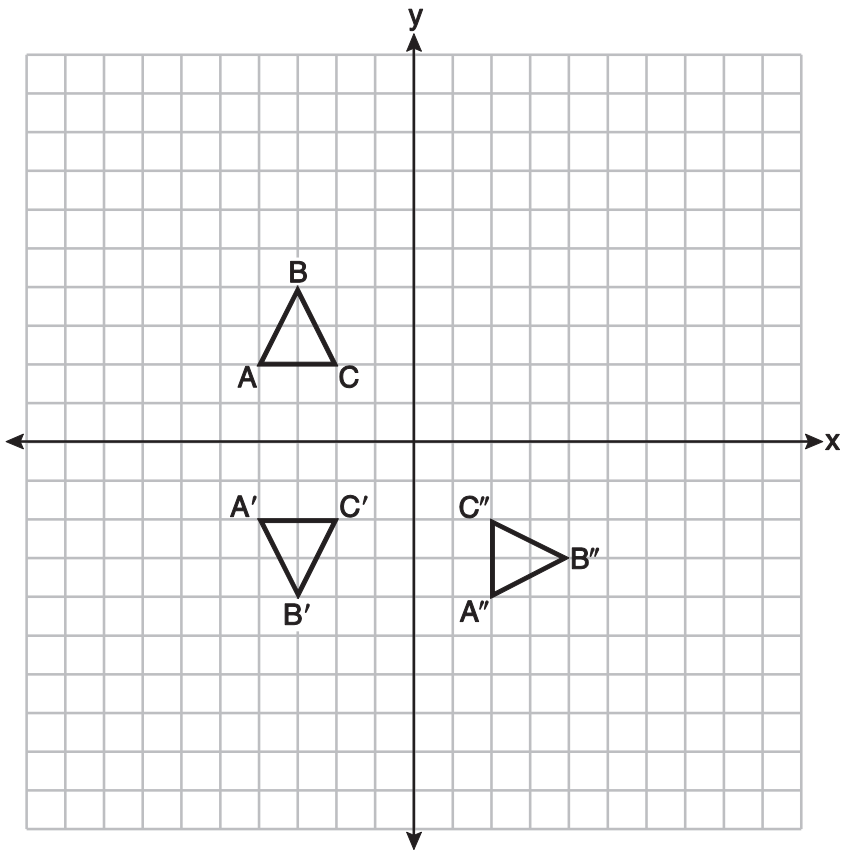
## Part I

**Answer all 24 questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For each statement or question, choose the word or expression that, of those given, best completes the statement or answers the question. Record your answers on your separate answer sheet.** [48]

**Use this space for computations.**

**1** On the set of axes below, triangle $ABC$ is graphed. Triangles $A'B'C'$ and $A''B''C''$, the images of triangle $ABC$, are graphed after a sequence of rigid motions.




Identify which sequence of rigid motions maps $\triangle ABC$ onto $\triangle A'B'C'$ and then maps $\triangle A'B'C'$ onto $\triangle A''B''C''$.

(1) a rotation followed by another rotation

(2) a translation followed by a reflection

(3) a reflection followed by a translation

(4) a reflection followed by a rotation

**Use this space for computations.**

**2** The table below shows the population and land area, in square miles, of four counties in New York State at the turn of the century.

| County | 2000 Census Population | 2000 Land Area ($mi^2$) |
|---|---|---|
| Broome | 200,536 | 706.82 |
| Dutchess | 280,150 | 801.59 |
| Niagara | 219,846 | 522.95 |
| Saratoga | 200,635 | 811.84 |

Which county had the greatest population density?

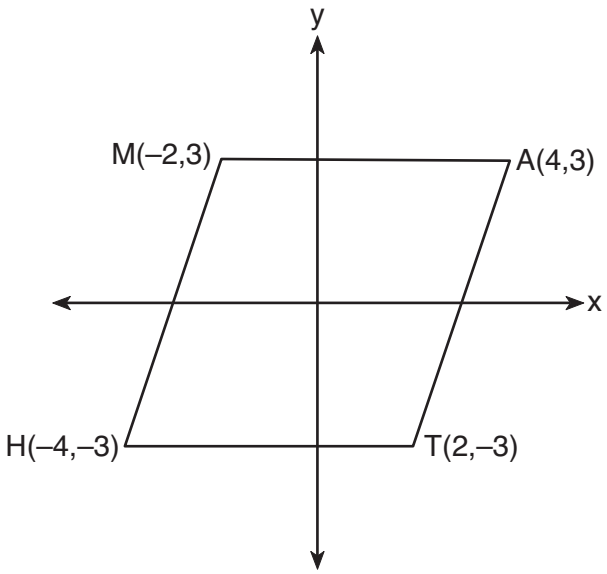
(1) Broome
(2) Dutchess
(3) Niagara
(4) Saratoga

**3** If a rectangle is continuously rotated around one of its sides, what is the three-dimensional figure formed?

(1) rectangular prism
(2) cylinder
(3) sphere
(4) cone

**Use this space for computations.**

**4** Which transformation carries the parallelogram below onto itself?




(1) a reflection over $y = x$

(2) a reflection over $y = -x$

(3) a rotation of 90° counterclockwise about the origin

(4) a rotation of 180° counterclockwise about the origin

**5** After a dilation centered at the origin, the image of $\overline{CD}$ is $\overline{C'D'}$. If the coordinates of the endpoints of these segments are $C(6,-4)$, $D(2,-8)$, $C'(9,-6)$, and $D'(3,-12)$, the scale factor of the dilation is

