

Math

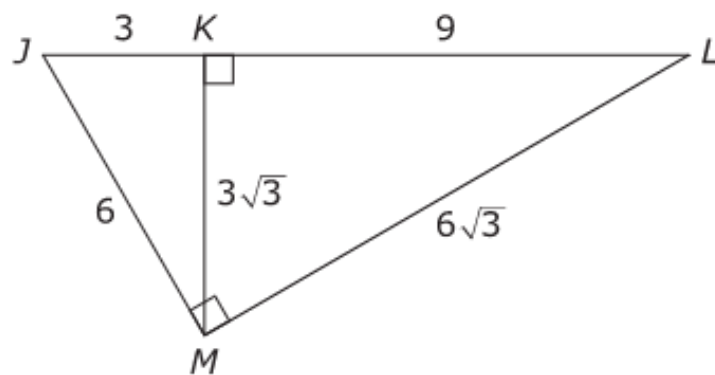
2019

**Geometry**  
**Released Items**

1.

VH244455

The figure shows right triangle  $JLM$  with  $\overline{KM} \perp \overline{JL}$ . Side lengths are given in units.



For which angle in the figure is the sine equal to  $\frac{1}{2}$ ?

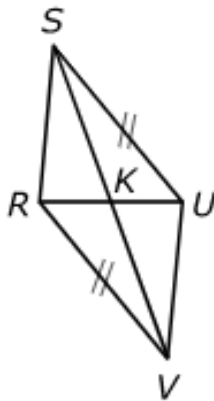
Select **all** that apply.

- A.  $\angle JKM$
- B.  $\angle JLM$
- C.  $\angle JMK$
- D.  $\angle JML$
- E.  $\angle KML$
- F.  $\angle LJM$
- G.  $\angle LKM$

2.

VH024886

The figure shows quadrilateral  $RSUV$  with  $\overline{RV} \parallel \overline{SU}$  and congruent segments as marked.



Prove that  $\overline{RU}$  bisects  $\overline{SV}$ .

Statement	Reason
1) Quadrilateral $RSUV$ with $\overline{RV} \parallel \overline{SU}$ and $\overline{RV} \cong \overline{SU}$	1) Given
2) $\angle KSU \cong \angle KVR$	2)
3) $\angle SUK \cong \angle KRV$	3)
4) $\triangle SUK \cong \triangle VRK$	4)
5) $\overline{SK} \cong \overline{VK}$	5)
6) $\overline{RU}$ bisects $\overline{SV}$	6) Definition of bisect

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**Part A**

What is the appropriate reason for the statement in step 2?

- A. Alternate exterior angles formed by parallel lines cut by a transversal are congruent.
- B. Alternate interior angles formed by parallel lines cut by a transversal are congruent.
- C. Corresponding angles formed by parallel lines cut by a transversal are congruent.
- D. Vertical angles are congruent.

**Part B**

What is the appropriate reason for the statement in step 3?

- A. Alternate exterior angles formed by parallel lines cut by a transversal are congruent.
- B. Alternate interior angles formed by parallel lines cut by a transversal are congruent.
- C. Corresponding angles formed by parallel lines cut by a transversal are congruent.
- D. Vertical angles are congruent.

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**Part C**

What is the appropriate reason for the statement in step 4?

- A. Angle Angle Angle
- B. Angle Side Angle
- C. Angle Side Side
- D. Side Side Side

**Part D**

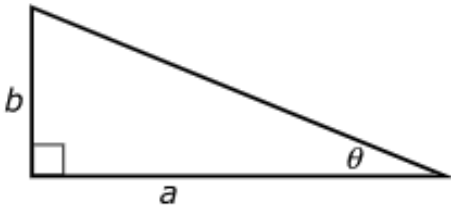
What is the appropriate reason for the statement in step 5?

- A. Corresponding sides of similar triangles are congruent.
- B. Corresponding angles of similar triangles are congruent.
- C. Corresponding sides of congruent triangles are congruent.
- D. Corresponding angles of congruent triangles are congruent.

3.

M41207

In the right triangle shown, Trish wants to estimate the degree measure of  $\theta$ . She knows that  $10 \leq a \leq 11$  and that  $5 \leq b \leq 6$ .



Determine the **greatest** and **least** estimates of the degree measure of  $\theta$ . Explain how you determined each estimate.

Enter your answers and your explanations in the space provided.



- ▶ Math symbols
- ▶ Relations
- ▶ Geometry
- ▶ Groups
- ▶ Trigonometry
- ▶ Statistics
- ▶ Greek

4.

VH176142

Parallelogram  $JKLM$  is drawn in the coordinate plane. Which transformation **must** produce a parallelogram that is similar to parallelogram  $JKLM$  ?

