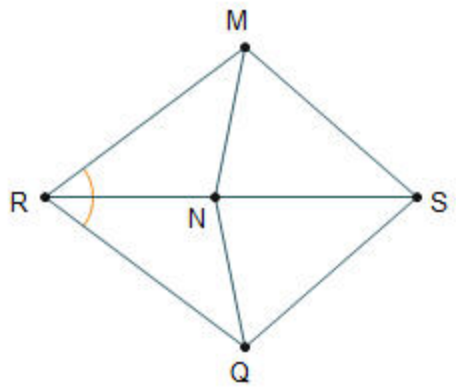


What is the length of a leg of the pre-image, triangle RST?

- 4 units
- 8 units
- 16 units
- 20 units

Question 61
Objective: Identify the triangle congruency theorem that can be used to prove two triangles congruent.

Given: $\overline{RS}$ bisects ∠MRQ; ∠RMS ≅ ∠RQS

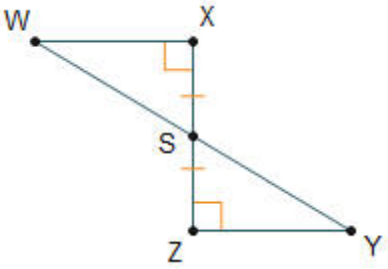


Which relationship in the diagram is true?

- ΔMNR ≅ ΔMNS by ASA
  ΔRMS ≅ ΔRQS by AAS
- ΔSNQ ≅ ΔSNM by SSS
- ΔQNR ≅ ΔMNR by HL

Question 62
Objective: Identify the triangle congruency theorem that can be used to prove two triangles congruent.

Which congruence theorem can be used to prove △WXS ≅ △YZS?



- SSS
  ASA
- SAS
- HL

Question 63
Objective: Identify the triangle congruency theorem that can be used to prove two triangles congruent.

Two sides and the non-included right angle of one right triangle are congruent to the corresponding parts of another right triangle. Which congruence theorem can be used to prove that the triangles are congruent?

- AAS
- SSS
- SAS
- HL

Question 64

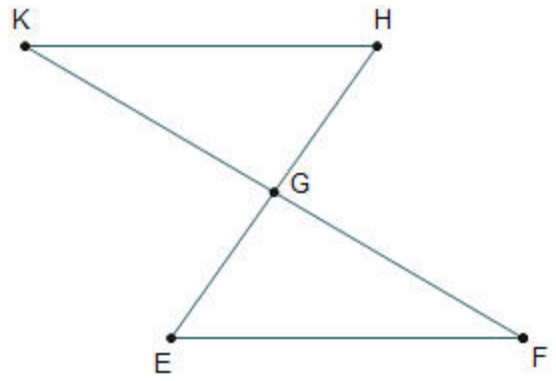
Objective: Complete the steps to prove angles, segments, and triangles are congruent using triangle congruence theorems and CPCTC.

The proof that $\overline{HG} \cong \overline{EG}$ is shown.

Given: G is the midpoint of $\overline{KF}$

$\overline{KH} \parallel \overline{EF}$

Prove: $\overline{HG} \cong \overline{EG}$



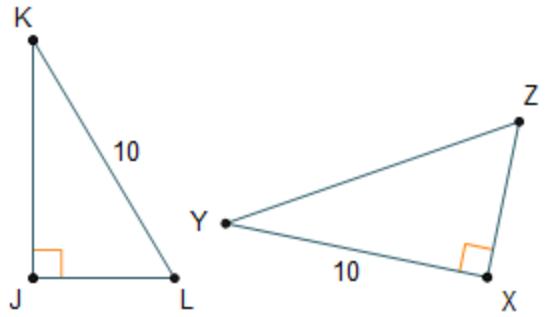
What is the missing reason in the proof?

Statement	Reason
1. $\angle EGF \cong \angle HGK$	1. vert. $\angle$s are $\cong$
2. $\overline{KH} \parallel \overline{EF}$	2. given
3. $\angle F \cong \angle K$	3. alt. int. $\angle$s are $\cong$
4. G is the midpoint of $\overline{KF}$	4. given
5. $\overline{FG} \cong \overline{KG}$	5. def. of midpt.
6. $\triangle FEG \cong \triangle KHG$	6. ?

7. $\overline{HG} \cong \overline{EG}$	7. CPCTC

- SAS
  ASA
- AAS
- HL

Question 65
Objective: Identify the parts that can be used to prove triangle congruency using SSS or HL.



Could ΔJKL be congruent to ΔXYZ? Explain.

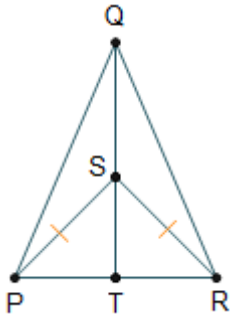
- Yes, if $\overline{JL} \cong \overline{XZ}$.
- Yes, if XZ = 10.
  No, because the hypotenuse of one triangle is equal in length to the leg of the other triangle.
- No, because the leg of one triangle is equal in length to the leg of the other triangle.

Question 66
Objective: Complete the steps to prove triangles are congruent using SSS or HL.

The proof that ΔQPT ≅ ΔQRT is shown.

Given: $\overline{SP} \cong \overline{SR}$

Prove: ΔQPT ≅ ΔQRT



What is the missing reason in the proof?

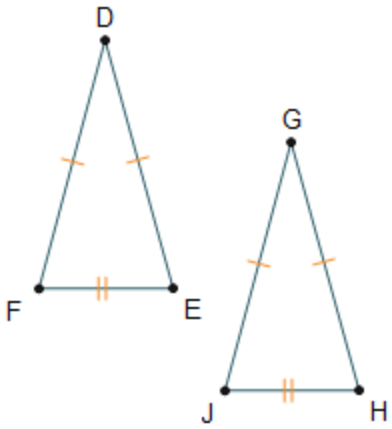
Statements	Reasons
1. $\overline{SP} \cong \overline{SR}$	1. given
2. $\overline{ST} \perp \overline{PR}$	2. converse of the perpendicular bisector theorem
3. $\overline{PT} \cong \overline{RT}$	3. ?
4. $\overline{QT} \perp \overline{PR}$	4. $\overline{ST}$ and $\overline{QT}$ name the same line.
5. $\overline{QP} \cong \overline{QR}$	5. perpendicular bisector theorem
6. $\Delta QPT \cong \Delta QRT$	6. HL theorem

definition of perpendicular bisector

- definition of congruence
- reflexive property
- substitution property

Question 67

Objective: Determine the isometric transformations that would map one triangle onto another triangle given that three corresponding sides are congruent.

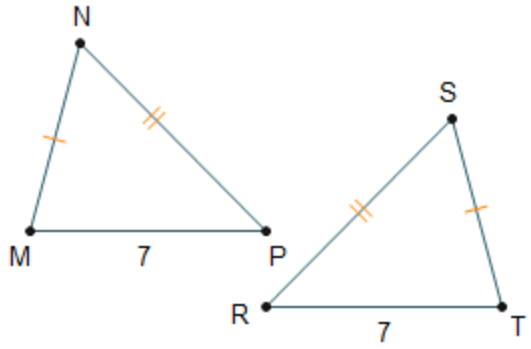


Triangle DEF is congruent to $\triangle$GHJ by the SSS theorem. Which rigid transformation is required to map $\triangle$DEF onto $\triangle$GHJ?

- dilation
- reflection
- rotation
- translation

Question 68
Objective: Determine the isometric transformations that would map one triangle onto another triangle given that three corresponding sides are congruent.

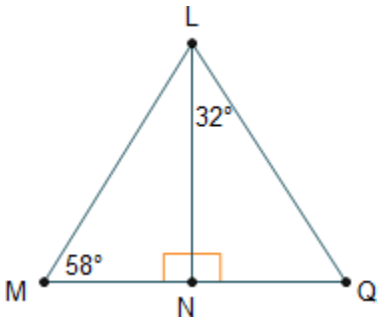
The triangles are congruent by the SSS congruence theorem.



Which rigid transformation(s) can map $\triangle$MNP onto $\triangle$TSR?

- reflection only
- rotation only
- translation, then reflection
- translation, then rotation

Question 69
Objective: Identify the side and angles that can be used to prove triangle congruency using ASA or AAS.



Is $\triangle$MNL $\cong$ $\triangle$QNL? Why or why not?

Yes, they are congruent by either ASA or AAS.

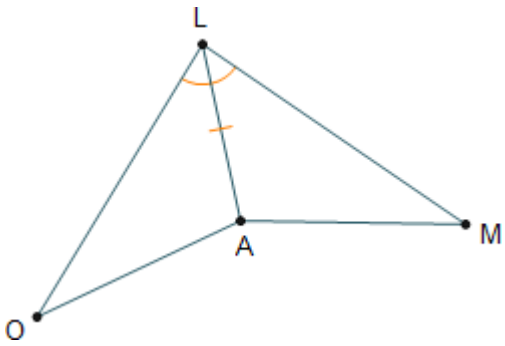
Yes, they are both right triangles.

No, $\angle$M is not congruent to $\angle$NLQ.

No, there are no congruent sides.

Question 70

Objective: Identify the side and angles that can be used to prove triangle congruency using ASA or AAS.



What additional information is needed to prove that the triangles are congruent using the AAS congruence theorem?

LO $\cong$ LM

OA $\cong$ MA

$\angle$LOA $\cong$ $\angle$LMA

$\angle$LAO $\cong$ $\angle$LAM

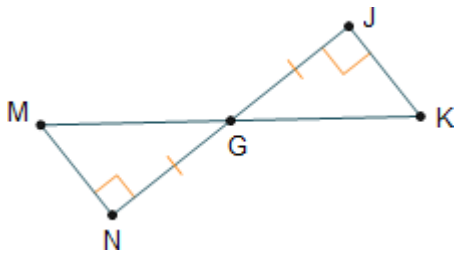
Question 71

Objective: Complete the steps to prove triangles are congruent using ASA or AAS.

The proof that $\triangle$MNG $\cong$ $\triangle$KJG is shown.

