

VIRGINIA STANDARDS OF LEARNING

EOC
GEOMETRY (2023)

2023 Mathematics Standards of Learning

Practice Item Set

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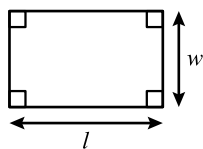
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Geometry Formula Sheet

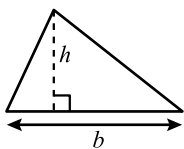
2023 Mathematics Standards of Learning

Geometric Formulas

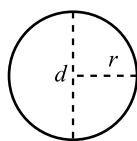


$$p = 2l + 2w$$

$$A = lw$$



$$A = \frac{1}{2}bh$$

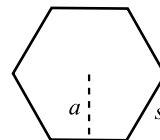


$$C = 2\pi r$$

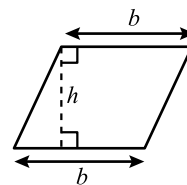
$$C = \pi d$$

$$A = \pi r^2$$

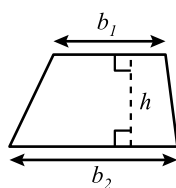
Regular Polygon



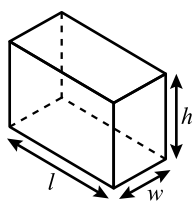
$$A = \frac{1}{2}pa$$



$$A = bh$$

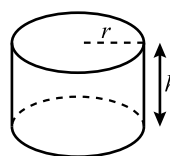


$$A = \frac{1}{2}h(b_1 + b_2)$$



$$V = lwh$$

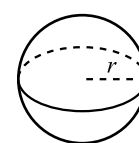
$$S.A. = 2lw + 2lh + 2wh$$



$$V = \pi r^2 h$$

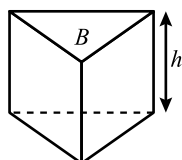
$$L.A. = 2\pi r h$$

$$S.A. = 2\pi r^2 + 2\pi r h$$



$$V = \frac{4}{3}\pi r^3$$

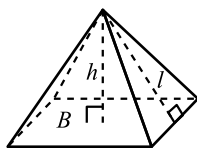
$$S.A. = 4\pi r^2$$



$$V = Bh$$

$$L.A. = hp$$

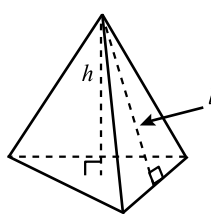
$$S.A. = hp + 2B$$



$$V = \frac{1}{3}Bh$$

$$L.A. = \frac{1}{2}lp$$

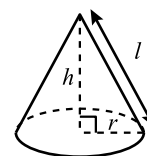
$$S.A. = \frac{1}{2}lp + B$$



$$V = \frac{1}{3}Bh$$

$$L.A. = \frac{1}{2}lp$$

$$S.A. = \frac{1}{2}lp + B$$



$$V = \frac{1}{3}Bh$$

$$V = \frac{1}{3}\pi r^2 h$$

$$L.A. = \pi r l$$

$$S.A. = \pi r^2 + \pi r l$$

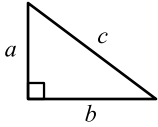
Abbreviations

Area	A
Area of Base	B
Circumference	C
Lateral Area	$L.A.$
Perimeter	p
Surface Area	$S.A.$
Volume	V

