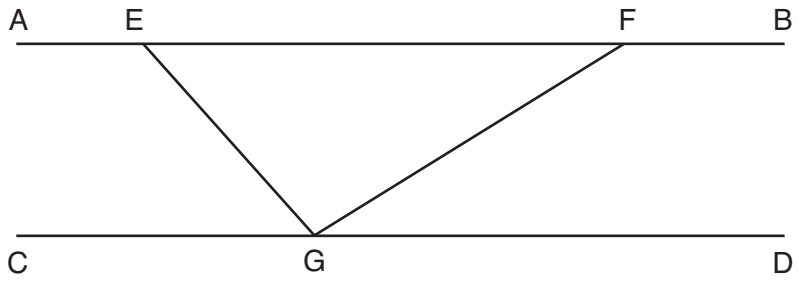
Part I

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, $\overline{AEFB} \parallel \overline{CGD}$, and $\overline{GE}$ and $\overline{GF}$ are drawn.



If $m\angle EFG = 32°$ and $m\angle AEG = 137°$, what is $m\angle EGF$?

(1) 11°
(2) 43°
(3) 75°
(4) 105°

2 If $\triangle ABC$ is mapped onto $\triangle DEF$ after a line reflection and $\triangle DEF$ is mapped onto $\triangle XYZ$ after a translation, the relationship between $\triangle ABC$ and $\triangle XYZ$ is that they are always

(1) congruent and similar
(2) congruent but not similar
(3) similar but not congruent
(4) neither similar nor congruent

Use this space for computations.

3 An isosceles right triangle whose legs measure 6 is continuously rotated about one of its legs to form a three-dimensional object. The three-dimensional object is a

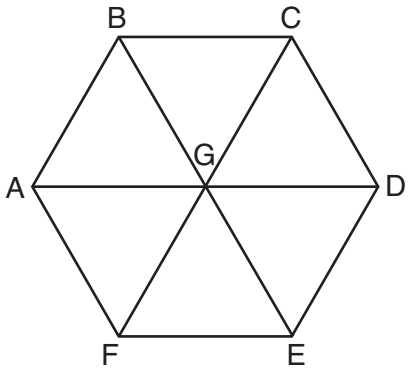
(1) cylinder with a diameter of 6

(2) cylinder with a diameter of 12

(3) cone with a diameter of 6

(4) cone with a diameter of 12

4 In regular hexagon *ABCDEF* shown below, $\overline{AD}$, $\overline{BE}$, and $\overline{CF}$ all intersect at *G*.



When $\triangle ABG$ is reflected over $\overline{BG}$ and then rotated 180° about point *G*, $\triangle ABG$ is mapped onto

(1) $\triangle FEG$

(2) $\triangle AFG$

(3) $\triangle CBG$

(4) $\triangle DEG$

5 A right cylinder is cut perpendicular to its base. The shape of the cross section is a

(1) circle

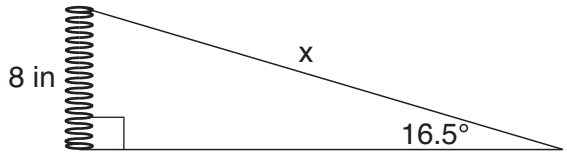
(2) cylinder

(3) rectangle

(4) triangular prism

Use this space for computations.

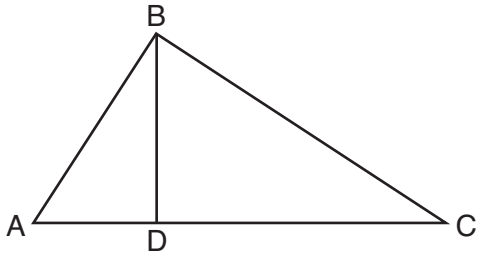
6 Yolanda is making a springboard to use for gymnastics. She has 8-inch-tall springs and wants to form a 16.5° angle with the base, as modeled in the diagram below.



To the *nearest tenth of an inch*, what will be the length of the springboard, x?

(1) 2.3
(2) 8.3
(3) 27.0
(4) 28.2

7 In the diagram below of right triangle ABC, altitude $\overline{BD}$ is drawn to hypotenuse $\overline{AC}$.



If $BD = 4$, $AD = x - 6$, and $CD = x$, what is the length of $\overline{CD}$?

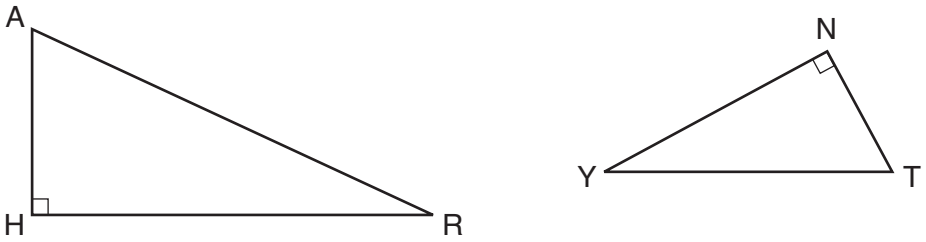
(1) 5
(2) 2
(3) 8
(4) 11

8 Rhombus $STAR$ has vertices $S(-1,2)$, $T(2,3)$, $A(3,0)$, and $R(0,-1)$. What is the perimeter of rhombus $STAR$?

(1) $\sqrt{34}$
(2) $4\sqrt{34}$
(3) $\sqrt{10}$
(4) $4\sqrt{10}$

Use this space for computations.