Given: ∠N and ∠J are right angles; NG ≅ JG

Prove: △MNG ≅ △KJG



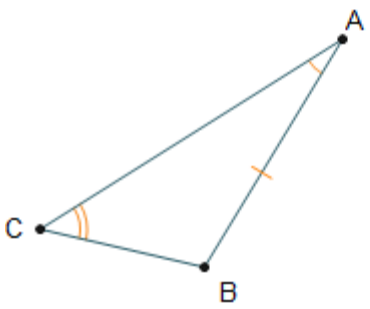
What is the missing reason in the proof?

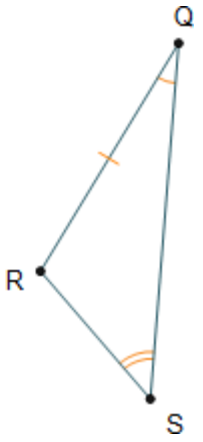
Statement	Reason
1. $\overline{NG} \cong \overline{JG}$	1. given
2. ∠N and ∠J are right angles	2. given
3. ∠MGN ≅ ∠KGJ	3. vert. ∠s are ≅
4. ∠N ≅ ∠J	4. rt. ∠s are ≅
5. △MNG ≅ △KJG	5. ?

- the reflexive property
  ASA
- AAS
- the third angle theorem

Question 72

Objective: Determine the isometric transformations that would map one triangle onto another triangle given that two pairs of corresponding angles and one pair of corresponding sides are congruent.



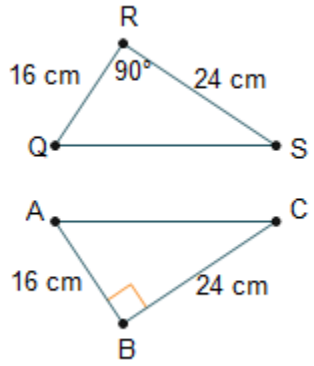


Two rigid transformations are used to map △ABC to △QRS. The first is a translation of vertex B to vertex R. What is the second transformation?

- a reflection across the line containing AB

- a rotation about point B
- a reflection across the line containing CB
- a rotation about point C

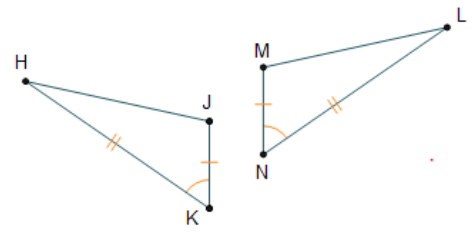
Question 73
Objective: Determine the isometric transformations that would map one triangle onto another triangle given that two corresponding sides and the included angle are congruent.



Is there a series of rigid transformations that could map ΔQRS to ΔABC? If so, which transformations could be used?

- No, ΔQRS and ΔABC are congruent but ΔQRS cannot be mapped to ΔABC using a series rigid transformations.
- No, ΔQRS and ΔABC are not congruent.
- Yes, ΔQRS can be translated so that R is mapped to B and then rotated so that S is mapped to C.
  Yes, ΔQRS can be translated so that Q is mapped to A and then reflected across the line containing QS.

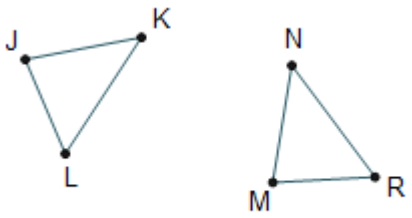
Question 74
Objective: Determine the isometric transformations that would map one triangle onto another triangle given that two corresponding sides and the included angle are congruent.



How can a translation and a reflection be used to map ΔHJK to ΔLMN?

- Translate K to N and reflect across the line containing $\overline{HJ}$.
  Translate K to N and reflect across the line containing $\overline{JK}$.
- Translate H to L and reflect across the line containing $\overline{JK}$.
- Translate K to L and reflect across the line containing $\overline{HJ}$.

Question 75
Objective: Identify the sides and angle that can be used to prove triangle congruency using SAS.

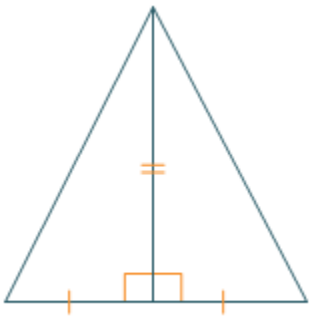


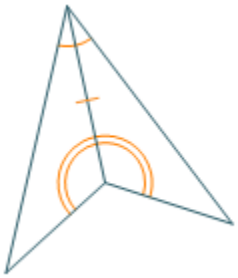
In the diagram, ∠J ≅ ∠M and $\overline{JL}$ ≅ $\overline{MR}$. What additional information is needed to show ΔJKL ≅ △MNR by SAS?

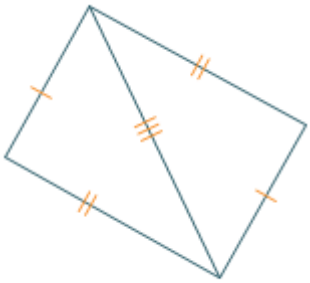
- $\overline{KL}$ ≅ $\overline{NR}$
- ∠L ≅ ∠R
- ∠K ≅ ∠N
  $\overline{JK}$ ≅ $\overline{MN}$

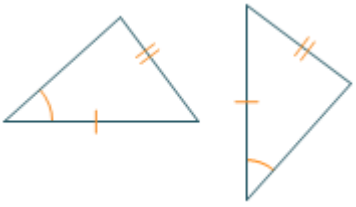
Question 76
Objective: Identify the sides and angle that can be used to prove triangle congruency using SAS.

Which pair of triangles can be proven congruent by SAS?



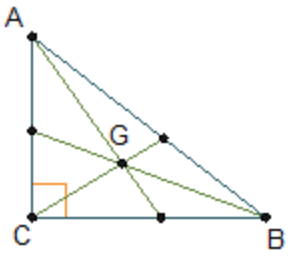


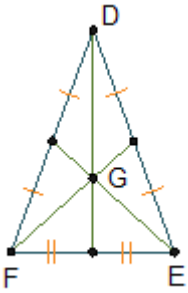


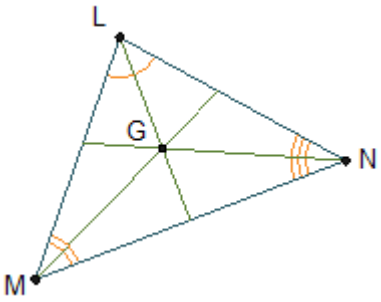


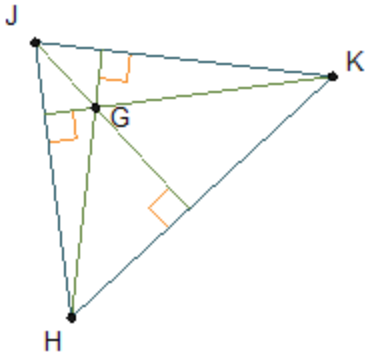
Question 77
Objective: Identify the characteristics of the centroid or orthocenter of a triangle.

In which figure is point G a centroid?

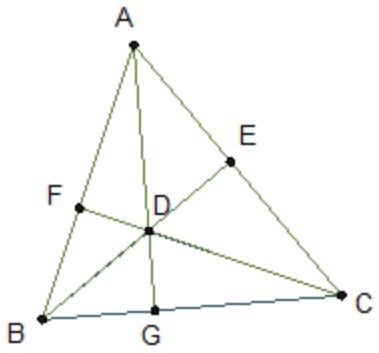








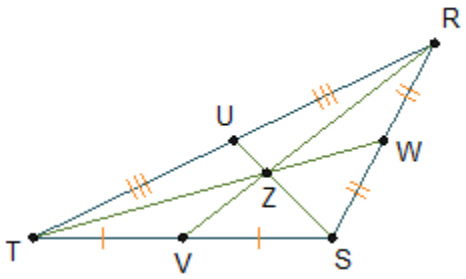
Question 78
Objective: Identify the characteristics of the centroid or orthocenter of a triangle.



In the diagram, which **must** be true for point D to be an orthocenter?

- BE, CF, and AG are angle bisectors.
  BE ⊥ AC, AG ⊥ BC, and CF ⊥ AB.
- BE bisects AC, CF bisects AB, and AG bisects BC.
- BE is a perpendicular bisector of AC, CF is a perpendicular bisector of AB, and AG is a perpendicular bisector of BC.

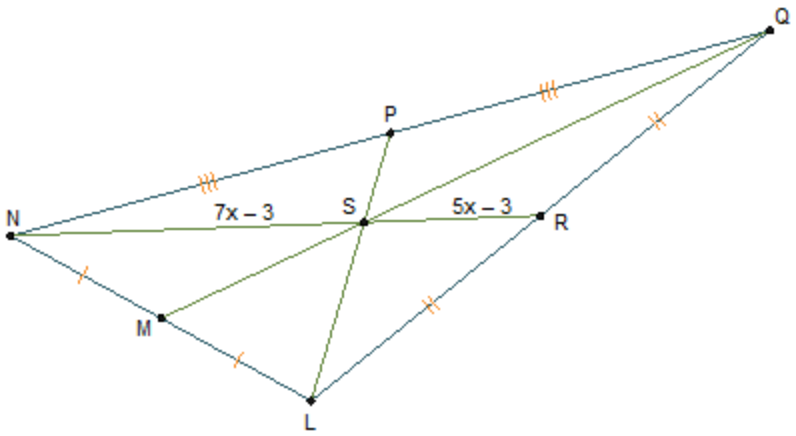
Question 79
Objective: Solve for unknown measures created by medians in a triangle.



In triangle TRS, VZ = 6 inches. What is RZ?

- 3 inches
- 6 inches
  12 inches
- 18 inches

Question 80
Objective: Solve for unknown measures created by medians in a triangle.



What is the length of segment NS?

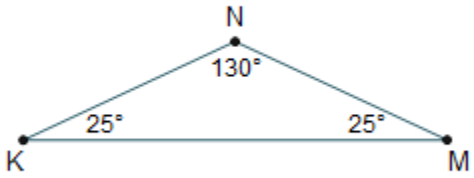
- 1 unit
- 2 units

4 units

- 6 units

Question 81
Objective: Identify characteristics of an isosceles triangle.