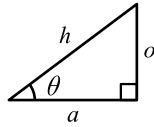
Geometry Formula Sheet

2023 Mathematics Standards of Learning

Geometric Formulas



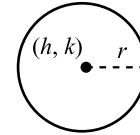
$$a^2 + b^2 = c^2$$



$$\sin \theta = \frac{o}{h}$$

$$\cos \theta = \frac{a}{h}$$

$$\tan \theta = \frac{o}{a}$$



$$(x - h)^2 + (y - k)^2 = r^2$$

Geometric Symbols

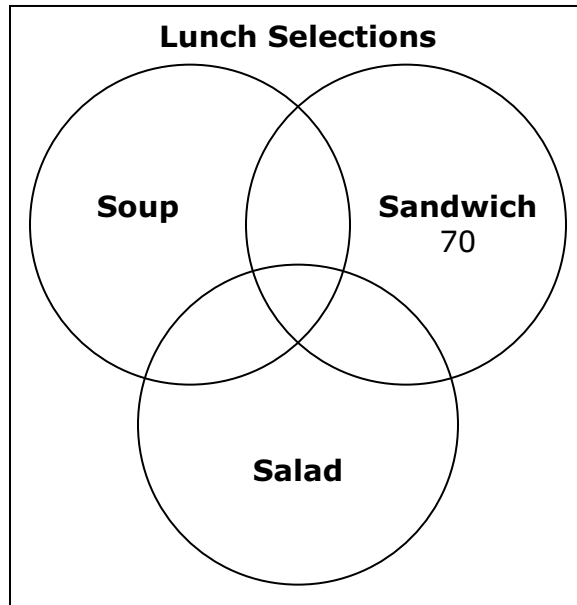
Example	Meaning
$m\angle A$	measure of angle A
AB	length of line segment AB
\overrightarrow{AB}	ray AB
$\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$	Line AB is parallel to line CD .
$\overline{AB} \perp \overline{CD}$	Line segment AB is perpendicular to line segment CD .
$\angle A \cong \angle B$	Angle A is congruent to angle B .
$\triangle ABC \sim \triangle DEF$	Triangle ABC is similar to triangle DEF .

1 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

2 The Venn diagram represents the combination of lunches that athletes selected.



- A total of 310 athletes selected a sandwich.
- A total of 125 athletes selected both a sandwich and a salad.
- A total of 180 athletes selected both a sandwich and a soup.

How many athletes selected a sandwich, a soup, and a salad?

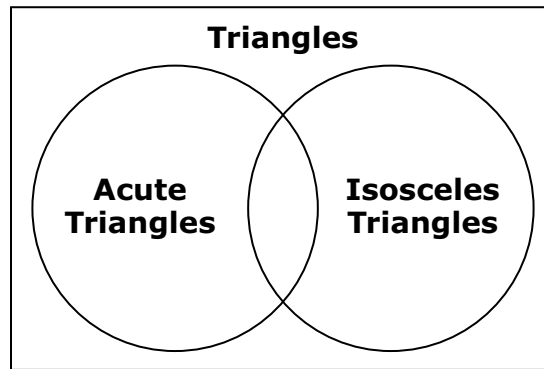
F 5

H 65

G 55

J 110

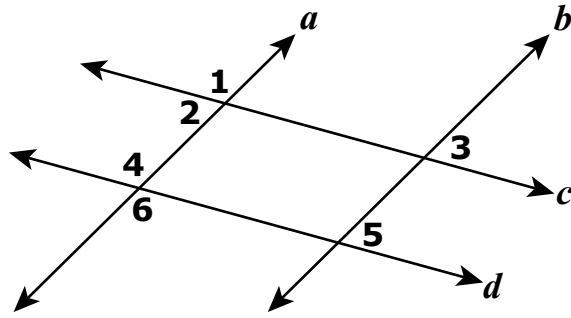
3 Given the Venn diagram:



Which statement is valid?

- A** All triangles are acute and isosceles.
- B** All triangles are either acute or isosceles.
- C** No triangles are both acute and isosceles.
- D** Some triangles are both acute and isosceles.

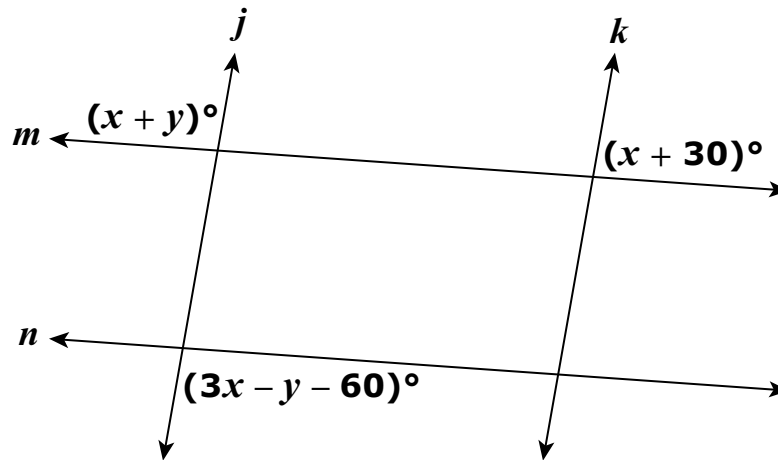
4 Lines a and b intersect lines c and d .