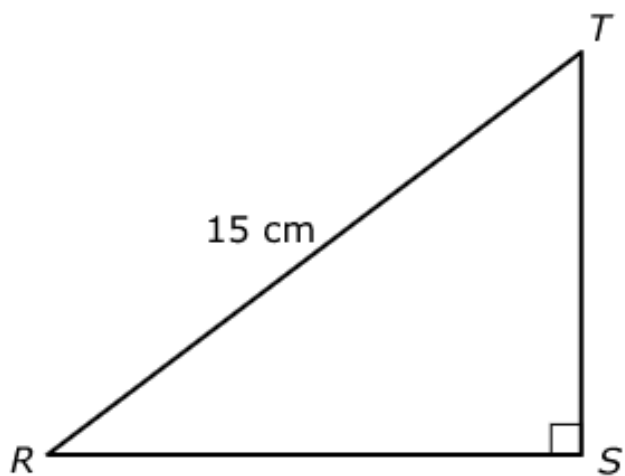
Select **all** that apply.

- A. a transformation that doubles the  $x$ -coordinates and divides the  $y$ -coordinates of each point by 2
- B. a dilation with scale factor 2 and center  $J$ , followed by a dilation with scale factor  $\frac{1}{3}$  and center  $L$
- C. a transformation that adds 1 to each  $x$ -coordinate and multiplies each  $y$ -coordinate by 2
- D. a dilation with center at the origin and scale factor 3, followed by a reflection over  $\overleftrightarrow{KM}$
- E. a transformation that triples both coordinates of each point

5.

M44766

Consider  $\triangle RST$ , as shown.



not to scale

In  $\triangle RST$ ,  $\cos R = \frac{3}{5}$ . Find  $\sin T$ .

Drag and drop a number into each box.

$$\sin T = \frac{\boxed{\phantom{00}}}{\boxed{\phantom{00}}}$$

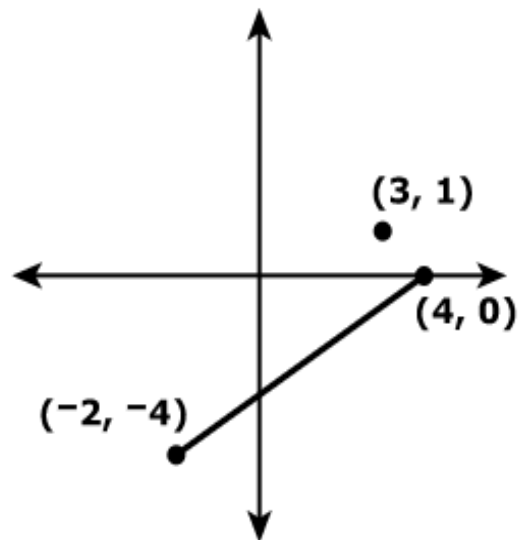
15	12
9	5
4	3



6.

VF657676

The longer base of a trapezoid has endpoints of  $(-2, -4)$  and  $(4, 0)$ . The shorter base contains the point  $(3, 1)$ .



Write an equation of the line that contains the shorter base of the trapezoid. Provide valid mathematical reasoning and calculations to explain how you derived your equation.

Enter your equation and your explanation in the space provided.



- ▶ Math symbols
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7.

VF646567

A circle in the  $xy$ -coordinate plane is represented by the equation  $x^2 + y^2 - 6x = 11$ . What is the  $x$ -coordinate of the center of the circle?

Enter your answer in the box.

8.

VH222235

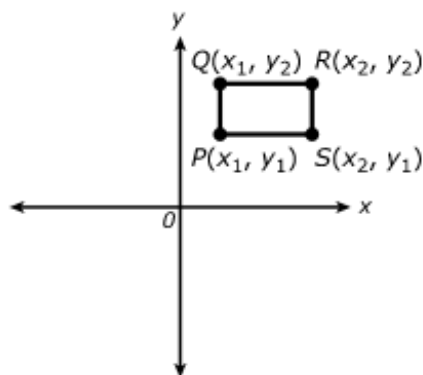
Quadrilateral  $JKLM$  is graphed in the coordinate plane. Under which transformation would the image of  $JKLM$  be similar to  $JKLM$ ?

- A.  $(x, y) \rightarrow (-2x, 2y)$
- B.  $(x, y) \rightarrow (-3x, 4y)$
- C.  $(x, y) \rightarrow (x + 5, 5y)$
- D.  $(x, y) \rightarrow (y - 2, 3x)$

9.

M40525

The figure shows rectangle  $PQRS$  in the first quadrant of a coordinate plane.



Rectangle  $PQRS$  is reflected across the  $x$ -axis. The image is  $P'Q'R'S'$ . Which two further transformations will carry rectangle  $P'Q'R'S'$  back onto rectangle  $PQRS$ ?

