Name _____ **Date** _____ **TEST NAV SOL 2016 Geometry**

Problem 1

Directions: Drag the answers to the correct boxes.

Let p represent

$\angle A$ *is acute.*

Let q represent

$\angle B$ *is acute.*

Create a symbolic representation of the following argument.

$\angle A$ ***is acute if and only if*** $\angle B$ ***is acute.***	
$\angle A$ ***is acute or*** $\angle B$ ***is acute.***	
Therefore, $\angle A$ ***is acute and*** $\angle B$ ***is acute.***	

$p \rightarrow q$ $p \leftrightarrow q$ $p \wedge q$ $p \vee q$ $\therefore p \wedge q$ $\therefore p \vee q$

Problem 2

Which value for x is a counterexample to the following statement?

For all positive values of x, $x^3 \geq x$.

A. $^{-}1.0$

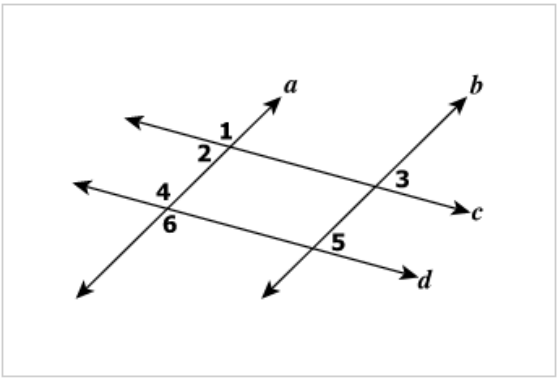
B. $^{-}0.1$

C. 0.1

D. 1.0

Problem 3

Lines a and b intersect lines c and d.

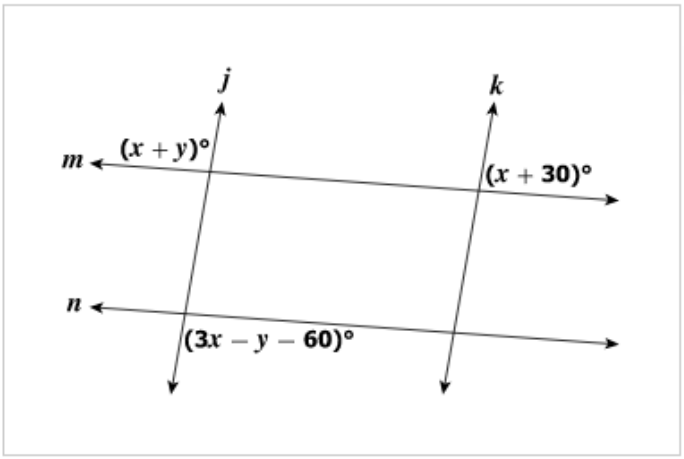


Which of the following statements could be used to prove that $a \parallel b$ and $c \parallel d$?

- A. $\angle 1 \cong \angle 6, \angle 3 \cong \angle 5$
- B. $\angle 1 \cong \angle 6, \angle 4$ and $\angle 5$ are supplementary
- C. $\angle 1 \cong \angle 4, \angle 1$ and $\angle 2$ are supplementary
- D. $\angle 1$ and $\angle 3$ are supplementary, $\angle 1$ and $\angle 6$ are supplementary

Problem 4

Lines j and k are cut by transversals m and n. (Figure is not drawn to scale.)



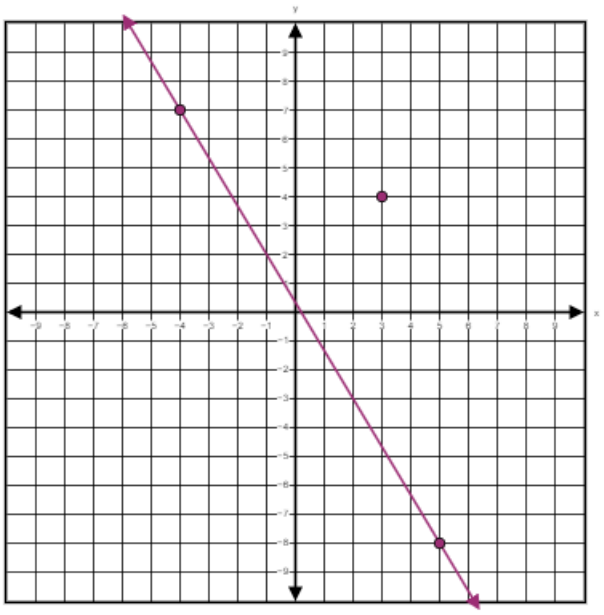
Which relationship is sufficient to prove $j \parallel k$?