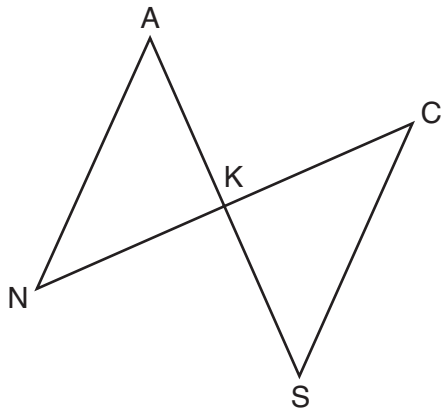
9 In the diagram below of $\triangle HAR$ and $\triangle NTY$, angles H and N are right angles, and $\triangle HAR \sim \triangle NTY$.



If $AR = 13$ and $HR = 12$, what is the measure of angle Y, to the *nearest degree*?

(1) 23°
(2) 25°
(3) 65°
(4) 67°

10 In the diagram below, $\overline{AKS}$, $\overline{NKC}$, $\overline{AN}$, and $\overline{SC}$ are drawn such that $\overline{AN} \cong \overline{SC}$.



Which additional statement is sufficient to prove $\triangle KAN \cong \triangle KSC$ by AAS?

(1) $\overline{AS}$ and $\overline{NC}$ bisect each other.
(2) K is the midpoint of $\overline{NC}$.
(3) $\overline{AS} \perp \overline{CN}$
(4) $\overline{AN} \parallel \overline{SC}$

Use this space for computations.

11 Which equation represents a line that is perpendicular to the line represented by $y = \frac{2}{3}x + 1$?

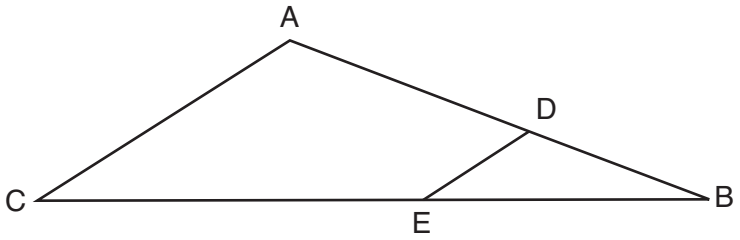
(1) $3x + 2y = 12$

(2) $3x - 2y = 12$

(3) $y = \frac{3}{2}x + 2$

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

12 In the diagram of $\triangle ABC$ below, points D and E are on sides $\overline{AB}$ and $\overline{CB}$ respectively, such that $\overline{DE} \parallel \overline{AC}$.



If EB is 3 more than DB, $AB = 14$, and $CB = 21$, what is the length of $\overline{AD}$?

(1) 6

(2) 8

(3) 9

(4) 12

13 Quadrilateral $MATH$ has both pairs of opposite sides congruent and parallel. Which statement about quadrilateral $MATH$ is always true?

(1) $\overline{MT} \cong \overline{AH}$

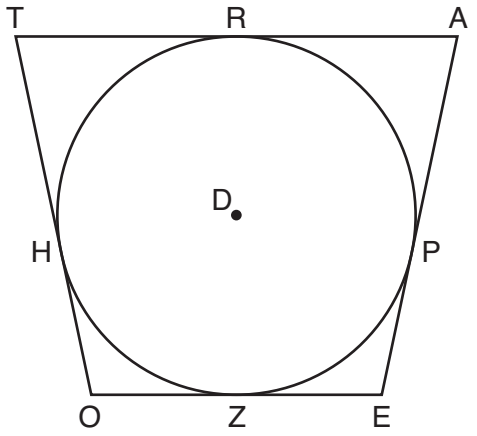
(2) $\overline{MT} \perp \overline{AH}$

(3) $\angle MHT \cong \angle ATH$

(4) $\angle MAT \cong \angle MHT$

Use this space for computations.

14 In the figure shown below, quadrilateral $TAEO$ is circumscribed around circle D. The midpoint of $\overline{TA}$ is R, and $\overline{HO} \cong \overline{PE}$.



If $AP = 10$ and $EO = 12$, what is the perimeter of quadrilateral $TAEO$?

(1) 56
(2) 64
(3) 72
(4) 76

15 The coordinates of the endpoints of directed line segment ABC are $A(-8,7)$ and $C(7,-13)$. If $AB:BC = 3:2$, the coordinates of B are

(1) $(1,-5)$
(2) $(-2,-1)$
(3) $(-3,0)$
(4) $(3,-6)$