VIRGINIA STANDARDS OF LEARNING

Spring 2010 Released Test

END OF COURSE GEOMETRY

Form M0110, CORE 1

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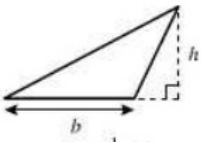
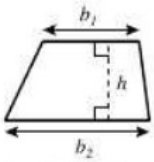
Geometry Formula Sheet

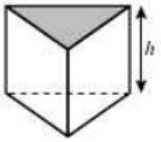
Geometric Formulas



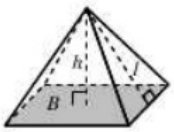
$A = \frac{1}{2}bh$



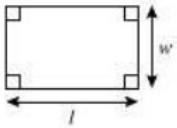
$A = \frac{1}{2}h(b_1 + b_2)$



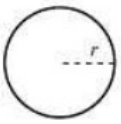
$V = Bh$
$L.A. = hp$
$S.A. = L.A. + 2B$



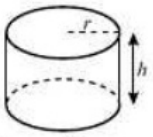
$V = \frac{1}{3}Bh$
$L.A. = \frac{1}{2}lp$
$S.A. = L.A. + B$



$A = lw$
$p = 2(l + w)$

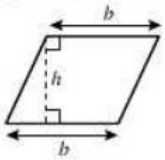


$A = \pi r^2$
$C = 2\pi r$

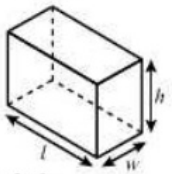


$V = \pi r^2 h$
$L.A. = 2\pi rh$
$S.A. = 2\pi r(h + r)$

$V = \frac{4}{3}\pi r^3$
$S.A. = 4\pi r^2$

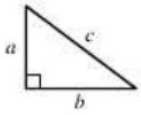


$A = bh$



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

$V = \frac{1}{3}\pi r^2 h$
$L.A. = \pi rl$
$S.A. = \pi r(l + r)$



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

Geometric Symbols

Example	Meaning
$\angle A$	angle A
$\text{m}\angle A$	measure of angle A
$\overline{AB}$	line segment AB
AB	measure of line segment AB
$\overleftrightarrow{AB}$	line AB
$\triangle ABC$	triangle ABC
$\square ABCD$	rectangle $ABCD$
$\square ABCD$	parallelogram $ABCD$

Example	Meaning
$\overrightarrow{AB}$	vector AB
	right angle
$\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$	Line AB is parallel to line CD.
$\overleftrightarrow{AB} \perp \overleftrightarrow{CD}$	Line AB is perpendicular to line CD.
$\angle A \cong \angle B$	Angle A is congruent to angle B.
$\triangle A \sim \triangle B$	Triangle A is similar to triangle B.
	Similarly marked segments are congruent.
	Similarly marked angles are congruent.

Abbreviations

Volume	V
Lateral Area	$L.A.$
Total Surface Area	$S.A.$
Area of Base	B

Pi

$\pi \approx 3.14$

$\pi \approx \frac{22}{7}$

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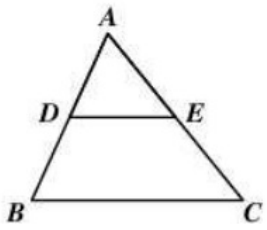
Directions

Read each question and choose the best answer.

SAMPLE

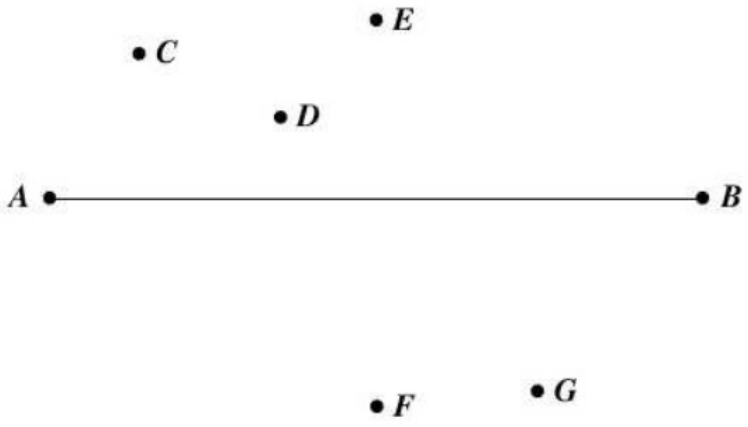


If $\triangle ABC$ is similar to $\triangle ADE$, then $AB : AD = ? : AE$. Which replaces the "?" to make the statement true?