- A. $x = 60$
- B. $y = 30$
- C. $y = x - 30$
- D. $y = 150 - 2x$

Problem 5

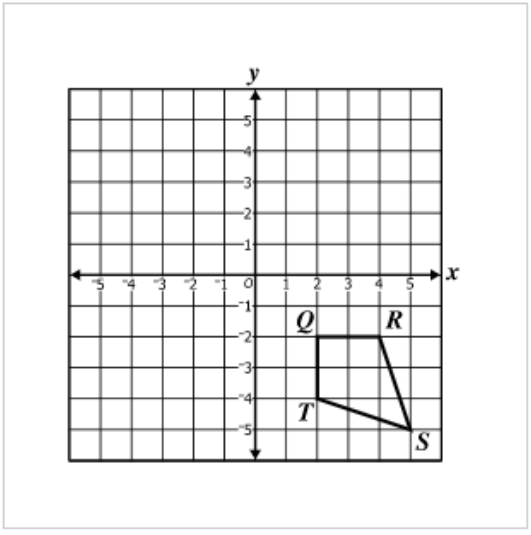
Directions: Plot a point on the grid.

A line and three points are shown on the grid. The line on the grid contains the points $(^{-}4, 7)$ and $(5, ^{-}8)$. The point is located at $(3, 4)$ on the grid. Plot another point with integral coordinates that lies on a line that passes through the point located at $(3, 4)$ and is parallel to the given line.



Problem 6

Quadrilateral $QRST$ will be reflected over the line $y = {}^{-}x$.



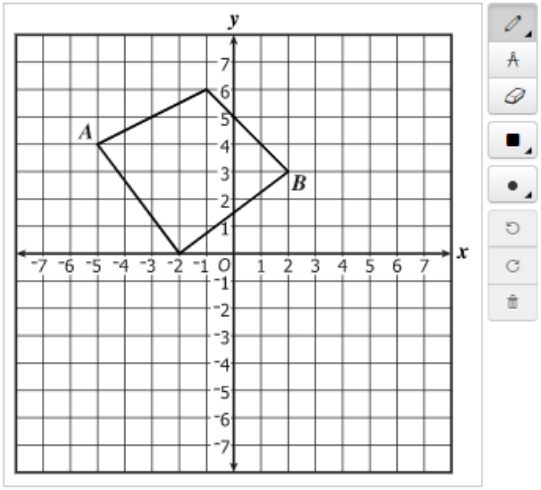
What are the coordinates of point T' after this reflection?

- A. $(^{-}4, 2)$
- B. $(^{-}2, ^{-}4)$
- C. $(2, 4)$
- D. $(4, ^{-}2)$

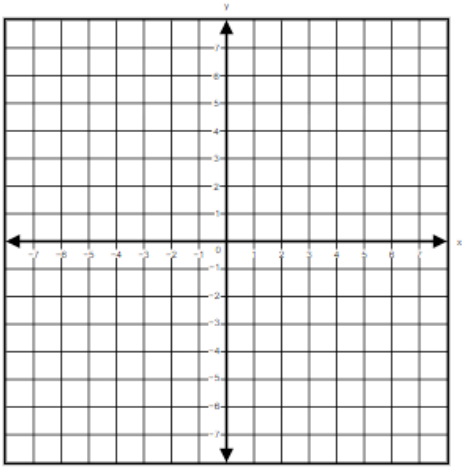
Problem 7

Directions: Plot each point on the coordinate grid on the right.

The vertices of the polygon shown have integral coordinates. The polygon will be rotated 180° about the origin and then reflected over the y-axis.



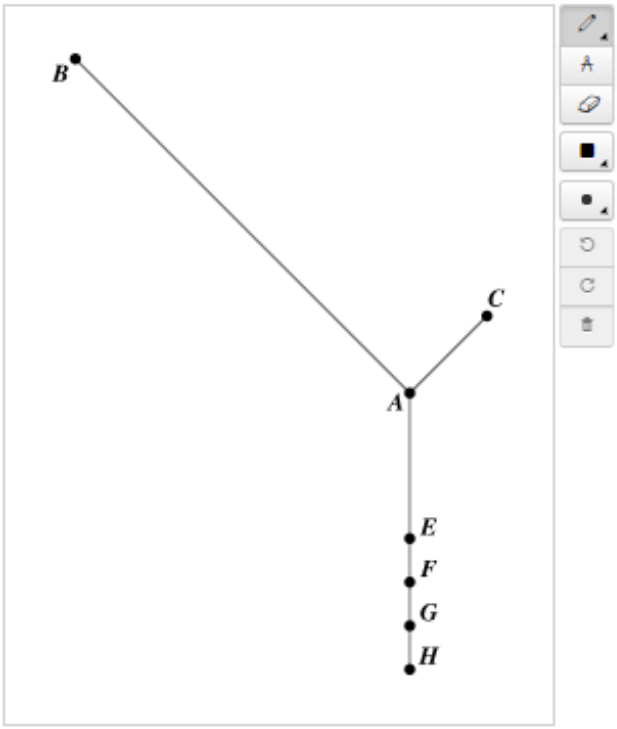
Plot vertices A' and B' after this transformation.