Triangle KNM is shown.



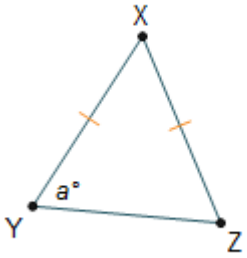
What is true about the sides of KNM?

KN = NM

- KN + NM = KM
- KM = 2(NM)
- KN = $\frac{1}{2}$ KM

Question 82
Objective: Identify characteristics of an isosceles triangle.

Triangle XYZ is isosceles. Angle Y measures $a°$.



What expression represents the measure of angle X?

- $2a$
- $\frac{a}{2}$
- $90 - a$
- $180 - 2a$

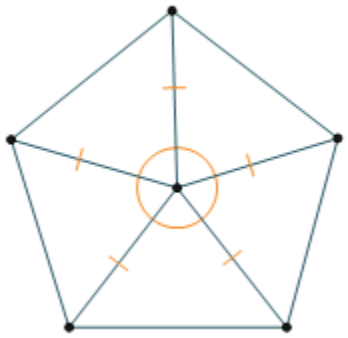
Question 83
Objective: Solve for unknown measures of isosceles triangles.

Triangle JKL is isosceles. The measure of angle J is 72° and the measure of angle K is 36°. Which statement describes angle L?

- Angle L is a base angle and measures 36°.
  Angle L is a base angle and measures 72°.
- Angle L is a vertex angle and measures 36°.
- Angle L is a vertex angle and measures 72°.

Question 84
Objective: Solve for unknown measures of isosceles triangles.

A regular pentagon is created using the bases of five congruent isosceles triangles, joined at a common vertex.



The total number of degrees in the center is 360°. If all five vertex angles meeting at the center are congruent, what is the measure of a base angle of one of the triangles?

54°

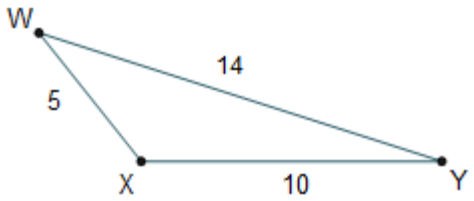
72°

108°

144°

Question 85
Objective: Identify angle and side relationships in a triangle.

Consider triangle WXY.



Which statement about the angles is true?

Angle W is greater than angle Y.

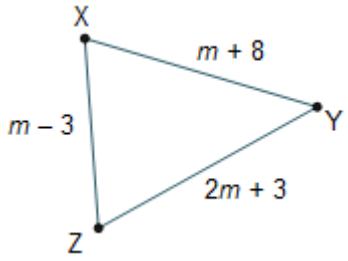
Angle Y is the largest angle.

Angle X is smaller than angle W.

Angle W is the smallest angle.

Question 86
Objective: Identify angle and side relationships in a triangle.

The lengths of the sides of triangle XYZ are written in terms of the variable m, where $m \geq 6$.

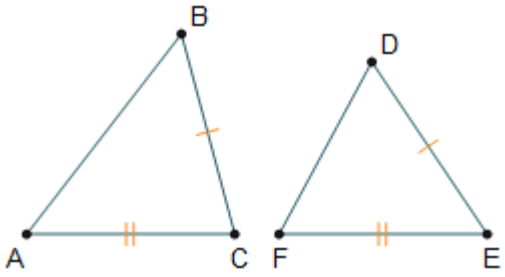


Which is correct regarding the angles of the triangle?

- $m\angle X < m\angle Z < m\angle Y$
  $m\angle Y < m\angle Z < m\angle X$
- $m\angle Y < m\angle X < m\angle Z$
- $m\angle Z < m\angle Y < m\angle X$

Question 87
Objective: Identify angle and side relationships between two triangles.

In the triangles, $\overline{BC} \cong \overline{DE}$ and $\overline{AC} \cong \overline{FE}$.

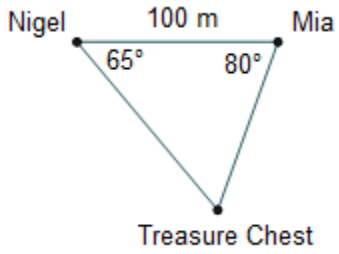


If $m\angle C$ is greater than $m\angle E$, then $\overline{AB}$ is _____ $\overline{DF}$.

- congruent to
  longer than
- shorter than
- the same length as

Question 88
Objective: Solve real world problems involving relationships between angle measures and side lengths of one or two triangles.

Nigel and Mia are searching for a treasure chest under water. The straight line distance between them is 100 meters.



Given the angles in the diagram, who is closer to the treasure chest and why?

- Nigel is closer because his distance to the chest is opposite the larger angle.
  Mia is closer because her distance to the chest is opposite the smaller angle.
- Nigel is closer because his distance from the chest is 100 meters.
- Mia is closer because her distance from the chest is 100 meters.

Question 89
Objective: Analyze the relationships between the angles of acute, right, and obtuse triangles.

If triangle RST is an acute triangle, then $m\angle S$ **must** be less than 90°.

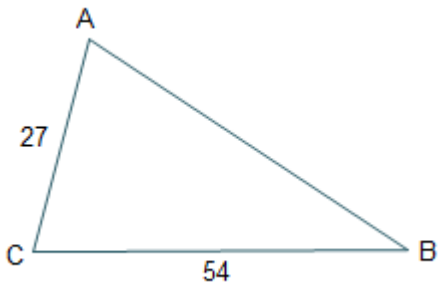
- equal to 90°.
- equal to 100°.
- greater than 90° and less than 180°.

Question 90
Objective: Analyze the relationships between the angles of acute, right, and obtuse triangles.

If isosceles triangle ABC has a 130° angle at vertex B, which statement must be true?

- $m\angle A = 15°$ and $m\angle C = 35°$
  $m\angle A + m\angle B = 155°$
- $m\angle A + m\angle C = 60°$
- $m\angle A = 20°$ and $m\angle C = 30°$

Question 91
Objective: Determine the length or parameters for a third side of a triangle given the other two sides.



Based on the diagram, which expresses all possible lengths of segment AB?

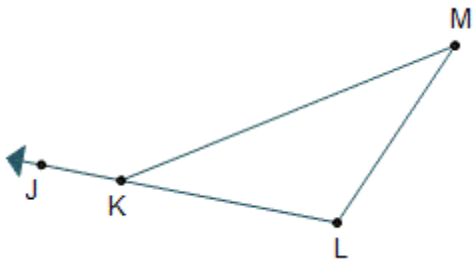
- AB = 25
  27 < AB < 81
- AB = 85
- AB< 27 or AB > 81

Question 92
Objective: Determine the length or parameters for a third side of a triangle given the other two sides.

Chang knows one side of a triangle is 13 cm. Which set of two sides is possible for the lengths of the other two sides of this triangle?

- 5 cm and 8 cm
- 6 cm and 7 cm
- 7 cm and 2 cm
  8 cm and 8 cm

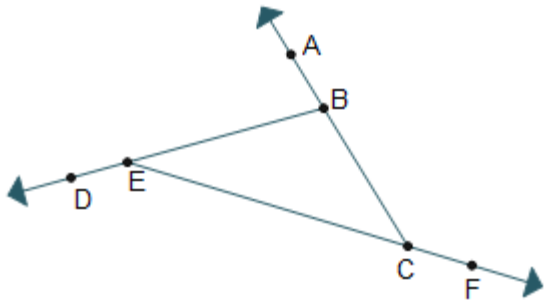
Question 93
Objective: Identify and relate the interior and exterior angles of a triangle.



Which angle is an adjacent interior angle to ∠JKM?

- ∠JKL
  ∠MKL
- ∠KLM
- ∠LMK

Question 94
Objective: Identify and relate the interior and exterior angles of a triangle.



Which statements regarding the diagram of ΔEBC are true? Select **three** options.

- ∠BEC is an exterior angle.

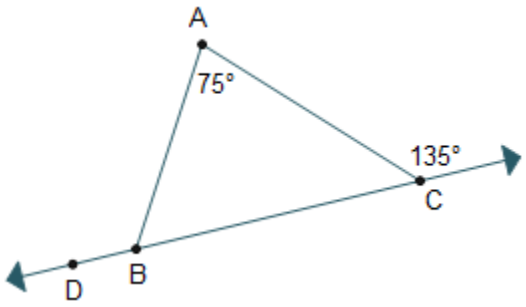
∠DEC is an exterior angle.

∠ABE and ∠EBC are supplementary angles.

- ∠BCF and ∠DEC are supplementary angles.

∠BEC is a remote interior angle to exterior ∠BCF.

Question 95
Objective: Calculate the measures of interior and exterior angles of a triangle.



What is $m\angle ABC$?

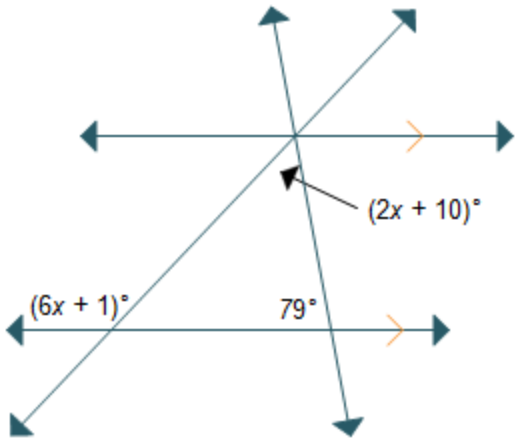
- $m\angle ABC = 15°$
- $m\angle ABC = 45°$

$m\angle ABC = 60°$

- $m\angle ABC = 75°$

Question 96

Objective: Calculate the measures of interior and exterior angles of a triangle.