A AC
B AE
C DE
D BC

GO ON

1 A bisector of $\overline{AB}$ contains which line segment?



A $\overline{CG}$

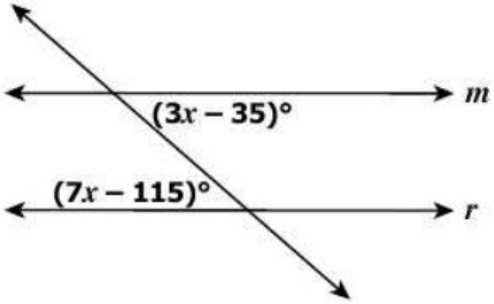
B $\overline{DF}$

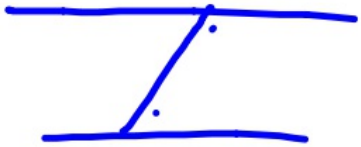
C $\overline{DG}$

D $\overline{EF}$

GO ON

2 **Lines m and r are cut by a transversal.**



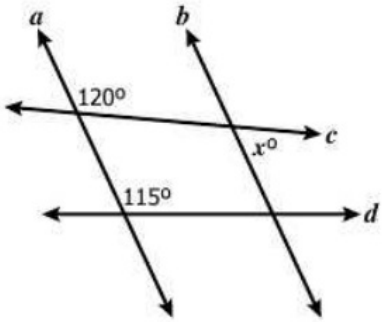


What value of x will show that line m is parallel to line r ?

F 20
G 24
H 25
J 33

$7x - 115 = 3x - 35$
$-3x \quad -3x$
$4x - 115 = -35$
$+115 \quad +115$
$4x = 80$
$x = 20$

3

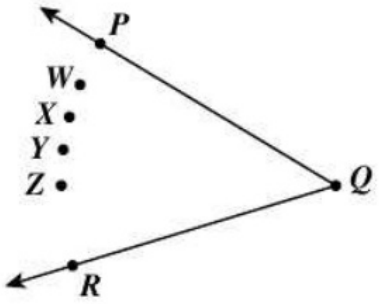


If lines a and b are parallel, what is the value of x ?

A 120
B 115
C 65
D 60

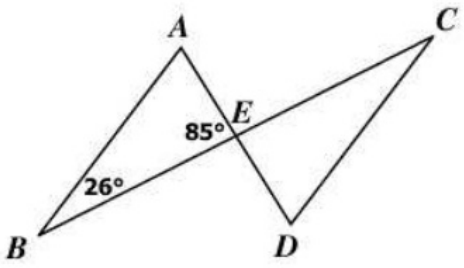
GO ON

4 Which point lies on the bisector of angle PQR ?



F W
G X
H Y
J Z

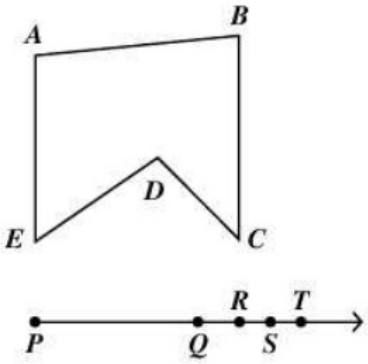
5 For what measure of $\angle D$ is $\overline{AB} \parallel \overline{DC}$ in this figure?



A 26°
B 59°
C 69°
D 95°

GO ON

6



Which line segment is congruent to $\overline{BC}$?

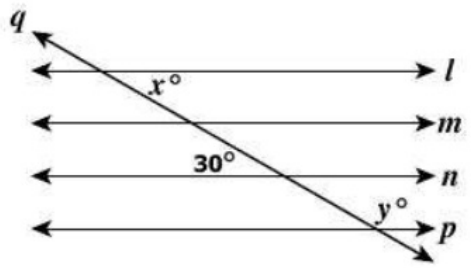
F $\overline{PQ}$

G $\overline{PR}$

H $\overline{PS}$

J $\overline{PT}$

7 **In the figure shown, line q is a transversal of parallel lines l, m, n, and p.**



What are the values of x and y ?