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

- F $\angle 1 \cong \angle 6$, $\angle 3 \cong \angle 5$
- G $\angle 1 \cong \angle 6$, $\angle 4$ and $\angle 5$ are supplementary
- H $\angle 1 \cong \angle 4$, $\angle 1$ and $\angle 2$ are supplementary
- J $\angle 1$ and $\angle 3$ are supplementary, $\angle 1$ and $\angle 6$ are supplementary

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



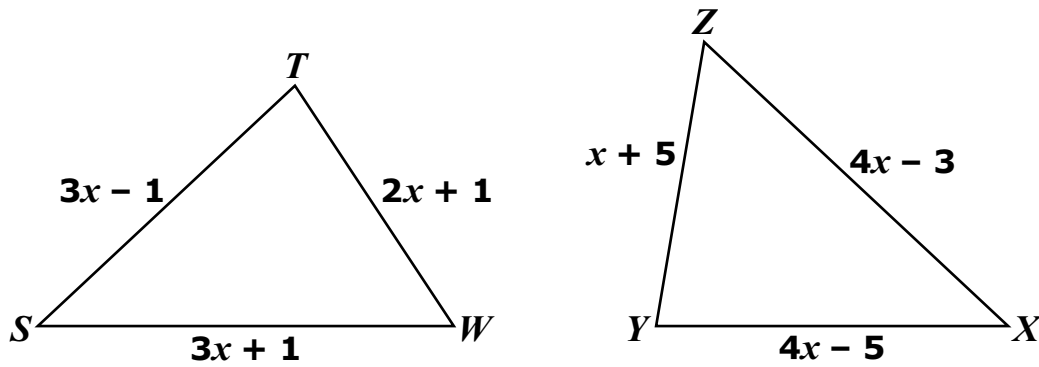
Which relationship is sufficient to prove $j \parallel k$?

- A $x = 60$
 - B $y = 30$
 - C $y = x - 30$
 - D $y = 150 - 2x$
- 6 The perimeter of $\triangle JKL$ is 200 centimeters.
- $JK = 68$ centimeters
 - $KL = 62$ centimeters

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

- F $m\angle L$ is the greatest of the interior angles
- G $m\angle L$ is the least of the interior angles
- H $m\angle K$ is the greatest of the interior angles
- J $m\angle K$ is the least of the interior angles

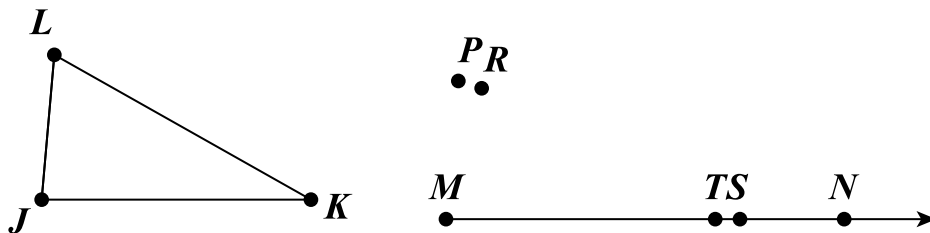
7 Triangle STW and $\triangle XYZ$ are shown.



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

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

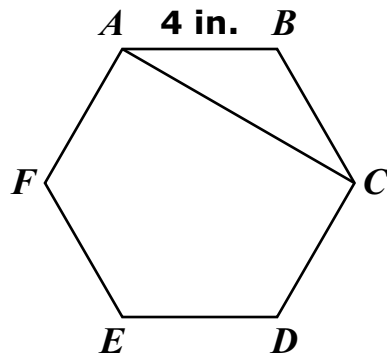
8 Evelyn is constructing a triangle congruent to $\triangle JKL$ using \overline{MN} .



Which triangle should Evelyn construct that will be congruent to $\triangle JKL$?

