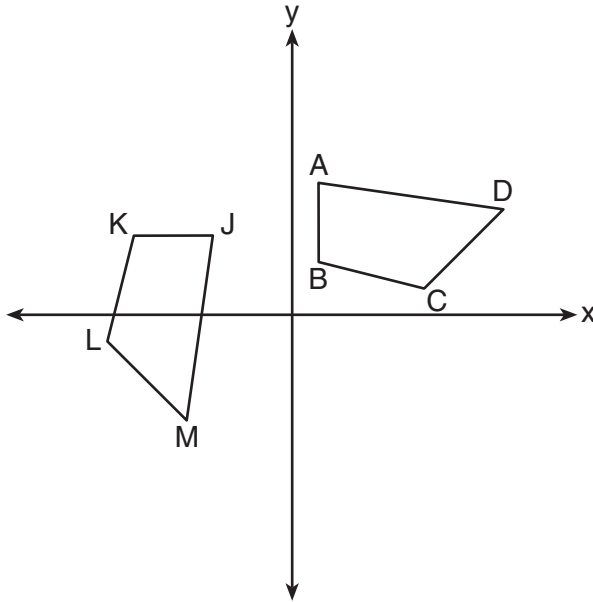


Part I

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 In the diagram below, a sequence of rigid motions maps $ABCD$ onto $JKLM$.

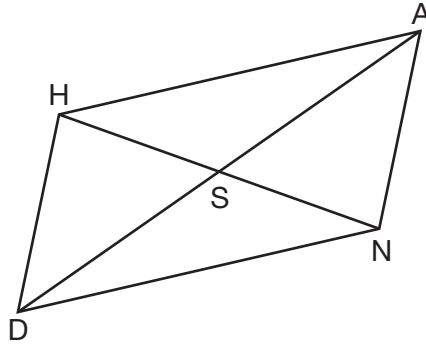


If $m\angle A = 82^\circ$, $m\angle B = 104^\circ$, and $m\angle L = 121^\circ$, the measure of $\angle M$ is

- (1) 53°
- (2) 82°
- (3) 104°
- (4) 121°

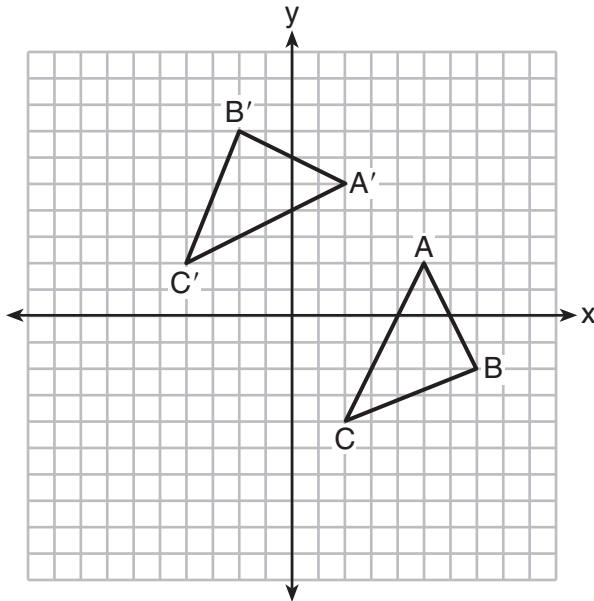
Use this space for computations.

- 2 Parallelogram $HAND$ is drawn below with diagonals \overline{HN} and \overline{AD} intersecting at S .



Which statement is always true?

- (1) $HN = \frac{1}{2}AD$ (3) $\angle AHS \cong \angle ANS$
(2) $AS = \frac{1}{2}AD$ (4) $\angle HDS \cong \angle NDS$
- 3 The graph below shows two congruent triangles, ABC and $A'B'C'$.