Problem 8

Given: $\overline{AB}$, $\overline{AC}$, and $\overline{AH}$

Points E, F, and G on $\overline{AH}$



Using construction, the length closest to $AB - 3AC$ is —

A. AE

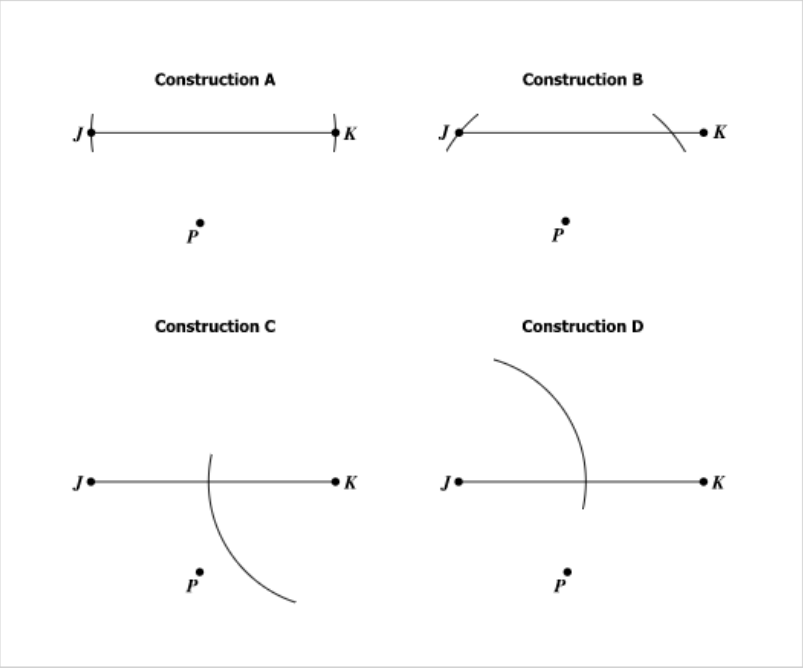
B. AF

C. AG

D. AH

Problem 9

Which construction represents a correct first step in constructing a line segment perpendicular to $\overline{JK}$ through point P?

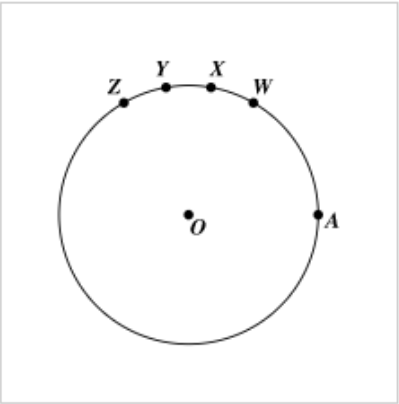


Select the correct answer.

- A. Construction A
- B. Construction B
- C. Construction C
- D. Construction D

Problem 10

Point A represents a vertex of an equilateral triangle inscribed in circle O.



Which other point is also a vertex of this equilateral triangle?

- A. Point W
- B. Point X
- C. Point Y
- D. Point Z

Problem 11

The perimeter of $\triangle JKL$ is 200 centimeters.

- $JK = 68$ centimeters
- $KL = 62$ centimeters

Which statement is true about the interior angles of $\triangle JKL$?

A. $m\angle L$ is the greatest of the interior angles

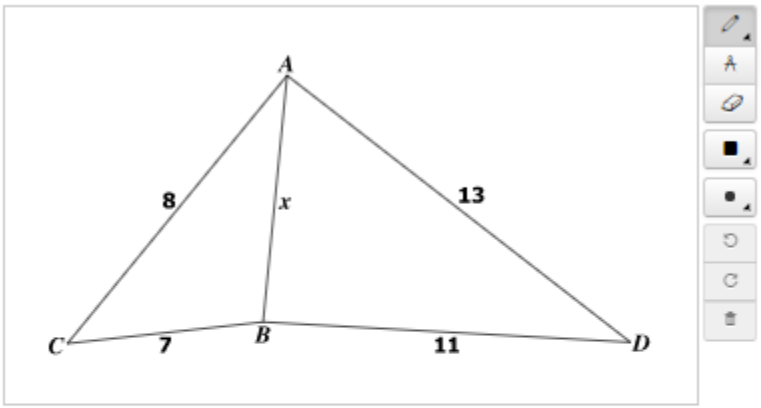
B. $m\angle L$ is the least of the interior angles

C. $m\angle K$ is the greatest of the interior angles

D. $m\angle K$ is the least of the interior angles

Problem 12

The figure shows two triangles, where x represents the length of the common side $\overline{AB}$. (Figure is not drawn to scale.)