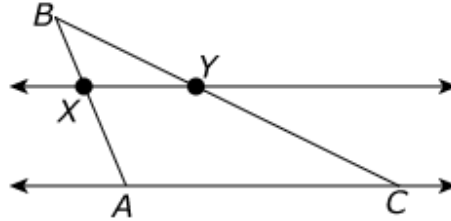
- A. reflection across the  $y$ -axis followed by a reflection across the  $x$ -axis
- B. reflection across the  $y$ -axis followed by a reflection across the line with equation  $y = -x$
- C. reflection across the  $y$ -axis followed by a  $180^\circ$  rotation around the origin
- D. reflection across the line with equation  $y = x$  followed by a  $180^\circ$  rotation around the origin

10.

M41165

In the given diagram:

- $B$ ,  $X$ , and  $A$  are collinear,
- $B$ ,  $Y$ , and  $C$  are collinear, and
- $BX = \frac{1}{3} (BA)$  and  $BY = \frac{1}{3} (BC)$ .



Prove that  $\overleftrightarrow{XY}$  and  $\overleftrightarrow{AC}$  are parallel.

Enter your proof in the space provided.

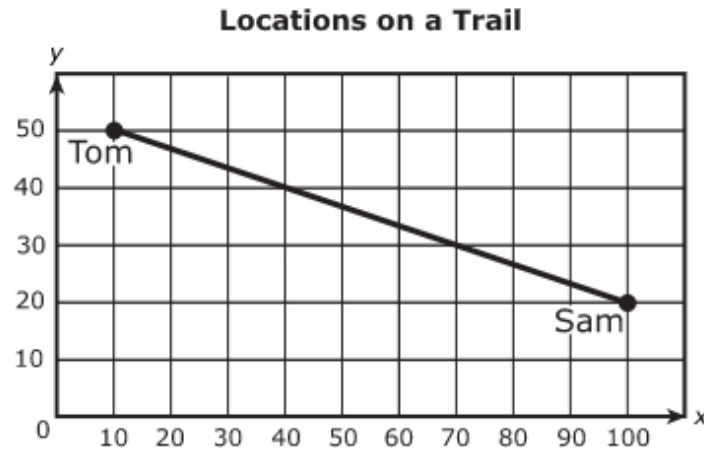


- ▶ Math symbols
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11.

M40033

Mark, Tom, and Sam are members of a search team. The positions of Tom and Sam are represented in the grid below. Mark started at the same point as Sam and walked two-thirds of the way toward Tom and then stopped.



What are the coordinates of Mark's current location?

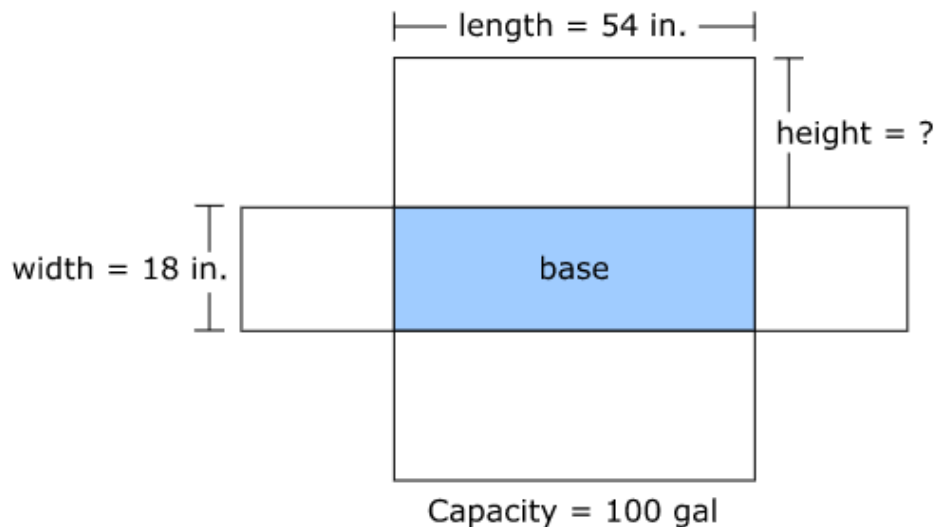
- A. (70, 30)
- B. (55, 35)
- C. (40, 40)
- D. (25, 45)

12.

2875-M42383

Part A

The Pisces Place is a company that makes fish tanks. Corey has sent the company a special order for a fish tank that is a rectangular prism with an open top. He provides a sketch with the dimensions as shown.



One cubic foot of water is equivalent to 7.48 gallons. If the capacity of the fish tank is 100 gallons, find the maximum possible height for the fish tank. Round your answer to the nearest thousandth of an inch.

Show your work.

Enter your answer and your work in the space provided.



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**12. (continued from previous page)**

**2875-M42383**

**Part B**

Corey plans to have the completed fish tank sent to his home. A shipping company offers to ship it at a cost of \$0.25 per pound.

Corey knows that his fish tank would weigh a total of 1,100 pounds if it were filled to capacity. One cubic foot of water weighs 62.4 pounds.

Use this information to calculate the total cost to ship the fish tank when it is empty. Show your work.

Enter your answer and your work in the space provided.



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