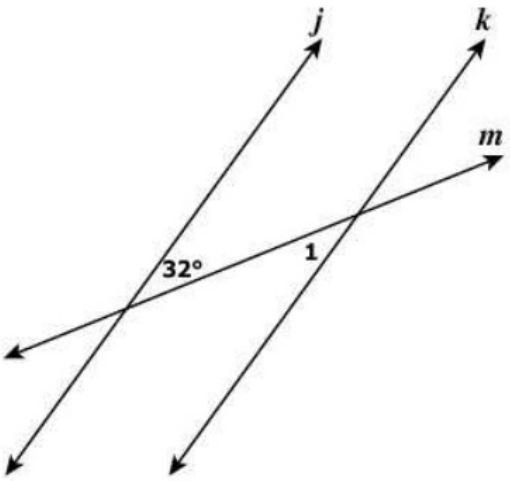
A $x = 30,\ y = 30$

B $x = 30,\ y = 150$

C $x = 150,\ y = 30$

D $x = 150,\ y = 150$

8 In the figure shown, parallel lines j and k are cut by transversal m.

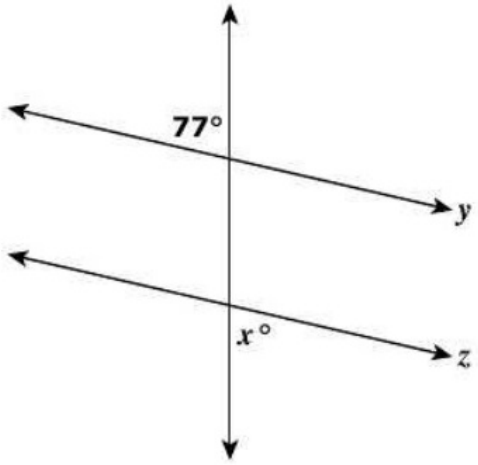


What is $m\angle 1$?

F 32°
G 58°
H 122°
J 148°

GO ON

9 Lines y and z are cut by a transversal.

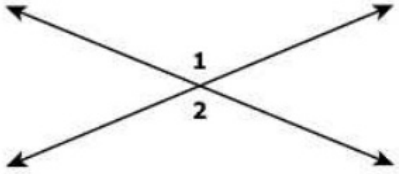


For what value of x is $y \parallel z$?

A 13
B 77
C 103
D 154

GO ON

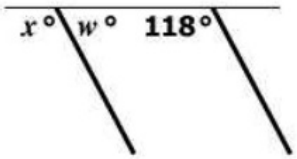
10 In this figure, $m\angle 1 = (15x - 5)°$ and $m\angle 2 = (10x + 35)°$.



What is $m\angle 1$?

F 31°
G 65°
H 85°
J 115°

11 **This figure represents line segments painted on a parking lot to create parking spaces.**



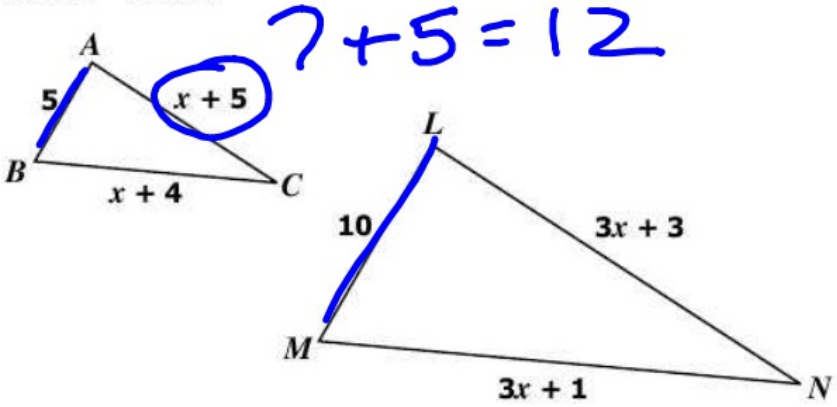
Which equation can be used to show that these line segments are parallel?