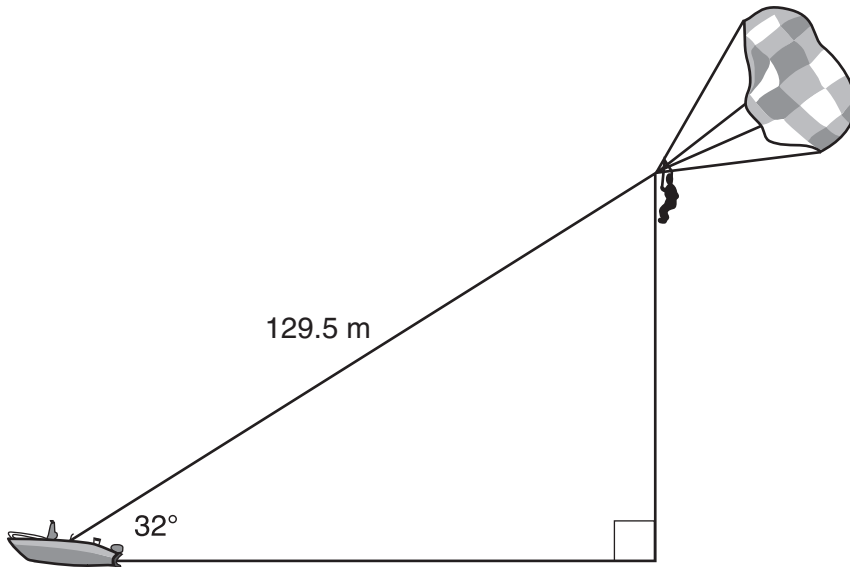


Which rigid motion would map $\triangle ABC$ onto $\triangle A'B'C'$?

- (1) a rotation of 90 degrees counterclockwise about the origin
(2) a translation of three units to the left and three units up
(3) a rotation of 180 degrees about the origin
(4) a reflection over the line $y = x$

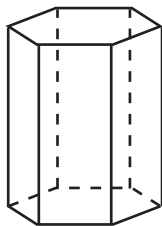
Use this space for computations.

- 4 A man was parasailing above a lake at an angle of elevation of 32° from a boat, as modeled in the diagram below.



If 129.5 meters of cable connected the boat to the parasail, approximately how many meters above the lake was the man?

- (1) 68.6 (3) 109.8
(2) 80.9 (4) 244.4
- 5 A right hexagonal prism is shown below. A two-dimensional cross section that is perpendicular to the base is taken from the prism.

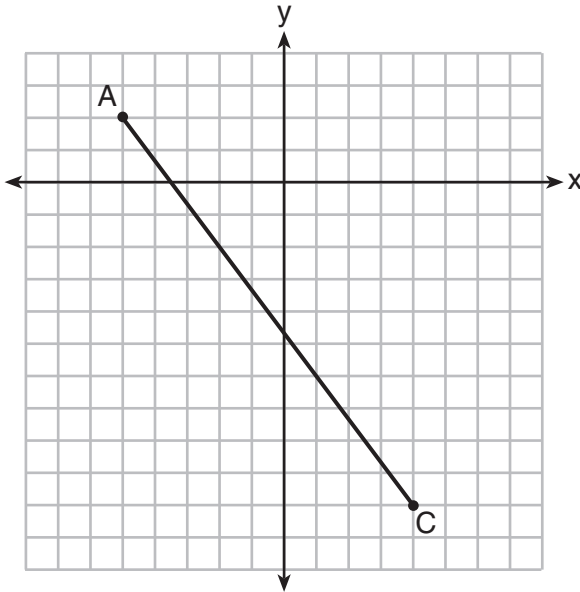


Which figure describes the two-dimensional cross section?

- (1) triangle (3) pentagon
(2) rectangle (4) hexagon

Use this space for computations.

- 6 In the diagram below, \overline{AC} has endpoints with coordinates $A(-5,2)$ and $C(4,-10)$.



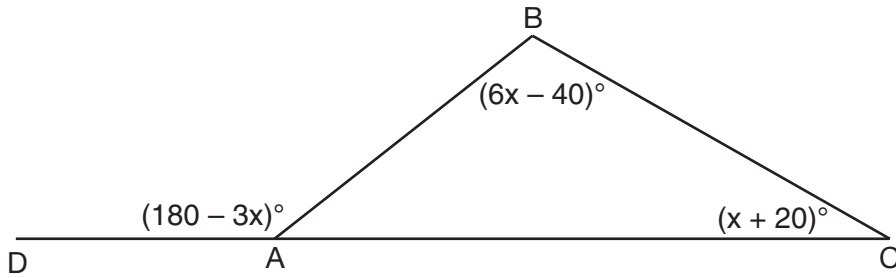
If B is a point on \overline{AC} and $AB:BC = 1:2$, what are the coordinates of B ?