- F $\triangle MSP$
- G $\triangle MSR$
- H $\triangle MTP$
- J $\triangle MTR$

9 The figure shown is a regular hexagon.

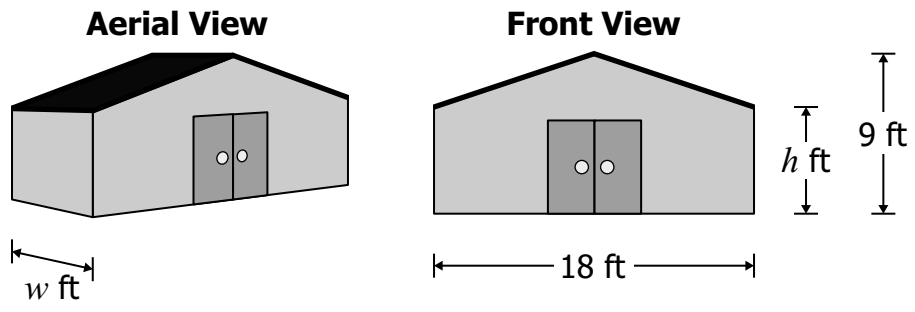


Which measure is the length of the diagonal *AC* ?

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

Directions: Use the following information to answer questions 10–12.

A carpenter will build a shed with four walls and a roof. The shape of the shed will consist of a triangular prism and a rectangular prism as shown in the model.



10 A vertical plane intersects the model. The plane is parallel to the front face of the model. What is the shape of this cross section?

- F** Triangle
- G** Pentagon
- H** Rectangle
- J** Trapezoid

11 If $w = 12$ and $h = 6$, the surface area of the exterior walls and doors is exactly —

- A** 360 square feet
- B** 414 square feet
- C** 468 square feet
- D** 630 square feet

12 If $w = 12$, which equation correctly models a calculation of the volume of the shed?

F $V = 18(12)(9 - h)$

G $V = 60h + 18(9 - h)$

H $V = 18(12)(h) + \frac{1}{2}(9)(12)(9 - h)$

J $V = 18(12)(h) + \frac{1}{2}(18)(12)(9 - h)$

End of Set

13 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

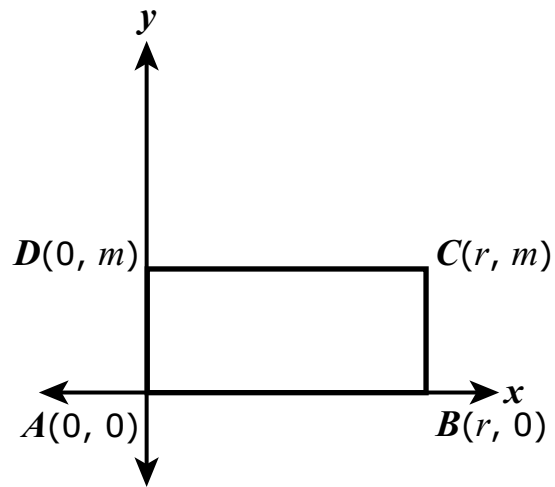
14 The height of a rectangular prism is decreased by a factor of $\frac{1}{3}$. The other dimensions are unchanged. Which statement is true?

- F** The volume is decreased by a factor of $\frac{1}{3}$.
- G** The volume is decreased by a factor of $\frac{1}{6}$.
- H** The volume is decreased by a factor of $\frac{1}{9}$.
- J** The volume is decreased by a factor of $\frac{1}{27}$.

15 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

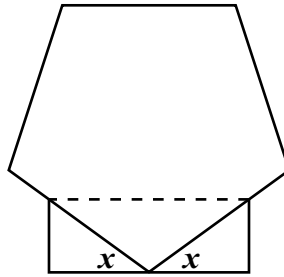
16 Given: Quadrilateral $ABCD$



Which expression proves that $ABCD$ is a rectangle?

- F The length of each diagonal is $\sqrt{r^2 + m^2}$.
- G The common midpoint of the diagonals is $(\frac{r}{2}, \frac{m}{2})$.
- H The slope of \overline{AC} is $\frac{m}{r}$ and the slope of \overline{BD} is $-\frac{m}{r}$.
- J The length of both \overline{AB} and \overline{CD} is r and the length of both \overline{AD} and \overline{BC} is m .