A $118 - w = x$
B $118 - x = w$
C $x + 118 = 180$
D $w + 118 = 180$

$w + 118 = 180$

GO ON

12 Given: $\triangle ABC \sim \triangle LMN$



7+5=12

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

F 11
G 12
H ~~22~~
J ~~24~~

$$\frac{5}{10} = \frac{x+4}{3x+1}$$

$10(x+4) = 5(3x+1)$

$10x + 40 = 15x + 5$

$-10x \quad -10x$

$40 = 5x + 5$

$5x = 35$

$x = 7$

13 Given the following measures of the sides of triangles, ~~which is a~~ right triangle?

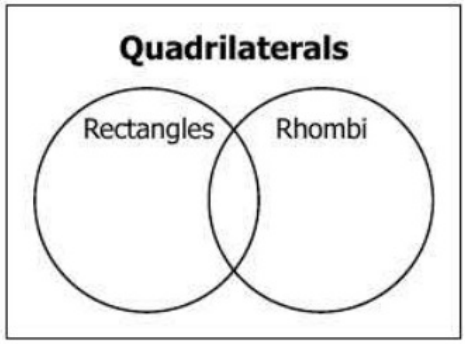
A 41 cm, 40 cm, 9 cm
B 45 ft, 40 ft, 35 ft
C 52 in., 50 in., 11 in.
D 45 yd, 35 yd, 25 yd

$9^2 + 40^2 = 41^2$ ✓

$35^2 + 40^2 = 45^2$ X

GO ON

14



Which of the following statements *must* be true about this Venn diagram?

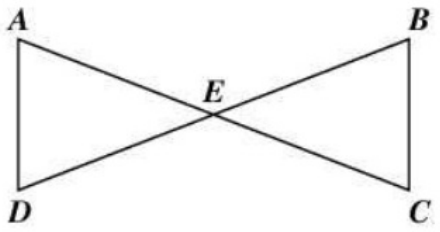
F All rectangles are rhombi.

G Some rhombi are rectangles.

H Quadrilaterals are not rhombi or rectangles.

J All quadrilaterals are rhombi and rectangles.

15 Given: In this figure, $\overline{AC}$ and $\overline{BD}$ bisect each other.



Based on the information given, which triangle congruence theorem could be used to prove $\triangle AED \cong \triangle CEB$?

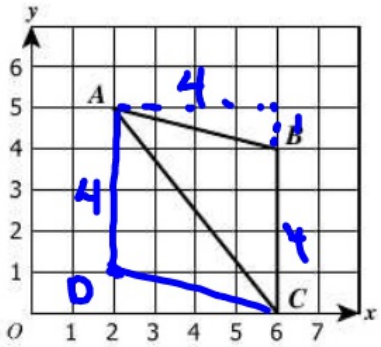
A Angle-Angle-Side (AAS)
B Angle-Side-Angle (ASA)
C Side-Angle-Side (SAS)
D Side-Side-Side (SSS)

16 Statement: *If lines are skew, then they are not coplanar.*

What is the contrapositive of the statement?

F If lines are not coplanar, then they are skew.
G If lines are not skew, then they are coplanar.
H If lines are coplanar, then they are not skew.
J If lines are skew, then they are coplanar.

17 Coordinates $A(2, 5)$, $B(6, 4)$, and $C(6, 0)$ are connected to form $\triangle ABC$.



$1^2+4^2=c^2$

If $\triangle CDA$ is congruent to $\triangle ABC$, what are the coordinates of D ?

A (1, 1)
B (1, 2)
C (2, 2)
D (2, 1)

GO ON

18 Let $p =$ ***An equation is of the form*** $y = mx + b$.
Let $q =$ ***Its graph is a line.***

Argument: ***If an equation is of the form*** $y = mx + b$, ***then its graph is a line.***
The graph is not a line.
Therefore, the equation is not of the form $y = mx + b$.

Which of the following is the symbolic representation of the given argument?

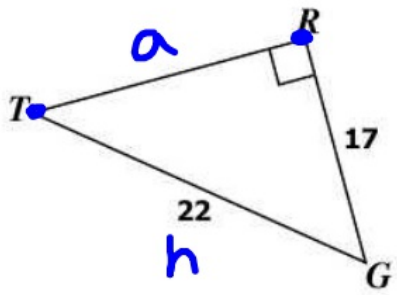
F
$$\begin{array}{|l} p \rightarrow q \\ \sim q \\ \therefore \sim p \end{array}$$

G
$$\begin{array}{|l} p \rightarrow q \\ q \\ \therefore p \end{array}$$

H
$$\begin{array}{|l} p \rightarrow q \\ \sim p \\ \therefore \sim q \end{array}$$

J
$$\begin{array}{|l} p \rightarrow q \\ p \\ \therefore q \end{array}$$

19 $\triangle TRG$ is a right triangle.