Which inequality shows all the possible values for x?

A. $1 < x < 15$

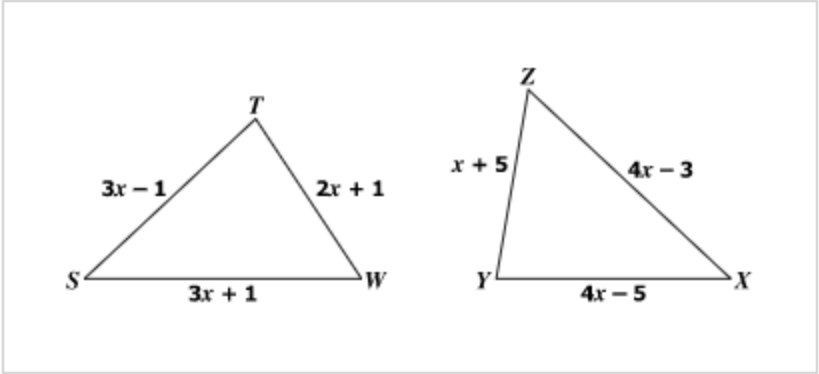
B. $1 < x < 24$

C. $2 < x < 15$

D. $2 < x < 24$

Problem 13

What value of x makes $\triangle STW \cong \triangle XYZ$?

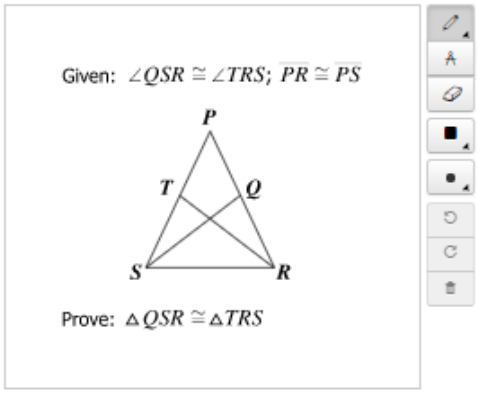


- A. 2
- B. 3
- C. 4
- D. 6

Problem 14

Directions: Drag the answers to the correct boxes.

Select the reasons for the last three statements of this proof.



Statements	Reasons
1. $\overline{PR} \cong \overline{PS}$ $\angle QSR \cong \angle TRS$	1. Given
2. $\angle TSR \cong \angle QRS$	2.
3. $\overline{SR} \cong \overline{RS}$	3.
4. $\triangle QSR \cong \triangle TRS$	4.

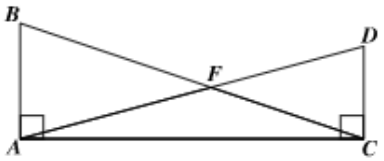
- Base angles of an isosceles triangle are congruent
- Corresponding parts of congruent triangles are congruent
- Reflexive property
- Angle-Side-Angle (ASA) Postulate
- Side-Angle-Side (SAS) Postulate

Problem 15

Directions: Drag the correct answer to each box.

Complete the proof.

Given: $\overline{BA} \perp \overline{AC}$
$\overline{DC} \perp \overline{AC}$
Prove: $\triangle BFA \sim \triangle CFD$



Statements	Reasons
1. Given: $\overline{BA} \perp \overline{AC}$, $\overline{DC} \perp \overline{AC}$	1. Given
2. $\overline{BA} \parallel \overline{DC}$	2. If two lines are perpendicular to a third line, then the two lines are parallel.
3. [ ]	3. If two parallel lines are cut by a transversal, alternate interior angles are congruent.
4. $\triangle BFA \sim \triangle CFD$	4. [ ]

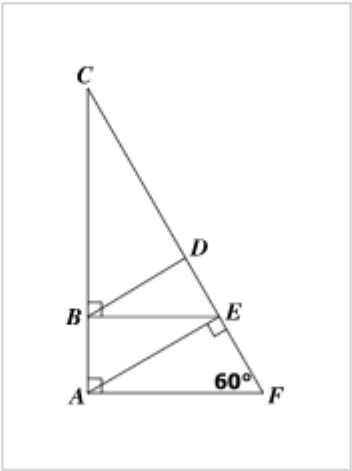
$\angle DFC \cong \angle BFA$; $\angle DAB \cong \angle BCD$	$\angle CBA \cong \angle ADC$; $\angle BAD \cong \angle DCB$	$\angle CDA \cong \angle BAD$; $\angle CBA \cong \angle BCD$	Angle-Angle (AA) Postulate	Side-Angle-Side (SAS) Postulate

Problem 16

Directions: Select the correct answers.