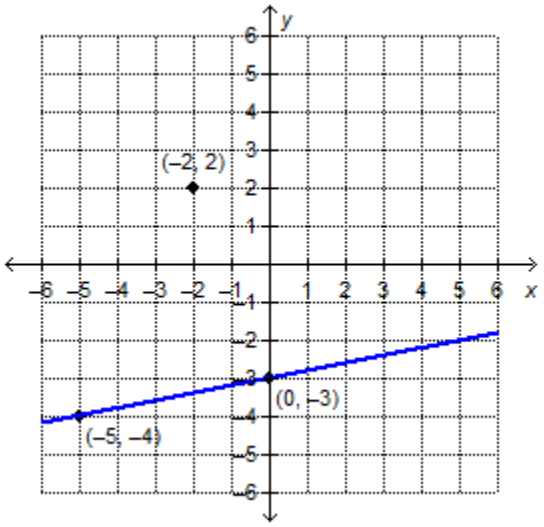
What is the value of x?

- $x = 2.25$
- $x = 11.25$
- $x = 13$

$x = 22$

Question 97

Objective: Write the equation of a line parallel to a given line that goes through a particular point.



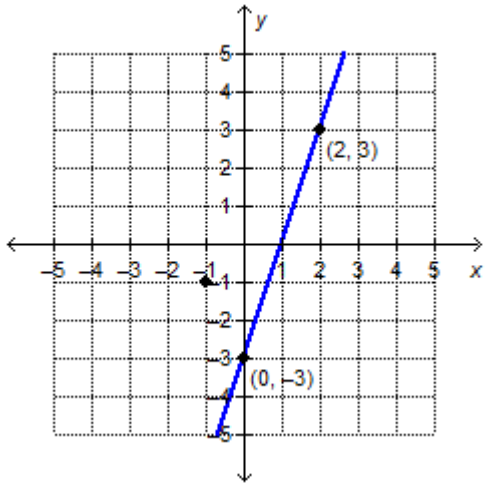
What is the equation of the line that is parallel to the given line and passes through the point (–2, 2)?

- $y = \frac{1}{5}x + 4$
- $y = \frac{1}{5}x + \frac{12}{5}$
- $y = -5x + 4$
- $y = -5x + \frac{12}{5}$

Question 98

Objective: Write the equation of a line parallel to a given line that goes through a particular point.

The given line passes through the points $(0, -3)$ and (2, 3).

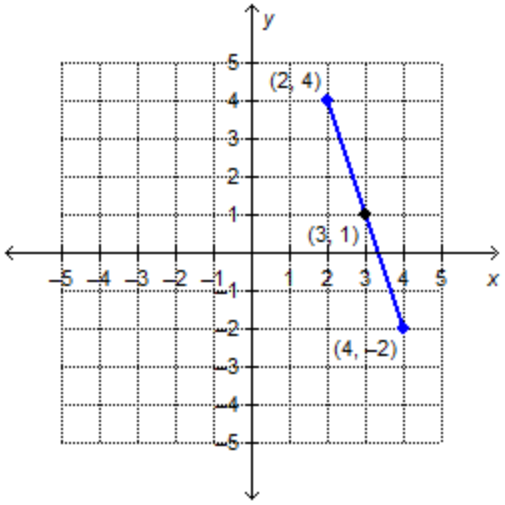


What is the equation, in point-slope form, of the line that is parallel to the given line and passes through the point $(-1, -1)$?

- $y + 1 = -3(x + 1)$
- $y + 1 = -\frac{1}{3}(x + 1)$
- $y + 1 = \frac{1}{3}(x + 1)$
- $y + 1 = 3(x + 1)$

Question 99
Objective: Write the equation of a line perpendicular to a given line or segment that goes through a particular point.

The given line segment has a midpoint at (3, 1).



What is the equation, in slope-intercept form, of the perpendicular bisector of the given line segment?

- $y = \frac{1}{3}x$
- $y = \frac{1}{3}x - 2$
- $y = 3x$
- $y = 3x - 8$

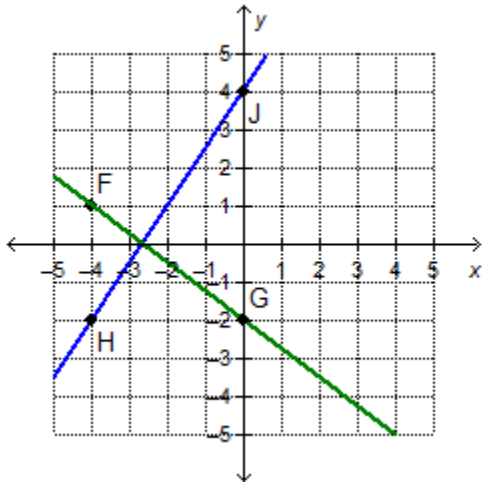
Question 100
Objective: Write the equation of a line perpendicular to a given line or segment that goes through a particular point.

A given line has the equation $2x + 12y = -1$.

What is the equation, in slope-intercept form, of the line that is perpendicular to the given line and passes through the point (0, 9)?

- $y = -6x + 9$
- $y = -\frac{1}{6}x + 9$
- $y = \frac{1}{6}x + 9$
- $y = 6x + 9$

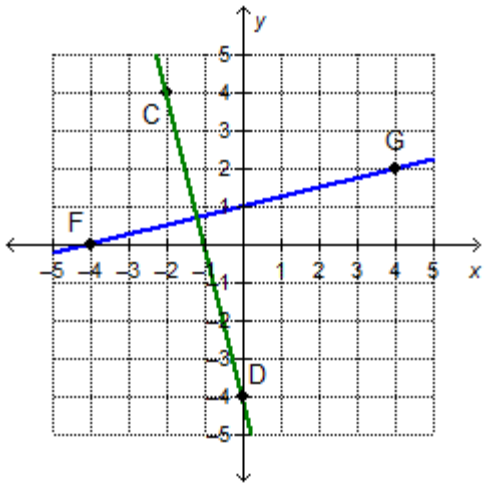
Question 101
Objective: Determine if two lines are parallel or perpendicular.



Which statement **best** explains the relationship between lines FG and HJ?

- They are perpendicular because their slopes are equal.
- They are perpendicular because their slopes are negative reciprocals.
- They are not perpendicular because their slopes are equal.
- They are not perpendicular because their slopes are not negative reciprocals.

Question 102
Objective: Determine if two lines are parallel or perpendicular.

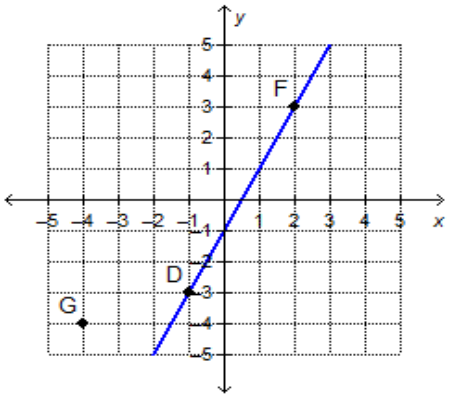


Which statement **best** explains the relationship between lines CD and FG?

- They are perpendicular because their slopes are equal.
- They are perpendicular because their slopes are negative reciprocals.
- They are not perpendicular because their slopes are equal.
- They are not perpendicular because their slopes are negative reciprocals.

Question 103

Objective: Use slope criteria to find additional points on a line parallel or perpendicular to a given line.

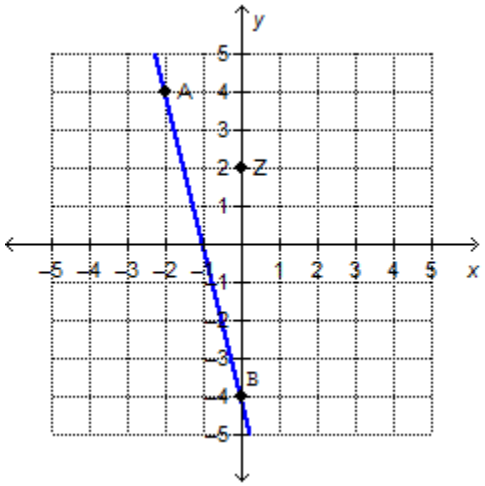


Which point on the *y*-axis lies on the line that passes through point G and is parallel to line DF?

- (–2, 0)
- (0, –2)
- (0, 4)
- (4, 0)

Question 104

Objective: Use slope criteria to find additional points on a line parallel or perpendicular to a given line.



Which point is on the line that passes through point Z and is perpendicular to line AB?

(–4, 1)

(1, –2)

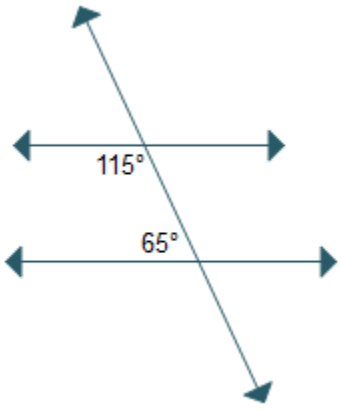
(2, 0)

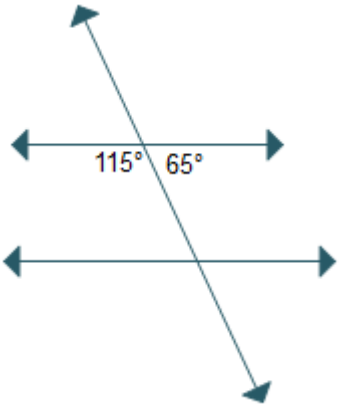
(4, 4)

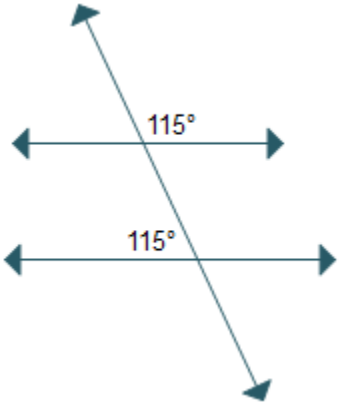
Question 105

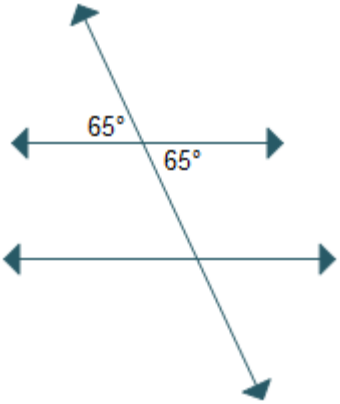
Objective: Apply theorems to determine if lines are parallel.