Which is closest to the length of $\overline{RT}$?

A 5
B 11
C 14
D 28

$a^2 + 17^2 = 22^2$

$a^2 + 289 = 484$

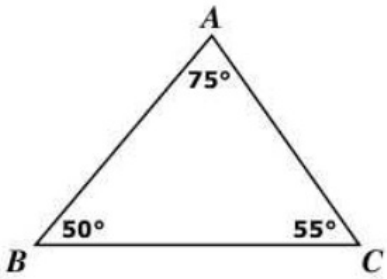
$-289 \quad -289$

$\sqrt{a^2} = \sqrt{195}$

$a \approx 13.96$

GO ON

20



Which list has the sides of $\triangle ABC$ ordered from longest to shortest?

F $\overline{BC}$, $\overline{AC}$, $\overline{AB}$

G $\overline{AB}$, $\overline{AC}$, $\overline{BC}$

H $\overline{AC}$, $\overline{AB}$, $\overline{BC}$

J $\overline{BC}$, $\overline{AB}$, $\overline{AC}$

21 **Three survey markers are located on a map at points H, I, and J. A triangle is formed by connecting these markers by string so that $HI = 150$ feet, $HJ = 245$ feet, and $IJ = 365$ feet.**

Which statement is true about the measures of the angles of $\triangle HIJ$?

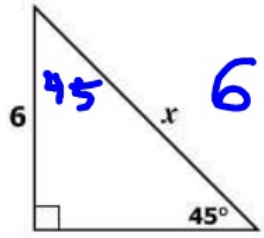
A $m\angle H$ is the smallest

B $m\angle H$ is the largest

C $m\angle I$ is the smallest

D $m\angle I$ is the largest

22



$6\sqrt{2}$

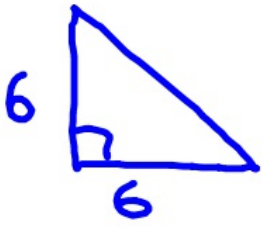
In the figure, what is the value of x?

~~F 6~~

~~G $6\sqrt{2}$~~ 8.49

H $6\sqrt{3}$

~~J 12~~



$6^2+6^2=c^2$

$\sqrt{72}=\sqrt{c^2}$

$c \approx 8.48$

23 Two sides of a triangle measure 14 inches and 8 inches. Which *cannot* be the length of the remaining side?

A 6 in.

B 8 in.

C 14 in.

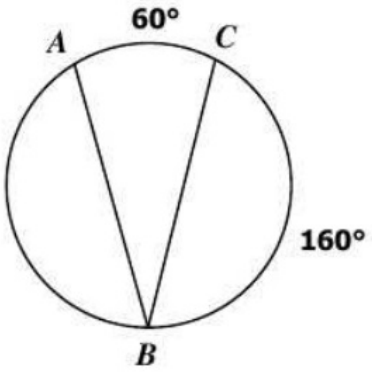
D 21 in.

$14 - 8$ $14 + 8$

$6 < m < 22$

GO ON

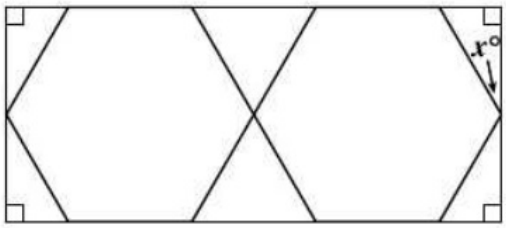
24



In the circle, what is the measure of $\angle ABC$?