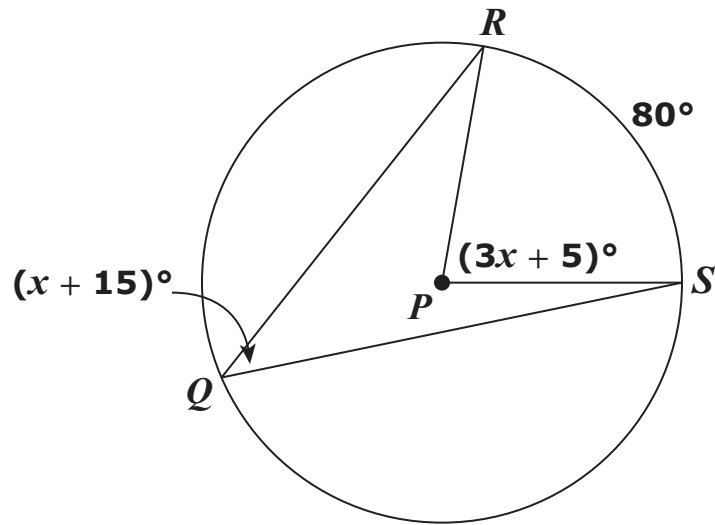
17 The figure shown is composed of a regular pentagon and a rectangle.



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

- A 36°
- B 54°
- C 72°
- D 108°

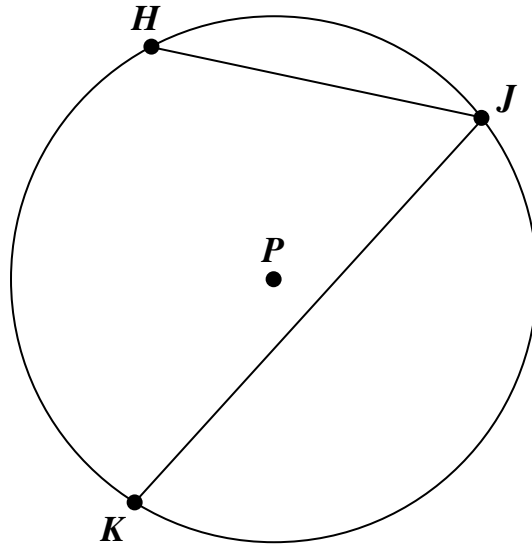
18 Points Q , R , and S lie on circle P .



What is the value of x ?

- F 5
- G 12
- H 25
- J 65

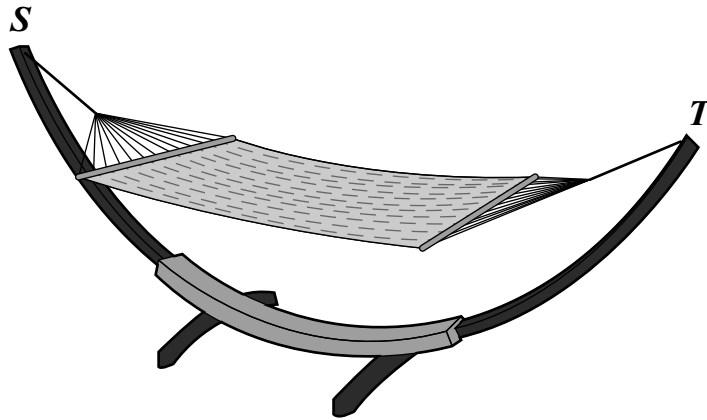
- 19 In circle P , $m\angle HJK = 60^\circ$ and $m\widehat{JK} = 2 \cdot m\widehat{HJ}$.



What is $m\widehat{HJ}$?