Given: $\triangle ACF$ is subdivided into smaller triangles
$\overline{AC} \perp \overline{AF}$ and $\overline{AC} \perp \overline{BE}$ and $\overline{AE} \perp \overline{CF}$
Point B lies on $\overline{AC}$ and points D and E lie on $\overline{CF}$

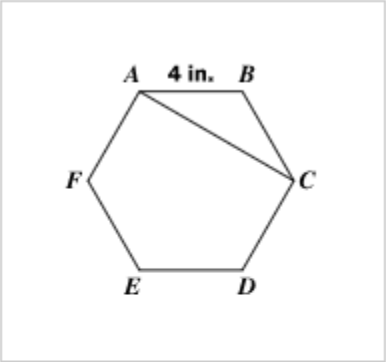
Based on the given information, identify two triangles that may NOT be similar.



$\triangle ACF$	$\triangle BCE$	$\triangle BEA$	$\triangle DBE$	$\triangle EAF$

Problem 17

The figure shown is a regular hexagon.

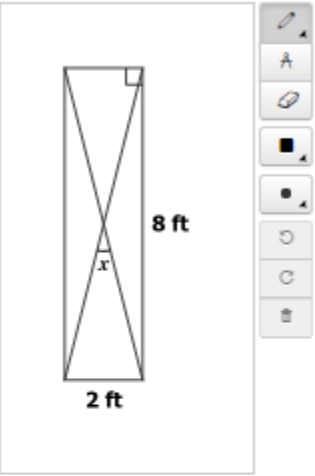


What is the length of the diagonal AC ?

- A. $4\sqrt{3}$ in.
- B. 8 in.
- C. 12 in.
- D. $8\sqrt{3}$ in.

Problem 18

The figure represents the side view of a rectangular frame for metal shelves. Two diagonal braces support the frame.



Which is closest to the measure of x ?

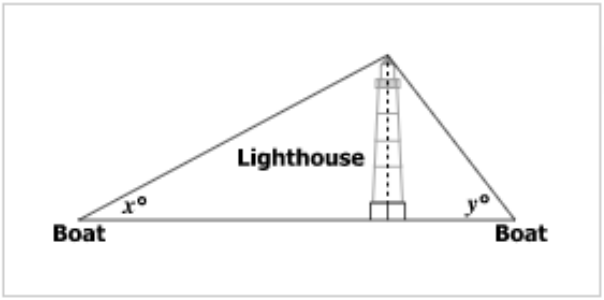
- A. 7°
- B. 14°
- C. 28°
- D. 76°

Directions: Type your answer in the box.

Problem 19

Two vertices of the triangle in the figure represent the relative positions of boats on opposite sides of a lighthouse. The angles of elevation from the boats to the top of the lighthouse are x° and y°.

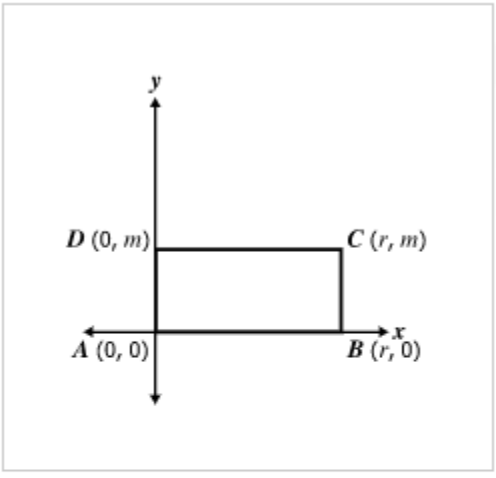
- $\sin(x^\circ) = \frac{8}{17}$, $\cos(x^\circ) = \frac{15}{17}$, and $\tan(x^\circ) = \frac{8}{15}$
- $\sin(y^\circ) = \frac{4}{5}$, $\cos(y^\circ) = \frac{3}{5}$, and $\tan(y^\circ) = \frac{4}{3}$



Write a fraction to represent the ratio of the height of the lighthouse to the distance between the boats. Your answer must be in fraction form.

Problem 20

Given: Quadrilateral $ABCD$



Which expression proves that $ABCD$ is a rectangle?