- (1) $(-2, -2)$ (3) $(0, -\frac{14}{3})$
- (2) $(-\frac{1}{2}, -4)$ (4) $(1, -6)$
- 7 An ice cream waffle cone can be modeled by a right circular cone with a base diameter of 6.6 centimeters and a volume of 54.45π cubic centimeters. What is the number of centimeters in the height of the waffle cone?
- (1) $3\frac{3}{4}$ (3) 15
- (2) 5 (4) $24\frac{3}{4}$
- 8 The vertices of $\triangle PQR$ have coordinates $P(2,3)$, $Q(3,8)$, and $R(7,3)$. Under which transformation of $\triangle PQR$ are distance and angle measure preserved?

- (1) $(x,y) \rightarrow (2x, 3y)$ (3) $(x,y) \rightarrow (2x, y + 3)$
- (2) $(x,y) \rightarrow (x + 2, 3y)$ (4) $(x,y) \rightarrow (x + 2, y + 3)$

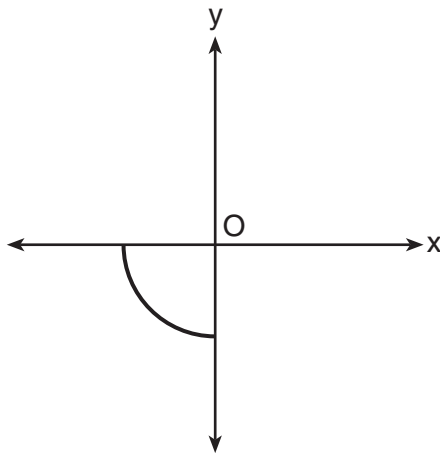
Use this space for
computations.

- 9 In $\triangle ABC$ shown below, side \overline{AC} is extended to point D with $m\angle DAB = (180 - 3x)^\circ$, $m\angle B = (6x - 40)^\circ$, and $m\angle C = (x + 20)^\circ$.



What is $m\angle BAC$?

- (1) 20° (3) 60°
(2) 40° (4) 80°
- 10 Circle O is centered at the origin. In the diagram below, a quarter of circle O is graphed.



Which three-dimensional figure is generated when the quarter circle is continuously rotated about the y -axis?

- (1) cone (3) cylinder
(2) sphere (4) hemisphere

Use this space for
computations.

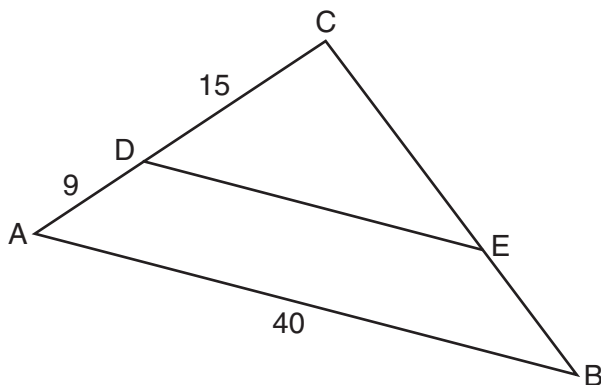
11 Rectangle $A'B'C'D'$ is the image of rectangle $ABCD$ after a dilation centered at point A by a scale factor of $\frac{2}{3}$. Which statement is correct?

- (1) Rectangle $A'B'C'D'$ has a perimeter that is $\frac{2}{3}$ the perimeter of rectangle $ABCD$.
- (2) Rectangle $A'B'C'D'$ has a perimeter that is $\frac{3}{2}$ the perimeter of rectangle $ABCD$.
- (3) Rectangle $A'B'C'D'$ has an area that is $\frac{2}{3}$ the area of rectangle $ABCD$.
- (4) Rectangle $A'B'C'D'$ has an area that is $\frac{3}{2}$ the area of rectangle $ABCD$.

12 The equation of a circle is $x^2 + y^2 - 6x + 2y = 6$. What are the coordinates of the center and the length of the radius of the circle?

- (1) center $(-3,1)$ and radius 4
- (2) center $(3,-1)$ and radius 4
- (3) center $(-3,1)$ and radius 16
- (4) center $(3,-1)$ and radius 16

13 In the diagram of $\triangle ABC$ below, \overline{DE} is parallel to \overline{AB} , $CD = 15$, $AD = 9$, and $AB = 40$.



The length of \overline{DE} is

- (1) 15
- (2) 24
- (3) 25
- (4) 30