- A 80°
B 120°
C 150°
D 160°
- 20 Circle P has a radius of 1 unit. A central angle of circle P is 225° . What is the length of the minor arc?
- F $\frac{5\pi}{4}$ units
G $\frac{3\pi}{4}$ units
H $\frac{5\pi}{8}$ units
J $\frac{3\pi}{8}$ units

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

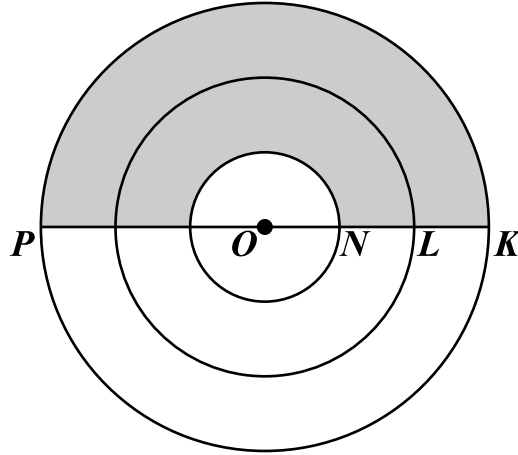


The length of \widehat{ST} is closest to —

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

22 Given: Three concentric circles with the center O

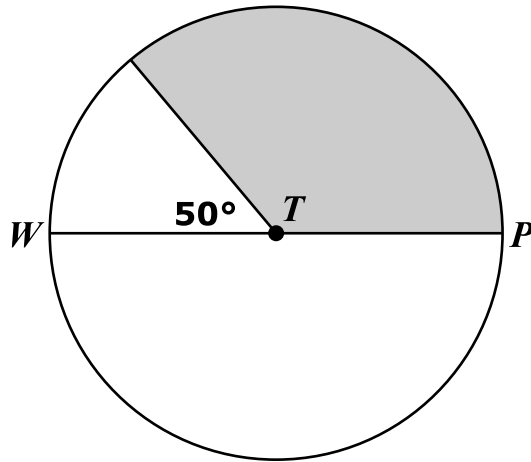
$$\begin{aligned}\overline{KL} &\cong \overline{LN} \cong \overline{NO} \\ \overline{KP} &= 42 \text{ inches}\end{aligned}$$



Which is closest to the area of the shaded region?

- F 231 sq in.
- G 308 sq in.
- H 539 sq in.
- J 616 sq in.

23 Given: Circle T with $WP = 36$ centimeters



Which best represents the area of the shaded sector?

- A $117\pi \text{ cm}^2$
- B $180\pi \text{ cm}^2$
- C $234\pi \text{ cm}^2$
- D $468\pi \text{ cm}^2$

24 Given: Circle W
 $W(-4, 6)$
Radius = 10 units

Which point lies on circle W ?

- F $(0, 4)$
- G $(2, 10)$
- H $(4, 0)$
- J $(6, 16)$

EOC Geometry (2023)
Practice Item Set Spring 2025
Answer Key

Sequence Number	Correct Answer	Reporting Category	Reporting Category Description
1	C	001	Reasoning, Lines, and Transformations
2	H	001	Reasoning, Lines, and Transformations
3	D	001	Reasoning, Lines, and Transformations
4	G	001	Reasoning, Lines, and Transformations
5	D	001	Reasoning, Lines, and Transformations
6	H	002	Triangles
7	C	002	Triangles
8	H	002	Triangles
9	A	002	Triangles
10	G	003	Polygons, Circles, and Three-Dimensional Figures
11	B	003	Polygons, Circles, and Three-Dimensional Figures
12	J	003	Polygons, Circles, and Three-Dimensional Figures
13	C	003	Polygons, Circles, and Three-Dimensional Figures
14	F	003	Polygons, Circles, and Three-Dimensional Figures
15	A	003	Polygons, Circles, and Three-Dimensional Figures
16	F	003	Polygons, Circles, and Three-Dimensional Figures
17	A	003	Polygons, Circles, and Three-Dimensional Figures
18	H	003	Polygons, Circles, and Three-Dimensional Figures
19	A	003	Polygons, Circles, and Three-Dimensional Figures
20	G	003	Polygons, Circles, and Three-Dimensional Figures
21	C	003	Polygons, Circles, and Three-Dimensional Figures
22	J	003	Polygons, Circles, and Three-Dimensional Figures
23	A	003	Polygons, Circles, and Three-Dimensional Figures
24	H	003	Polygons, Circles, and Three-Dimensional Figures