A. The length of each diagonal is $\sqrt{r^2 + m^2}$.

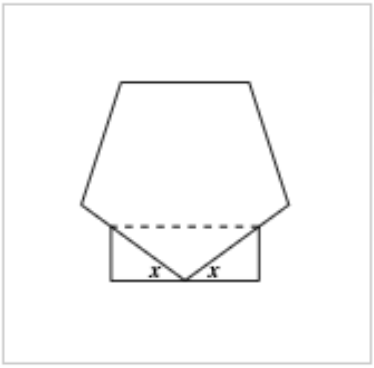
B. The common midpoint of the diagonals is $\left(\frac{r}{2}, \frac{m}{2}\right)$.

C. The slope of $\overline{AC}$ is $\frac{m}{r}$ and the slope of $\overline{BD}$ is $-\frac{m}{r}$.

D. The length of both $\overline{AB}$ and $\overline{CD}$ is r and the length of both $\overline{AD}$ and $\overline{BC}$ is m.

Problem 21

This figure is composed of a regular pentagon and a rectangle.

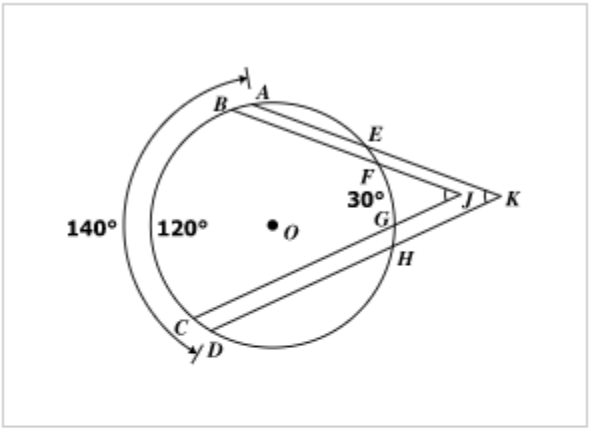


What is the measure of each of the angles identified as x ?

- A. 36°
- B. 54°
- C. 72°
- D. 108°

Problem 22

In circle O, $m\overset{\frown}{FG} = 30^\circ$, $m\overset{\frown}{BC} = 120^\circ$, and $\angle J \cong \angle K$.

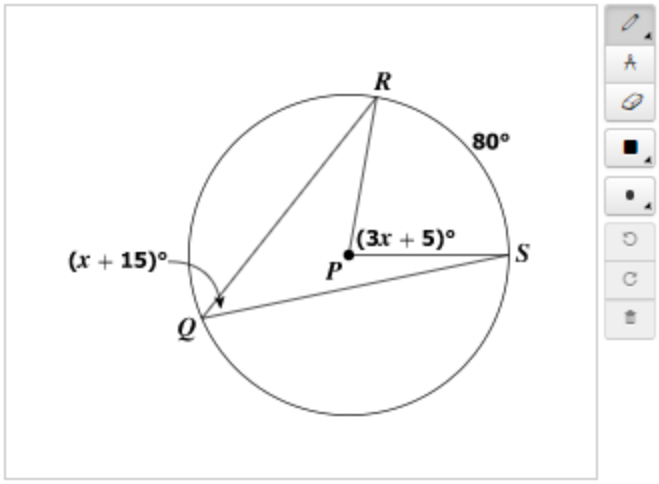


What is $m\overset{\frown}{EH}$?

- A. 35°
- B. 40°
- C. 45°
- D. 50°

Problem 23

Points Q, R, and S lie on circle P.



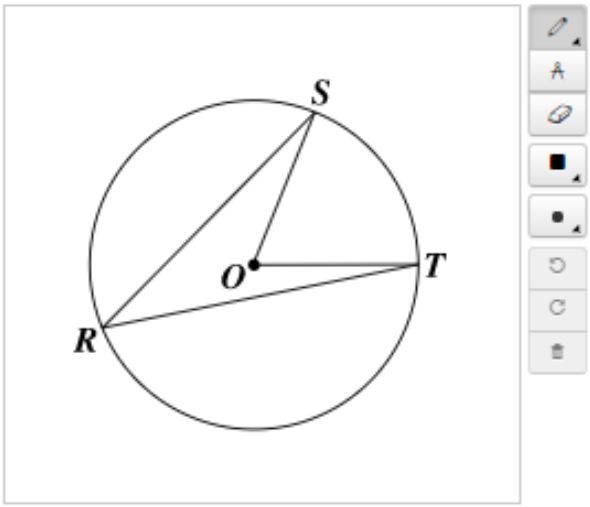
What is the value of x ?