Which diagram shows lines that must be parallel lines cut by a transversal?



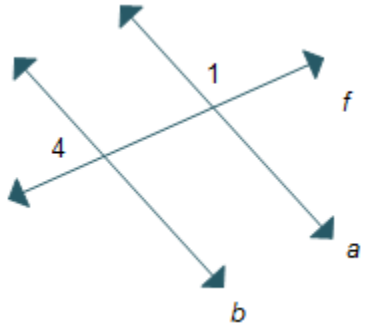






Question 106
Objective: Apply theorems to determine if lines are parallel.

Lines ***a*** and ***b*** are parallel lines cut by transversal *f*.

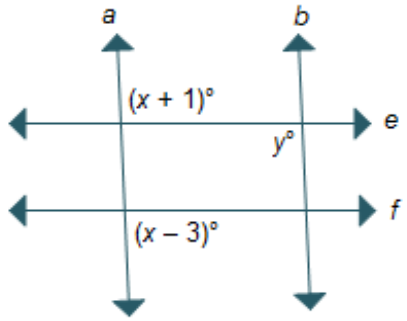


If $m\angle 1 = 110°$, what is $m\angle 4$?

- 20°
- 70°
- 110°
- 130°

Question 107

Objective: Apply theorems to determine if lines are parallel.



If $a \parallel b$ and $e \parallel f$, what is the value of y?

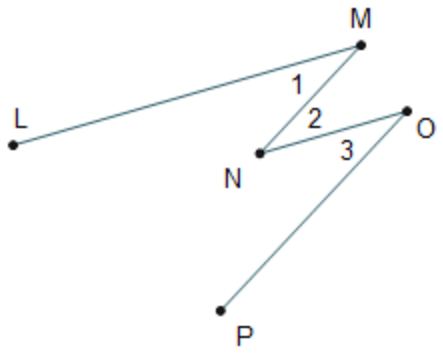
- 87
- 88
- 91
- 92

Question 108

Objective: Prove lines are parallel given angle relationships.

Given: $\overline{NM} \parallel \overline{PO}$ and $\overline{LM} \parallel \overline{NO}$ $\angle 1 \cong \angle 3$

Prove:



Statements	Reasons
1. $\overline{NM} \parallel \overline{PO}$	1. given
2. $\angle 2 \cong \angle 3$	2. alternate interior angles theorem
3. $\angle 1 \cong \angle 3$	3. given
4. $\angle 1 \cong \angle 2$	4. ?
5. $\overline{LM} \parallel \overline{NO}$	5. converse of alternate interior angles theorem

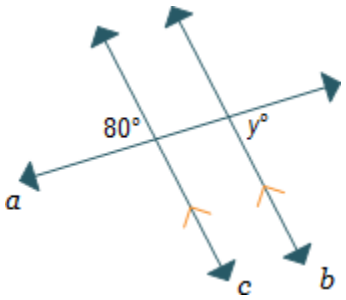
What is the missing reason in the proof?

- given
  transitive property
- alternate interior angles theorem
- converse alternate interior angles theorem

Question 109

Objective: Solve for angle measures when parallel lines are cut by a transversal.

Two parallel lines are crossed by a transversal.



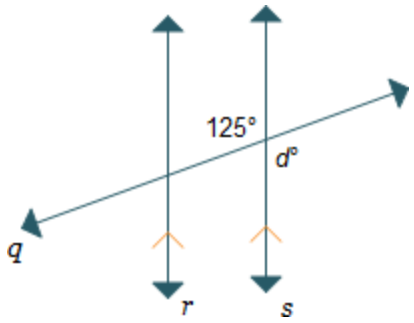
What is the value of *y*?

- $y = 40$
  $y = 80$

- $y = 100$
- $y = 120$

Question 110
Objective: Solve for angle measures when parallel lines are cut by a transversal.

Two parallel lines are crossed by a transversal.

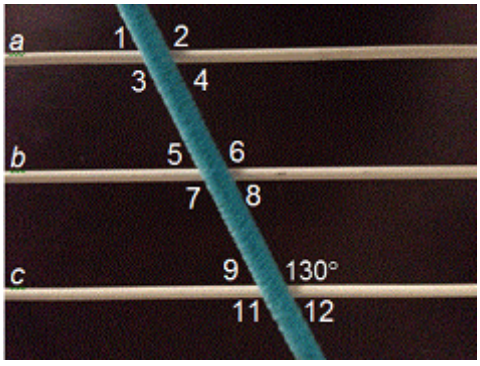


What is the value of d?

- $d = 55$
- $d = 75$
- $d = 125$
- $d = 155$

Question 111
Objective: Solve for angle measures when parallel lines are cut by a transversal.

A pipe cleaner lay across a wire shelf. The wires that make up the shelf are parallel, and the pipe cleaner is a transversal. The parallel wires are labeled a, b, and, c, and the angles are labeled with numbers.

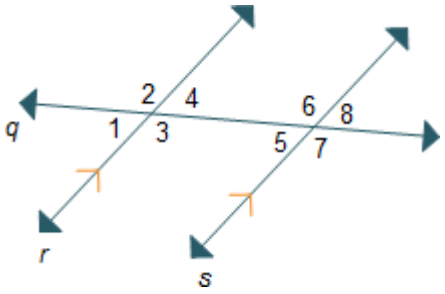


The measure of one angle is 130°. Which statement is true regarding the 130° angle and angle 3?

- They are same-side interior angles, so angle 3 measures 50°.
  They are alternate interior angles, so angle 3 also measures 130°.
- They are corresponding angles, so angle 3 also measures 130°.
- They are alternate exterior angles, so angle 3 measures 50°

Question 112
Objective: Complete the steps to prove angle relationships given parallel lines cut by a transversal.

Consider the diagram.

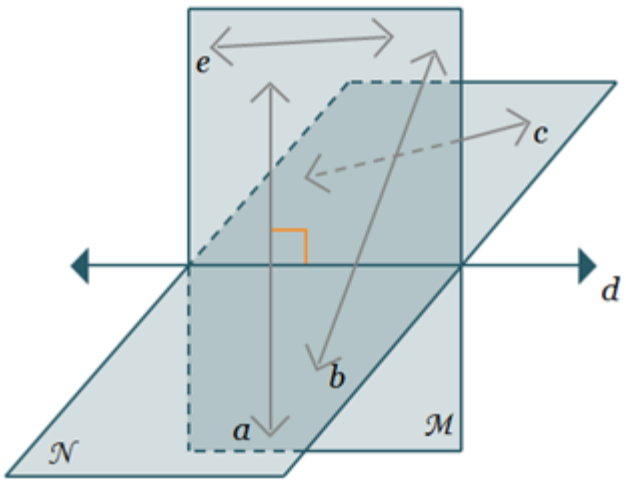


Given that $r \| s$ and q is a transversal, we know that $\angle 3 \cong \angle 6$ by the [_____].

- corresponding angles theorem
  alternate interior angles theorem
- vertical angles theorem
- alternate exterior angles theorem

Question 113
Objective: Identify parallel, perpendicular, and skew lines from three-dimensional figures.

Consider the diagram.



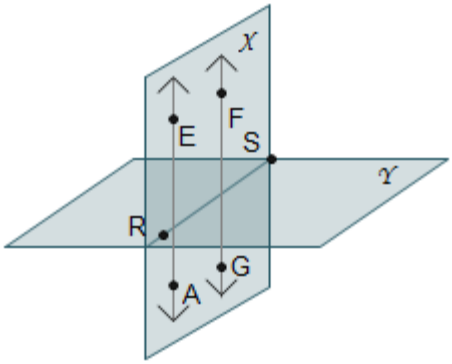
Lines e and c can be described as

- intersecting.
- parallel.
- perpendicular.
- skew.

Question 114

Objective: Identify parallel, perpendicular, and skew lines from three-dimensional figures.

Planes *X* and *Y* are perpendicular. Points A, E, F, and G are points only in plane *X*. Points R and S are points in both planes *X* and *Y*. Lines EA and FG are parallel.



Based on this information, which pair of lines, together, could be perpendicular to RS?

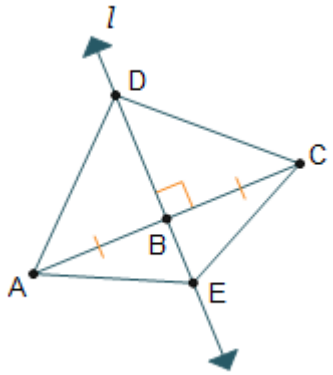
Select **two** options.

- $\overleftrightarrow{EA}$
- $\overleftrightarrow{ER}$

- ☐ $\overleftrightarrow{EF}$
- $\overleftrightarrow{FG}$
- ☐ $\overleftrightarrow{FS}$

Question 115
Objective: Solve problems involving the distance from a point on the perpendicular bisector to both endpoints of the line segment.

In the diagram, CE=12 units and BE=5 units.

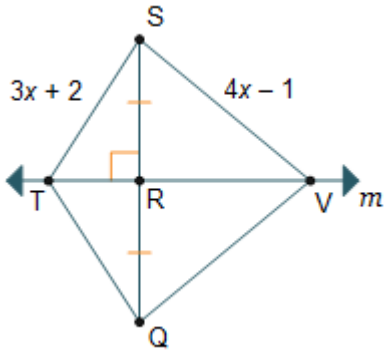


Based on the given information, what is AE?

- 2 units
- 7 units
- 12 units
- 17 units

Question 116
Objective: Solve problems involving the distance from a point on the perpendicular bisector to both endpoints of the line segment.

In the diagram, the length of segment QV is 15 units.



What is the length of segment TQ?

- 4 units
- 11 units
- 14 units
- 15 units

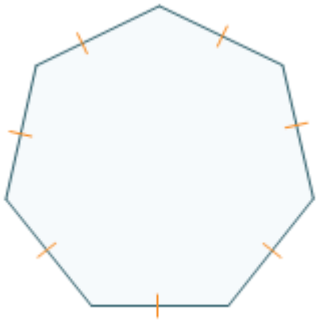
Question 117
Objective: Identify reflectional symmetry in geometric figures and the number of lines of symmetry.