F 30°
G 60°
H 120°
J 140°

25 This figure shows a pattern of triangles and regular hexagons.

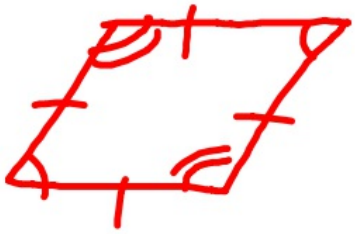


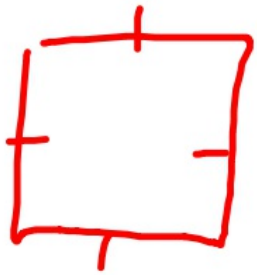
What is the value of x ?

A 30
B 60
C 90
D 120

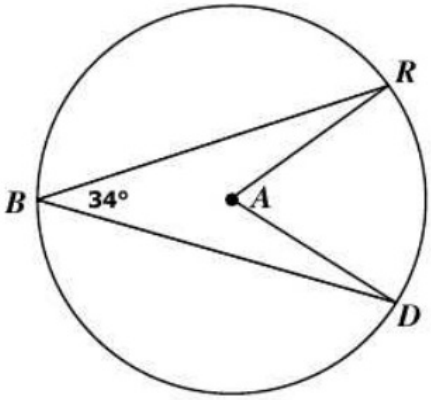
26 **Which figure has all sides of equal measure but not necessarily all angles of equal measure?**

F Square
G Rectangle
H Rhombus
J Trapezoid





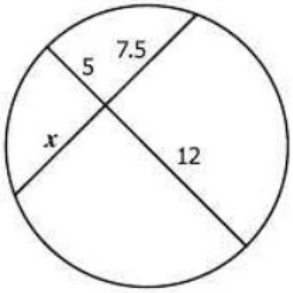
27 **What is $m\angle DAR$ in circle A ?**



A 17°
B 34°
C 56°
D 68°

GO ON

28 Two chords intersect with the measures shown in the drawing.



What is the value of x ?

F 8.0
G 9.5
H 10.0
J 14.5

29 In rectangle $ABCD$, the slope of $\overline{AB}$ is $\frac{1}{2}$. What is the slope of $\overline{CD}$?

A -2

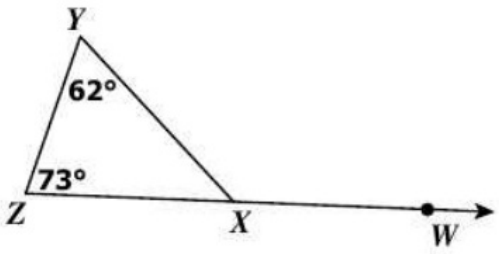
B $-\frac{1}{2}$

C $\frac{1}{2}$

D 2

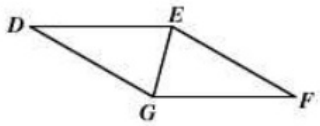
GO ON

30 **In the figure shown, what is $m\angle WXY$?**



F 45°
G 107°
H 120°
J 135°

31 **$DEFG$ is a rhombus with $m\angle EFG = 28°$.**



What is $m\angle GDE$?

A 14°
B 28°
C 30°
D 56°

GO ON

32 This figure is a traffic sign in the shape of a regular octagon.

What is the value of x ?

F 45
G 60
H 135
J 180

33 A rectangular rug is 24 feet long and 10 feet wide. A rhombus design is formed inside the rug by joining the midpoints of each side of the rectangle. What is the length of each side of the rhombus?

A 13 ft
B 26 ft
C 169 ft
D 240 ft

34 **A man who is 6 feet tall casts a shadow that is 4 feet long. At the same time, a nearby flagpole casts a shadow that is 18 feet long. How tall is the flagpole?**

F 10 ft
G 12 ft
H 22 ft
J 27 ft

35 **A fish tank in the shape of a rectangular prism has these dimensions:**

- **length = 20 inches**
- **width = 10 inches**
- **height = 12 inches**

What is the volume of water in the tank when it is $\frac{4}{5}$ full?