- A. 5
- B. 12
- C. 25
- D. 65

Problem 24

Directions: Type your answer in the box.

In circle O, $m\angle SOT = 68^{\circ}$.



What is $m\angle SRT$?

$m\angle SRT =$ [ ] degrees

Problem 25

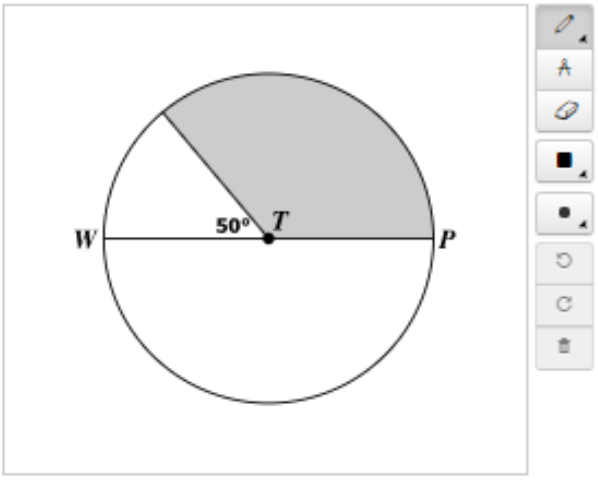
The design for the arc-shaped stand of the hammock shown was based on a 144° arc, $\overset{\frown}{ST}$, of a circle with a radius of 2.3 meters. (Figure is not drawn to scale.)

The length of $\overset{\frown}{ST}$ is closest to —

- A. 2.89 m
- B. 3.68 m
- C. 5.78 m
- D. 7.23 m

Problem 26

Given: Circle T with $WP = 36$ centimeters



Which best represents the area of the shaded sector?

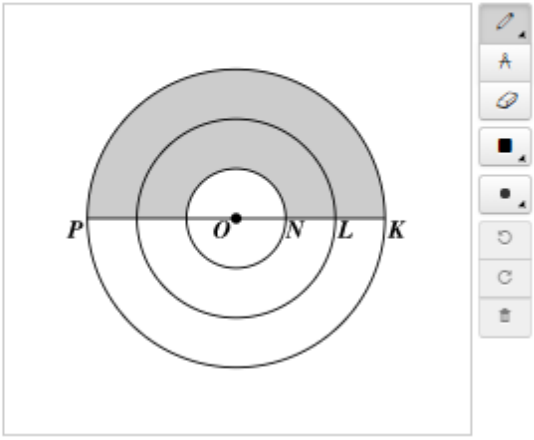
- A. 117π cm^2
- B. 180π cm^2
- C. 234π cm^2
- D. 468π cm^2

Problem 27

Given: Three concentric circles with the center O

$\overline{KL} \cong \overline{LN} \cong \overline{NO}$

$KP = 42$ inches



Which is closest to the area of the shaded region?

- A. 231 sq in.
- B. 308 sq in.
- C. 539 sq in.
- D. 616 sq in.

Problem 28

Given: Circle W

$W(^{-}4, 6)$

Radius $= 10$ units

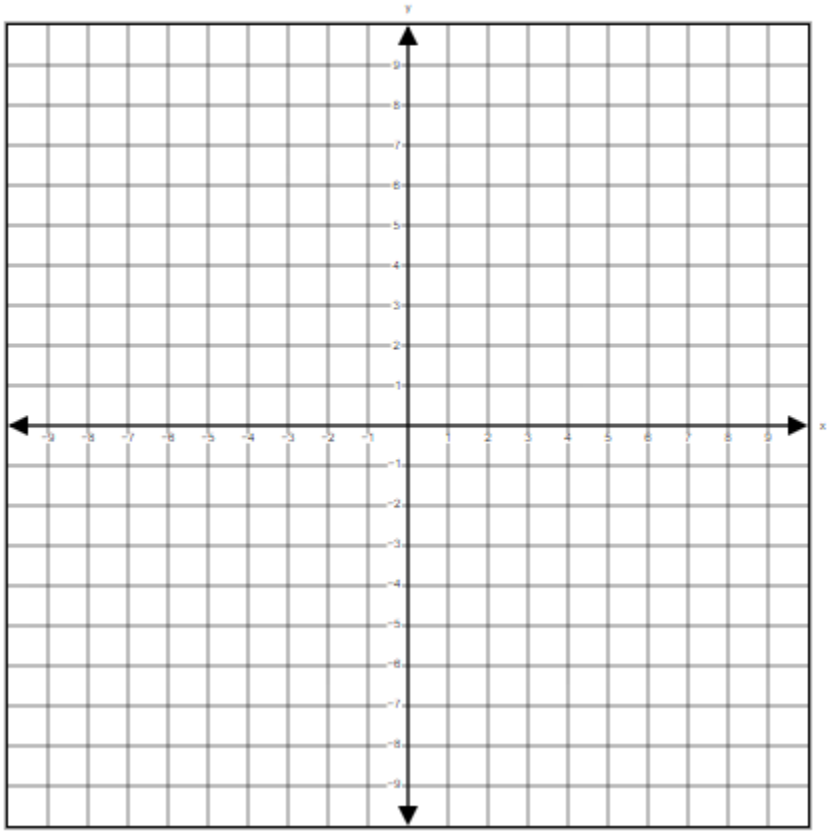
Which point lies on circle W ?