The figure is an isosceles trapezoid.

How many lines of reflectional symmetry does the trapezoid have?

- 0
- 1
- 2
- 3

Question 118
Objective: Identify reflectional symmetry in geometric figures and the number of lines of symmetry.



Which statements are true about the reflectional symmetry of a regular heptagon? Select **two** options.

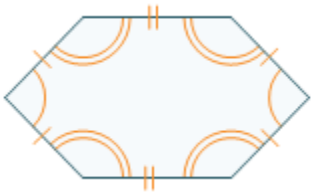
- [ ] It has only 1 line of reflectional symmetry.
- [ ] A line of symmetry will connect 2 vertices.

A line of symmetry will connect a vertex and a midpoint of an opposite side.

It has 7-fold symmetry.

- [ ] A line of symmetry will connect the midpoints of 2 opposite sides.

Question 119
Objective: Identify rotational symmetry and its order in geometric figures.



At which angle will the hexagon rotate onto itself?

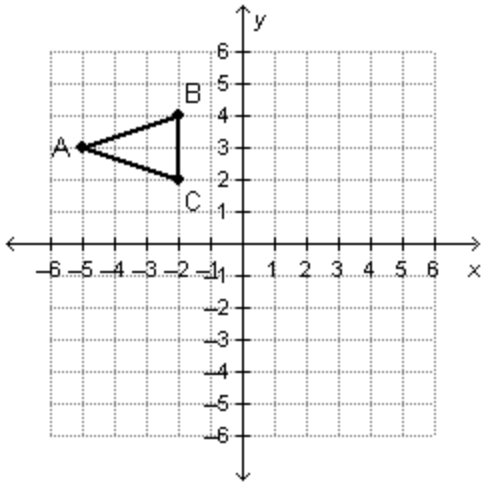
- 60°
- 90°
- 120°
- 180°

Question 120
Objective: Identify rotational symmetry and its order in geometric figures.

A clock is constructed using a regular polygon with 60 sides. The polygon rotates every minute. How much has the polygon rotated after 7 minutes?

- 14°
- 21°
- 35°
- 42°

Question 121
Objective: Determine the image or pre-image of a figure after a given rotation.



Triangle ABC is shown on the graph. What are the coordinates of the image of point B after the triangle is rotated 270° about the origin?

- (4, 2)
- (2, 4)
- (–4, –2)
- (–2, –4)

Question 122
Objective: Determine the image or pre-image of a figure after a given rotation.

A rectangle is transformed according to the rule $R_{0,\,90°}$. The image of the rectangle has vertices located at R'(–4, 4), S'(–4, 1), P'(–3, 1), and Q'(–3, 4). What is the location of Q?

- (–4, –3)
- (–3, –4)
- (3, 4)

(4, 3

Question 123
Objective: Describe the properties of and write rules for rotations.

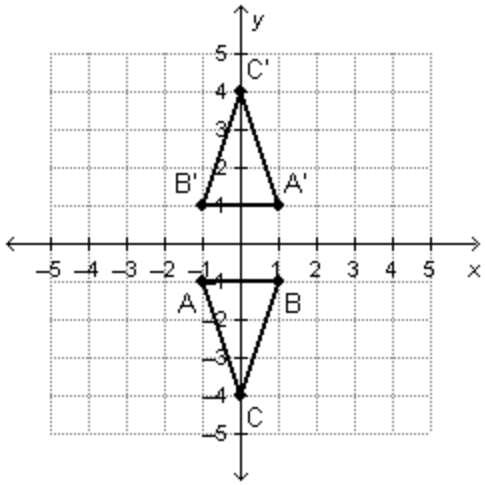
A parallelogram is transformed according to the rule $(x, y) \rightarrow (x, y)$. Which is another way to state the transformation?

- $R_{0,\ 90°}$
- $R_{0,\ 180°}$
- $R_{0,\ 270°}$

$R_{0,\ 360}$

Question 124
Objective: Describe the properties of and write rules for rotations.

Triangle ABC is rotated to create the image A'B'C'.



Which rule describes the transformation?

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

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

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

Question 125
Objective: Write the rule that describes a given translation.

The function rule $T_{-4, 6}(x, y)$ could be used to describe which translation?

- a parallelogram on a coordinate plane that is translated 4 units down and 6 units to the right
  a trapezoid on a coordinate plane that is translated 4 units to the left and 6 units up
- a rhombus on a coordinate plane that is translated 4 units down and 6 units to the left
- a rectangle on a coordinate plane that is translated 4 units to the right and 6 units up

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Question 126
Objective: Write the rule that describes a given translation.

Right triangle LMN has vertices L(7, –3), M(7, –8), and
N(10, –8). The triangle is translated on the coordinate plane so the coordinates of L' are (–1, 8).

Which rule was used to translate the image?

- $(x, y) \rightarrow (x + 6, y - 5)$
- $(x, y) \rightarrow (x - 6, y + 5)$
- $(x, y) \rightarrow (x + 8, y - 11)$
  $(x, y) \rightarrow (x - 8, y + 11)$

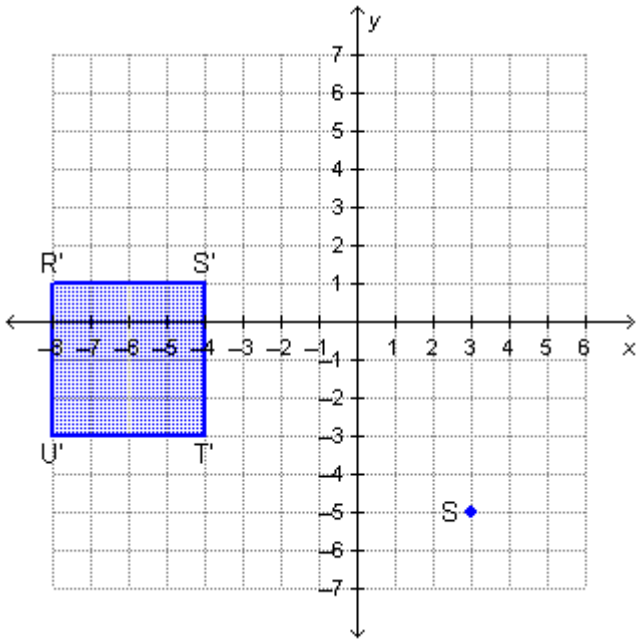
Question 127
Objective: Determine the image or pre-image of a figure after a given translation.

Triangle PQR has vertices $P(-2, 6)$, $Q(-8, 4)$, and $R(1, -2)$. It is translated according to the rule $(x, y) \rightarrow (x - 2, y - 16)$.

What is the y-value of P'?

- -18
- -16
- -12
  -10

Question 128
Objective: Determine the image or pre-image of a figure after a given translation.

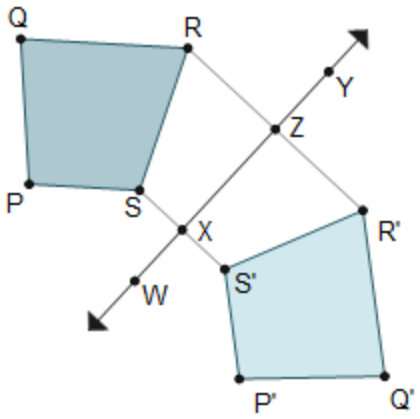


Square RSTU is translated to form R'S'T'U', which has vertices R'(–8, 1), S'(–4, 1), T'(–4, –3), and U'(–8, –3). If point S has coordinates of (3, –5), which point lies on a side of the pre-image, square RSTU?

- (–5, –3)
- (3, –3)
  (–1, –6)
- (4, –9)

Question 129
Objective: Describe the properties of and write rules for reflections.

The image of trapezoid PQRS after a reflection across $\overleftrightarrow{WY}$ is trapezoid P'Q'R'S'.



What is m$\angle YXS$?

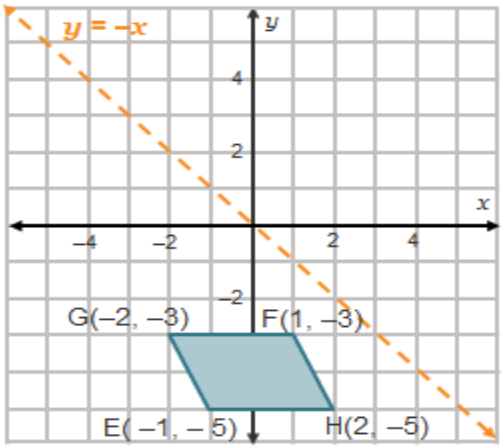
- 45°
- 90°
- 180°
- 270°

Question 130
Objective: Describe the properties of and write rules for reflections.

A line segment has endpoints at (–1, 4) and (4, 1). Which reflection will produce an image with endpoints at (–4, 1) and (–1, –4)?

- a reflection of the line segment across the *x*-axis
- a reflection of the line segment across the *y*-axis
- a reflection of the line segment across the line $y = x$
- a reflection of the line segment across the line $y = –x$

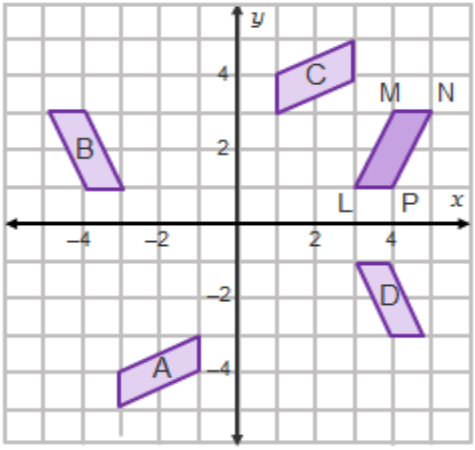
Question 131
Objective: Determine the image or pre-image of a figure after a given reflection.



What are the coordinates of the image of vertex F after a reflection across the line $y = -x$?