~~**A** 1,120 cu in.~~
B 1,920 cu in.
~~**C** 2,400 cu in.~~
~~**D** 3,000 cu in.~~

$V = 20 \cdot 12 \cdot 10$

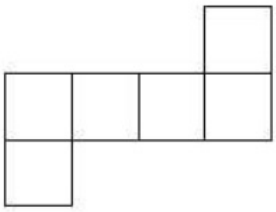
$V = 2400$

$\frac{4}{5} \cdot 2400$

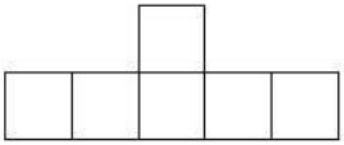
GO ON

36 **Which of these nets would form a cube when folded?**

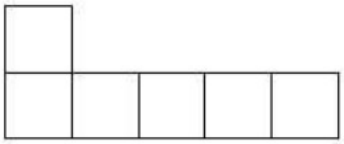
F



G



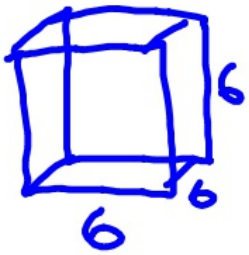
H



J

37 **If a cube with side length 6 inches has its dimensions divided in half, what will be the volume of the new cube?**

A 108 cubic inches
B 54 cubic inches
C 27 cubic inches
D 9 cubic inches

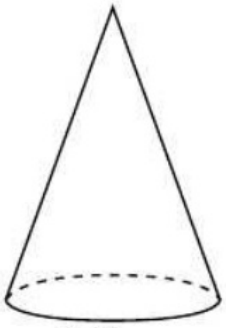


$V = 216$

$V = 27$

GO ON

38 **A right cone is placed on its circular base.**



Which statement about the cone is *incorrect*?

F The view from the front is a triangle. ✓
G The view from the bottom is a circle. ✓
H The view from the top is a circle. ✓
J The view from the left is a rhombus.

39 **A cone has a slant height of 10 centimeters and a lateral area of 60π square centimeters. What is the volume of a sphere with a radius equal to that of the cone?**

A 102π cm^3
B 144π cm^3
C 288π cm^3
D $1{,}333\pi$ cm^3

$L.A. = \pi r 2$

$\downarrow$

$\frac{60\pi}{10\pi} = \frac{\pi \cdot r \cdot 10}{\pi \quad 10}$

$6 = r$

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

$\frac{4}{3}\pi \cdot 6^3$

288π

GO ON

40 **Which line of reflection maps point K at $(-2, 2)$ to point K' at $(2, -2)$?**

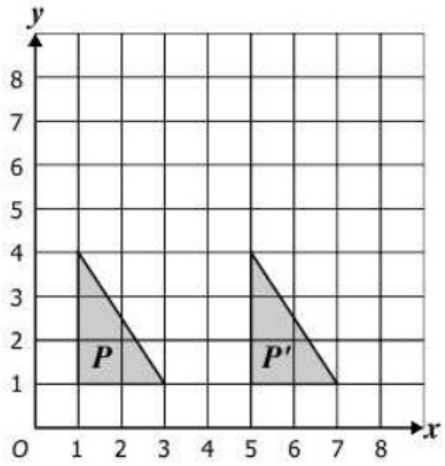
F $y = 2$
G $y = x$
H x-axis
J y-axis

41 **If the coordinates of A are $(1, 1)$ and the midpoint of $\overline{AB}$ is $(-2, 0)$, then the coordinates of B are —**

A $(-0.5, 0.5)$
B $(0.5, 0.5)$
C $(-1, 0)$
D $(-5, -1)$

GO ON

42 Which transformation could move the triangle P to triangle P' in a single step?



F Reflection over $x = 4$

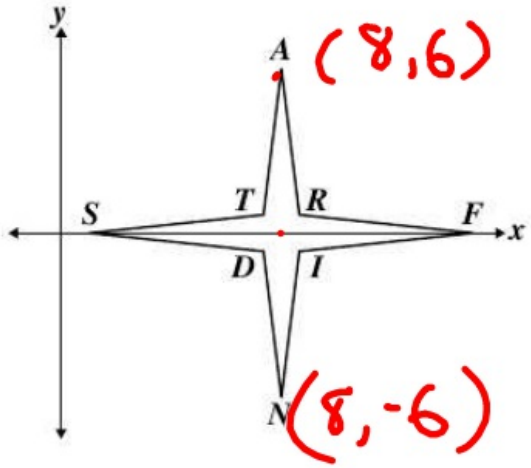
G Rotation about (2, 3)