- A. $(0, 4)$
- B. $(2, 10)$
- C. $(4, 0)$
- D. $(6, 16)$

Problem 29

Directions: Plot each point on the grid.

Circle O is defined by the equation $x^2 + (y-2)^2 = 25$. Plot the center of circle O and one point with integral coordinates that lies on circle O.



Problem 30

Directions: Drag the answers to the correct boxes.

Given: Circle O with diameter $\overline{CD}$
$C(^{-}7, ^{-}4)$ and $D(1, 2)$

Create the equation of this circle.

The Equation of the Circle

$\square + \square = \square$

$(x-3)^2$	$(x+3)^2$	$(y-1)^2$	$(y+1)^2$	25	100

Problem 31

A cylinder has a volume of 300π cubic centimeters and a base with a circumference of 10π centimeters. What is the height of the cylinder?

- A. 30 cm
- B. 15 cm
- C. 12 cm
- D. 3 cm

Problem 32

Directions: Select the correct answers.

Two cylinders, a sphere, and a cone are shown. Select the two objects with the same volume.

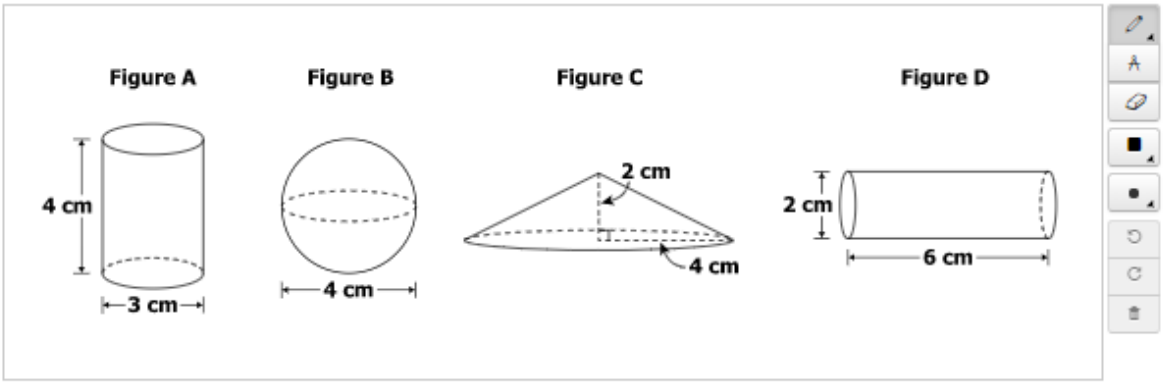


Figure A | Figure B | Figure C | Figure D

Problem 33

Directions: Drag the correct answers to the boxes.

The ratio of the volumes of two spheres is $8{:}27$. What is the ratio of the lengths of the radii of these two spheres?

1	2	3	4	6	8	9	13	19	27

Problem 34

The height of a rectangular prism is decreased by a factor of $\frac{1}{3}$. The other dimensions are unchanged. Which statement is true?

A. The volume is decreased by a factor of $\frac{1}{3}$.

B. The volume is decreased by a factor of $\frac{1}{6}$.

C. The volume is decreased by a factor of $\frac{1}{9}$.

D. The volume is decreased by a factor of $\frac{1}{27}$.

Problem 35

Directions: Select the correct answers.

The volume of a cube is 216 cubic inches. The dimensions of the cube are changed to create a rectangular prism.

- One dimension of the cube is changed by a factor of 2.
- A second dimension of the cube is changed by a factor of $\frac{1}{2}$.
- The third dimension of the cube is unchanged.

The surface area of the rectangular prism is Choose... square inches.

The volume of the rectangular prism is Choose... cubic inches.

Problem 36

A company makes two similar cylindrical containers. The total surface area of the smaller container is 0.81 times that of the larger container. The height of the larger container is 60 centimeters. What is the height of the smaller container?

- A. 54 cm
- B. 48.6 cm
- C. 24.3 cm
- D. 21 cm