(1) $\frac{3}{2}$

(2) $\frac{2}{3}$

(3) 3

(4) $\frac{1}{3}$

**Use this space for computations.**

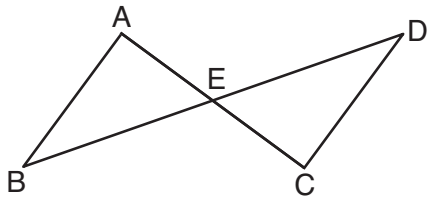
**6** A tent is in the shape of a right pyramid with a square floor. The square floor has side lengths of 8 feet. If the height of the tent at its center is 6 feet, what is the volume of the tent, in cubic feet?

(1) 48
(2) 128
(3) 192
(4) 384

**7** The line $-3x + 4y = 8$ is transformed by a dilation centered at the origin. Which linear equation could represent its image?

(1) $y = \frac{4}{3}x + 8$
(2) $y = \frac{3}{4}x + 8$
(3) $y = -\frac{3}{4}x - 8$
(4) $y = -\frac{4}{3}x - 8$

**8** In the diagram below, $\overline{AC}$ and $\overline{BD}$ intersect at $E$.




Which information is always sufficient to prove $\triangle ABE \cong \triangle CDE$?

(1) $\overline{AB} \parallel \overline{CD}$
(2) $\overline{AB} \cong \overline{CD}$ and $\overline{BE} \cong \overline{DE}$
(3) $E$ is the midpoint of $\overline{AC}$.
(4) $\overline{BD}$ and $\overline{AC}$ bisect each other.

**9** The expression sin 57° is equal to

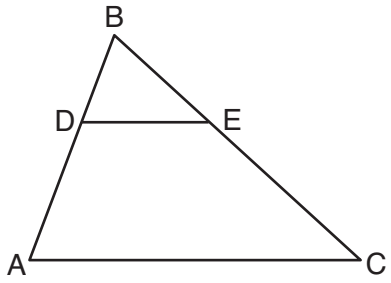
(1) tan 33°
(2) cos 33°
(3) tan 57°
(4) cos 57°

**Use this space for computations.**

**10** What is the volume of a hemisphere that has a diameter of 12.6 cm, to the *nearest tenth of a cubic centimeter*?

(1) 523.7
(2) 1047.4
(3) 4189.6
(4) 8379.2

**11** In the diagram below of $\triangle ABC$, $D$ is a point on $\overline{BA}$, $E$ is a point on $\overline{BC}$, and $\overline{DE}$ is drawn.




If $BD = 5$, $DA = 12$, and $BE = 7$, what is the length of $\overline{BC}$ so that $\overline{AC} \parallel \overline{DE}$?

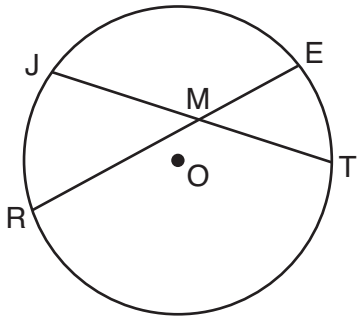
(1) 23.8
(2) 16.8
(3) 15.6
(4) 8.6

**12** A quadrilateral must be a parallelogram if

(1) one pair of sides is parallel and one pair of angles is congruent
(2) one pair of sides is congruent and one pair of angles is congruent
(3) one pair of sides is both parallel and congruent
(4) the diagonals are congruent

**Use this space for computations.**

**13** In the diagram below of circle $O$, chords $\overline{JT}$ and $\overline{ER}$ intersect at $M$.



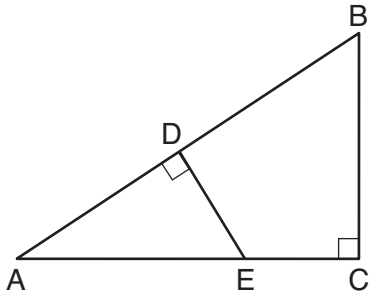

If $EM = 8$ and $RM = 15$, the lengths of $\overline{JM}$ and $\overline{TM}$ could be

(1) 12 and 9.5
(2) 14 and 8.5
(3) 16 and 7.5
(4) 18 and 6.5

**14** Triangles $JOE$ and $SAM$ are drawn such that $\angle E \cong \angle M$ and $\overline{EJ} \cong \overline{MS}$. Which mapping would *not* always lead to $\triangle JOE \cong \triangle SAM$?

(1) $\angle J$ maps onto $\angle S$
(2) $\angle O$ maps onto $\angle A$
(3) $\overline{EO}$ maps onto $\overline{MA}$
(4) $\overline{JO}$ maps onto $\overline{SA}$

**15** In $\triangle ABC$ shown below, $\angle ACB$ is a right angle, $E$ is a point on $\overline{AC}$, and $\overline{ED}$ is drawn perpendicular to hypotenuse $\overline{AB}$.




If $AB = 9$, $BC = 6$, and $DE = 4$, what is the length of $\overline{AE}$?

(1) 5
(2) 6
(3) 7
(4) 8