H Reflection over $y = 4$

J Translation

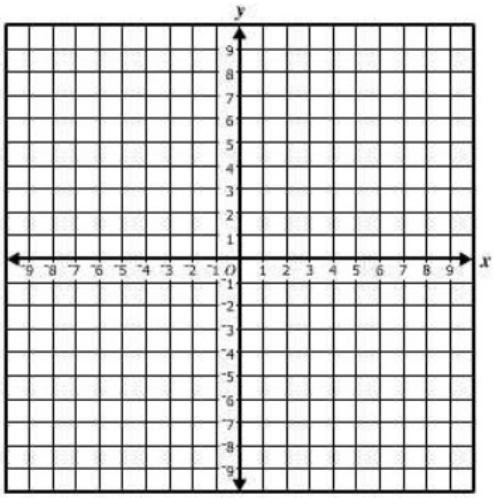
GO ON

43 Figure $STARFIND$ is symmetric with respect to the x-axis. The coordinates of point A are (8, 6). What are the coordinates of point N ?



A $(8, -6)$
B $(6, -8)$
C $(-6, 8)$
D $(-8, 6)$

44 **Parallelogram $RSTV$ has coordinates $R(0, 0)$, $S(2, 4)$, $T(6, 0)$, and $V(4, -4)$. Which ordered pair represents the intersection of the diagonals of this parallelogram? (The coordinate grid may be used to help answer this question.)**



F (2, 0)

G (3, 0)

H (3, 1)

J (4, −1)

45 A regular quadrilateral has what type of symmetry?

A Line symmetry only
B Point symmetry only
C Both point and line symmetry
D Neither point nor line symmetry

STOP

Answer Key-EOC021-M0110

Test Sequence Number	Correct Answer	Reporting Category	Reporting Category Description
1	D	001	Lines and Angles
2	F	001	Lines and Angles
3	D	001	Lines and Angles
4	H	001	Lines and Angles
5	C	001	Lines and Angles
6	G	001	Lines and Angles
7	B	001	Lines and Angles
8	F	001	Lines and Angles
9	B	001	Lines and Angles
10	J	001	Lines and Angles
11	D	001	Lines and Angles
12	G	002	Triangles and Logic
13	A	002	Triangles and Logic
14	G	002	Triangles and Logic
15	C	002	Triangles and Logic
16	H	002	Triangles and Logic
17	D	002	Triangles and Logic
18	F	002	Triangles and Logic
19	C	002	Triangles and Logic
20	J	002	Triangles and Logic
21	B	002	Triangles and Logic
22	G	002	Triangles and Logic
23	A	002	Triangles and Logic
24	F	003	Polygons and Circles
25	A	003	Polygons and Circles
26	H	003	Polygons and Circles
27	D	003	Polygons and Circles
28	F	003	Polygons and Circles
29	C	003	Polygons and Circles
30	J	003	Polygons and Circles
31	B	003	Polygons and Circles
32	F	003	Polygons and Circles
33	A	003	Polygons and Circles
34	J	004	Three-Dimensional Figures
35	B	004	Three-Dimensional Figures
36	F	004	Three-Dimensional Figures
37	C	004	Three-Dimensional Figures
38	J	004	Three-Dimensional Figures
39	C	004	Three-Dimensional Figures
40	G	005	Coordinate Relations and Transformations
41	D	005	Coordinate Relations and Transformations
42	J	005	Coordinate Relations and Transformations
43	A	005	Coordinate Relations and Transformations
44	G	005	Coordinate Relations and Transformations
45	C	005	Coordinate Relations and Transformations

Geometry, Core 1

If you get this many items correct:	Then your converted scale score is:
0	000
1	177
2	213
3	234
4	250
5	263
6	274
7	284
8	292
9	300
10	307
11	314
12	320
13	326
14	332
15	338
16	343
17	348
18	353
19	358
20	363
21	368
22	373
23	378
24	383
25	388
26	392
27	397
28	**402**
29	408
30	413
31	418
32	424
33	430
34	436
35	442
36	449
37	457
38	465
39	474
40	485
41	497
42	**513**
43	534
44	569
45	600

A total raw score (left column) is converted to a total scaled score (right column). The total scaled score may range from 0 to 600.

A scaled score of 400 or more means the student passed the SOL test, while a scaled score of 399 or less means the student did not pass the test. A scaled score of 500 or more indicates the student passed the SOL test at an advanced level.