- (–1, –3)
  (3, –1)
- (1, 3)
- (–3, 1)

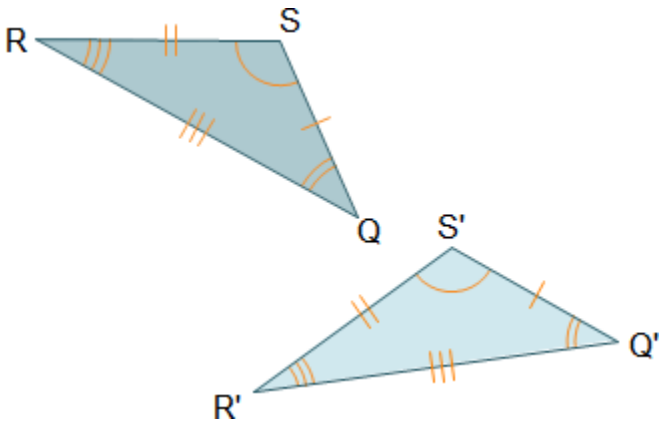
Question 132
Objective: Determine the image or pre-image of a figure after a given reflection.



Which figure represents the image of parallelogram LMNP after a reflection across the line $y = x$?

- figure A
- figure B
  figure C
- figure D

Question 133
Objective: Determine if a transformation is isometric and identify corresponding parts of the pre-image and image.



Which statement about the transformation is true?

It is rigid because all side lengths and angles are congruent.

It is rigid because no side lengths or angles are congruent.

It is nonrigid because all side lengths are congruent.

It is nonrigid because no side lengths or angles are congruent.

Question 134
Objective: Determine if a transformation is isometric and identify corresponding parts of the pre-image and image.

All side lengths in quadrilateral PQRS measure 4 units. A transformation maps PQRS to P'Q'R'S'. All sides of P'Q'R'S' measure 1 unit.

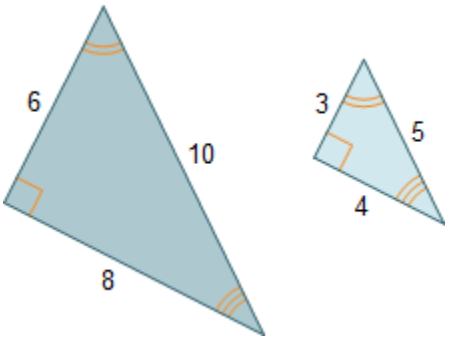
Is the transformation an isometric transformation? Explain.

Yes, the side lengths in the two figures are proportional.

Yes, one figure maps to the other.
No, the side lengths are not preserved.

No, the angles are not preserved.

Question 135
Objective: Identify the type of transformation given a pre-image and an image.



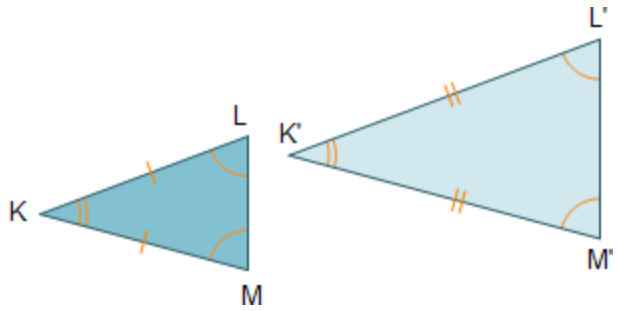
Which transformation maps the large triangle onto the small triangle?

dilation

- reflection
- rotation
- translation

Question 136
Objective: Identify the type of transformation given a pre-image and an image.

A transformation of ΔKLM results in ΔK'L'M'.



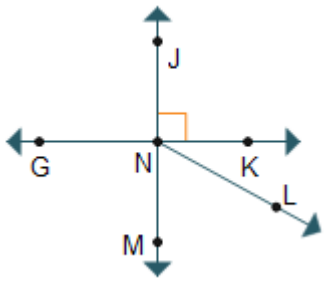
Which transformation maps the pre-image to the image?

dilation

- translation
- reflection
- rotation

Question 137
Objective: Identify complementary angles and supplementary angles from given diagrams.

Line JM intersects line GK at point N.

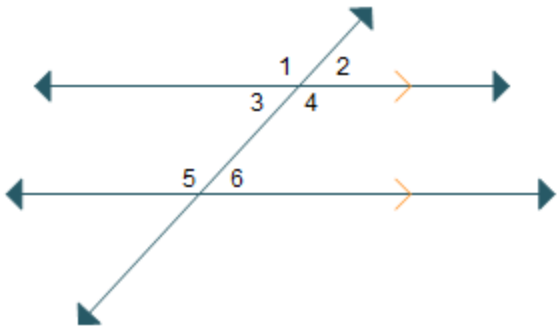


Which statements are true about the figure? Select **two** options.

- ∠GNJ is complementary to ∠JNK.
- ∠MNL is complementary to ∠KNL.
- ∠MNG is complementary to ∠GNJ.
- ∠KNJ is supplementary to ∠MNL.
- ∠GNM is supplementary to ∠JNK.

Question 138
Objective: Identify complementary angles and supplementary angles from given diagrams.

Two parallel lines are intersected by a third line so that angles 1 and 5 are congruent.



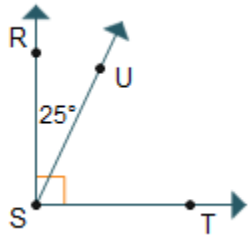
Which statement is true about angles 3 and 5?

- They are acute.
- They are congruent.
- They are complementary.
- They are supplementary.

Question 139

Objective: Solve problems involving measures of complementary and supplementary angles.

Angle RST is a right angle. Angle RSU has a measure of 25°.



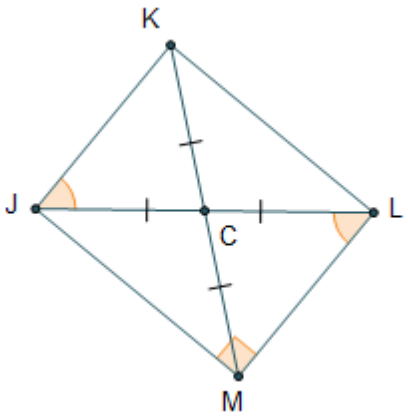
What is the measure of angle TSU?

- 25°
- 45°
- 65°
- 75°

Question 140

Objective: Complete the steps to prove statements using complementary angles and supplementary angles.

Figure JKLM is a rectangle, so $m\angle KJM = m\angle KLM = 90°$ and $\angle KJC \cong \angle MLC$.



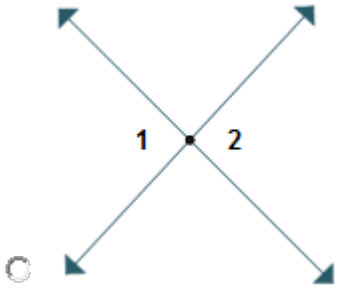
Which reason justifies the statement that $\angle KLC$ is complementary to $\angle KJC$?

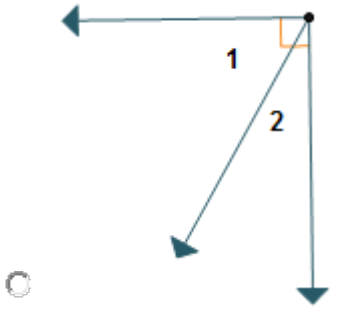
Angles that are congruent are complementary to the same angle.

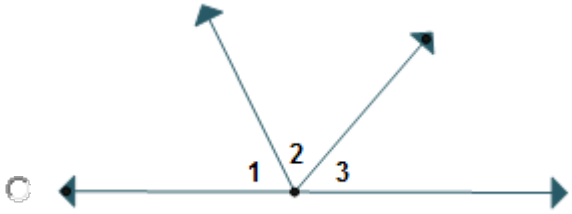
- Angles that are congruent are supplementary to the same angle.
- All angles in a rectangle are right angles.
- Complementary angles are always also congruent.

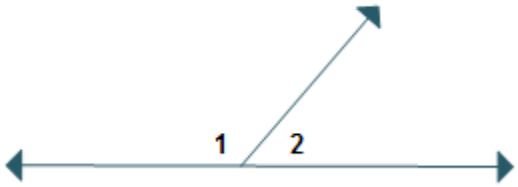
Question 141
Objective: Identify linear pairs and vertical angles from given diagrams.

In which diagram do angles 1 and 2 form a linear pair?



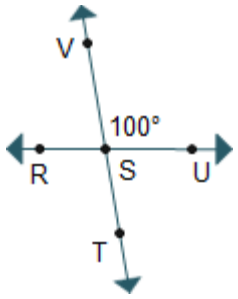






Question 142
Objective: Calculate angle measures by using definitions and theorems about linear pairs and vertical angles.

In the diagram, what is $m\angle VSR$?

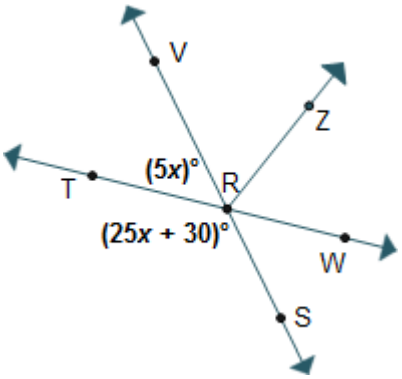


$m\angle VSR =$ 80 °

Explain:

Question 143

Objective: Calculate angle measures by using definitions and theorems about linear pairs and vertical angles.



In the diagram, what is the measure of $\angle WRS$?

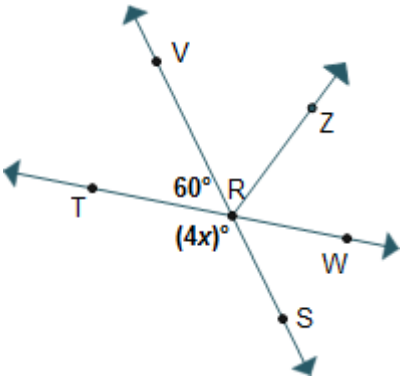
- 5°
- 7.5°
  25°
- 37.5°

Question 144

Objective: Complete the steps to prove statements using linear pairs and vertical angles.

Given: $m\angle TRV = 60°$
$m\angle TRS = (4x)°$

Prove: $x = 30$



What is the missing reason in step 3?

Statements	Reasons
1. $m\angle TRV=60°$; $m\angle TRS=(4x)°$	1. given
2. $\angle TRS$ and $\angle TRV$ are a linear pair	2. definition of linear pair
3. $m\angle TRS + m\angle TRV = 180$	3. ?
4. $60+4x=180$	4. substitution property of equality
5. $4x=120$	5. subtraction property of equality
6. $x=30$	6. division property of equality

- substitution property of equality
  angle addition postulate
- subtraction property of equality
- addition property of equality

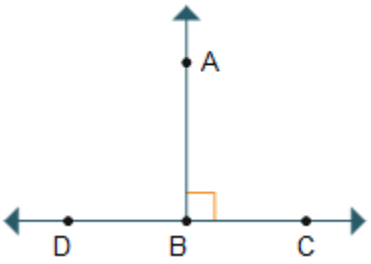
Question 145

Objective: Complete the steps to prove algebraic and geometric statements.

What is the missing reason in the proof?

Given: ∠ABC is a right angle, ∠DBC is a straight angle

Prove: ∠ABC ≅ ∠ABD

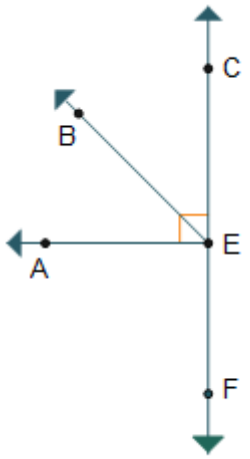


Statements	Reasons
1. $\angle ABC$ is a right angle	1. given
2. $\angle DBC$ is a straight angle	2. given
3. $m\angle ABC = 90°$	3. definition of right angle
4. $m\angle DBC = 180°$	4. definition of straight angle
5. $m\angle ABD + m\angle ABC = m\angle DBC$	5. angle addition property
6. $m\angle ABD + 90° = 180°$	6. substitution property
7. $m\angle ABD = 90°$	7. subtraction property
8. $\angle ABC \cong \angle ABD$	8. ?

- definition of angle bisector
- segment addition property
  definition of congruent angles
- transitive property

Question 146

Objective: Identify proof formats, the essential parts of a proof, and the assumptions that can be made from a given drawing.



Given that $\overrightarrow{EB}$ bisects $\angle CEA$, which statements must be true? Select **three** options.

$m\angle CEA = 90°$

- $m\angle CEF = m\angle CEA + m\angle BEF$
- $m\angle CEB = 2(m\angle CEA)$

$\angle CEF$ is a straight angle.

$\angle AEF$ is a right angle.

Question 147
Objective: Identify proof formats, the essential parts of a proof, and the assumptions that can be made from a given drawing.

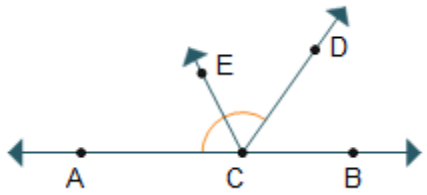
The last step in a proof contains the ? conclusion.

Question 148
Objective: Identify proof formats, the essential parts of a proof, and the assumptions that can be made from a given drawing.

A flowchart proof

- contains a set of sentences explaining the steps needed to reach a conclusion.
- uses inductive reasoning to prove a statement.
  uses a visual representation of the logical flow of steps needed to reach a conclusion.
- contains a table with a logical series of statements and reasons that reach a conclusion.

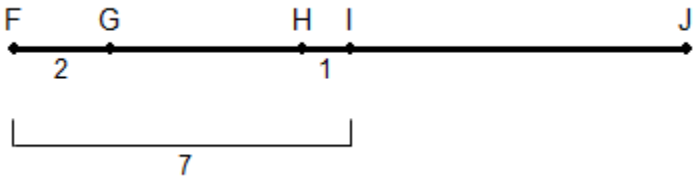
Question 149
Objective: Identify a midpoint or bisector of a line segment or angles.



Ray CE is the angle bisector of $\angle ACD$. Which statement about the figure must be true?

- $m\angle ECD = \frac{1}{2} m\angle ECB$
  $m\angle ACE = \frac{1}{2} m\angle ACD$
- $\angle ACE \cong \angle DCB$
- $\angle ECD \cong \angle ACD$

Question 150
Objective: Apply the ruler postulate and segment addition postulate to calculate the lengths of line segments.

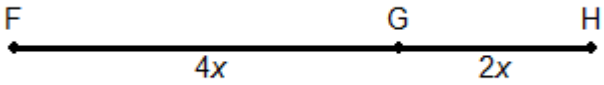


If FG = 2 units, FI = 7 units, and HI = 1 unit, what is GH?

- 3 units
- 4 units
- 5 units
- 6 units

Question 151
Objective: Apply the ruler postulate and segment addition postulate to calculate the lengths of line segments.

Point G lies between points F and H on $\overline{FH}$.

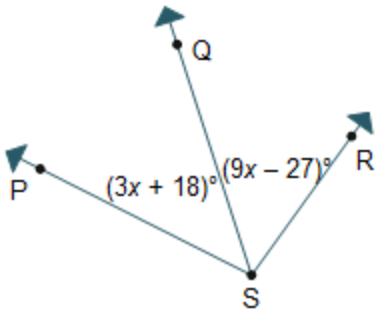


If the length of FH is 18 units, what is the value of *x*?

- 3
- 4
- 6
- 12

Question 152
Objective: Apply the protractor postulate and angle addition postulate to calculate angle measures.

Angle PSR measures 99°.



What is the measure of $\angle PSQ$ in degrees?

- 9°
- 24°
- 45°
- 54°

Question 153
Objective: Use undefined terms to precisely define parallel lines, perpendicular lines, ray, angle, arc, circle, and line segment.

Two lines intersecting at a right angle

- form a line.
- are parallel.
- are perpendicular.
- form a ray.

Question 154
Objective: Use undefined terms to precisely define parallel lines, perpendicular lines, ray, angle, arc, circle, and line segment.

Which figures can be precisely defined by using only undefined terms? Select **three** options.

- angle
- arc

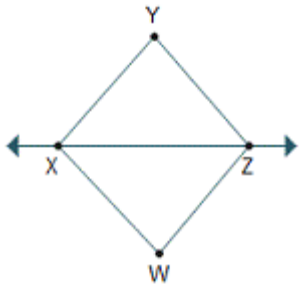
circle

line segment

parallel lines

Question 155

Objective: Identify and name a pair of parallel lines, a pair of perpendicular lines, a ray, an angle, an arc, a circle, and a line segment.

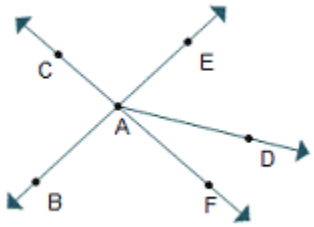


Which is the line shown in the figure?

- line XY
  line XZ
- line WX
- line WZ

Question 156

Objective: Identify and name a pair of parallel lines, a pair of perpendicular lines, a ray, an angle, an arc, a circle, and a line segment.



Which rays are part of line BE?

- $\overrightarrow{AC}$ and $\overrightarrow{AE}$
- $\overrightarrow{AB}$ and $\overrightarrow{AE}$
- $\overrightarrow{AC}$ and $\overrightarrow{AB}$
- $\overrightarrow{AB}$ and $\overrightarrow{AF}$

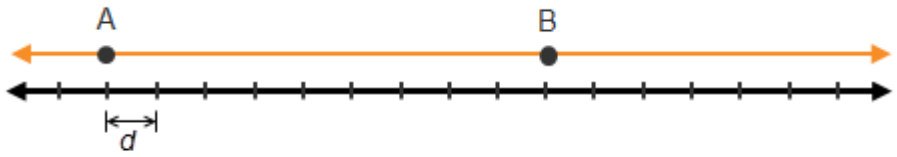
Question 157
Objective: Identify and name undefined terms of point, line, plane, and distance along a line.

Which undefined geometric term is described as an infinite set of points that has length but not width?

- distance
- line
- plane
- sphere

Question 158
Objective: Identify and name undefined terms of point, line, plane, and distance along a line.

Line segment AB measures 18 units.



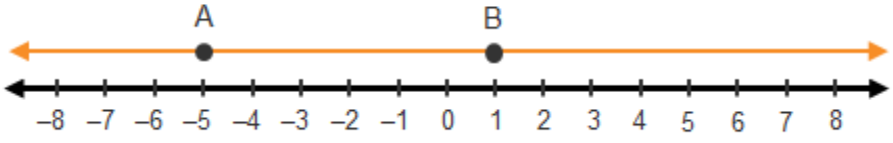
What is *d*, the distance between tick marks on the number line?

- 1 unit
- 2 units
- 3 units
- 9 units

Question 159

Objective: Identify and name undefined terms of point, line, plane, and distance along a line.

What is the distance between points A and B?

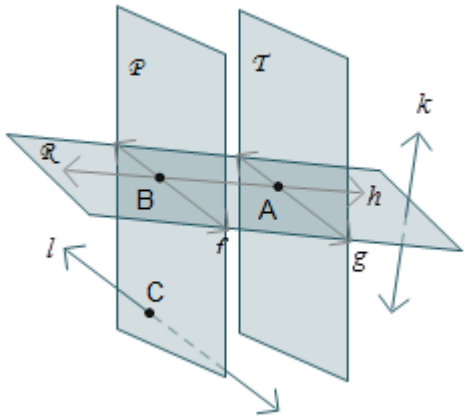


- −6 units

- -1 units
- 5 units
- 6 units

Question 160
Objective: Analyze descriptions and diagrams that illustrate basic postulates about points, lines, and planes.

The diagram shows several planes, lines, and points.



Which statement is true about line *h*?

- Line *h* intersects line *f* at two points, A and B.
- Line *h* is the intersection of planes $\mathcal{R}$ and $\mathcal{T}$.
- Line *h* intersects plane $\mathcal{P}$ at point C.
  Line *h* has points on planes $\mathcal{R}$, $\mathcal{P}$, and $\mathcal{T}$.