① A cylinder is sliced vertically along a dotted line, as shown.

Which two-dimensional shape is created from this cross section?

Ⓐ [rectangle]

Ⓒ [circle]

Ⓑ [barrel shape]

Ⓓ [ellipse]

② In the figure shown, L is the center of the circle and $\overline{PQ}$ is a chord of the circle measuring 30 centimeters (cm).

L
8 cm
P   M   Q
├──── 30 cm ────┤
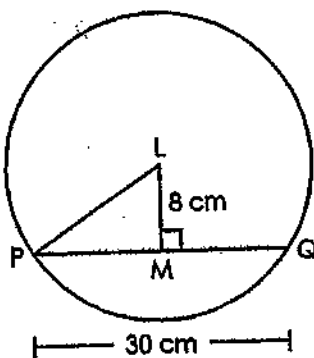
What is the length, in centimeters, of $\overline{PL}$?

[_____] *cm*

③ A survey was conducted to determine whether a group of 11th graders and 12th graders preferred to go to the amusement park or to the zoo for a class trip. The results are shown in the table.

	Amusement Park	Zoo
11th graders	32	18
12th graders	24	26

Based on the table, what is the probability that a student preferred a class trip to the zoo given they are in 11th grade?

---

④ A circle with center L contains points J and K. Circle L is dilated by a factor of 2, resulting in a new circle with center P. Points M and N are on circle P such that central angle MPN has the same measure as central angle JLK.

Which statement correctly identifies the relationship between the arc length of JK and the arc length of MN?

Ⓐ The arc length of JK is half the arc length of MN.

Ⓑ The arc length of MN is half the arc length of JK.

Ⓒ The arc length of JK is a quarter of the arc length of MN.

Ⓓ The arc length of MN is a quarter of the arc length of JK.

---

⑤ Point A is located at $(-1, -5)$. The midpoint of line segment AB is point C $(2, 3)$.

What are the coordinates of point B?

([ ] , [ ])

---

⑥ In triangle ABC, $\angle A$ and $\angle B$ are complementary, where $\cos A = 0.5$.

What is the measure, in degrees, of $\angle B$?

[ ] *degrees*

---

⑦ A company wants to design a cylindrical object that has a height of 10 centimeters and a volume of at least 2,000 cubic centimeters, but not more than 2,500 cubic centimeters.

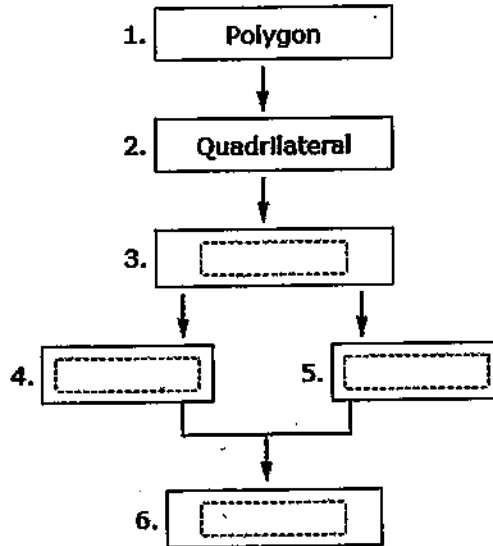What is a possible radius, in centimeters, of the cylinder? Round your answer to the nearest hundredth.

[ ] *centimeters*

A partially completed chart shows the hierarchy of a set of polygons.

Move a term to each blank box to complete the chart.

Kite   Parallelogram   Rectangle   Rhombus   Square

1. Polygon

2. Quadrilateral

3. [ ]

4. [ ]   5. [ ]

6. [ ]

Trisha wants to create the perpendicular bisector of line segment AB.

She places her compass on point A and opens it with the width equal to the length of the line segment AB. She makes arcs above and below the line segment.

What could be Trisha's next step to create the perpendicular bisector of line segment AB?

Ⓐ   connect the two arcs using a straightedge

Ⓑ   connect each arc with point B using a straightedge

Ⓒ   place the compass on the approximate midpoint and draw intersecting arcs

Ⓓ   place the compass on point B and complete the same steps that she did for point A

A university determined the number of students pursuing different degrees, by gender. Some of the results are shown.

			500	12,500
		2,500		12,500
	16,250	6,250	2,500	25,000

What is the probability that a female student chosen at random is pursuing an undergraduate degree?

Ⓐ   18%

Ⓑ   32%

Ⓒ   36%

Ⓓ   64%

11 Bryan records the number of hours he sleeps each night for several days and whether it is raining in the morning when he wakes up. Bryan concludes that these two events are independent:

- Bryan sleeps 8 or more hours.

- It is raining in the morning.

Based on Bryan's conclusion, which statement must be true?

Ⓐ Bryan never sleeps 8 or more hours on days that it is not raining in the morning.

Ⓑ The probability that Bryan sleeps 8 or more hours is the same whether or not it is raining in the morning.

Ⓒ The probability that Bryan sleeps 8 or more hours is influenced by whether or not it is raining in the morning.

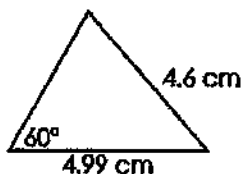Ⓓ The probability that Bryan sleeps 8 or more hours is the same as the probability that it is raining in the morning.
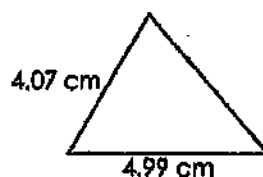
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12 Triangle MNO is shown.
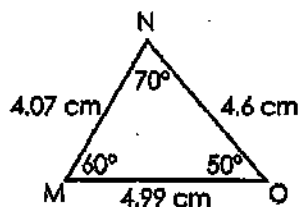
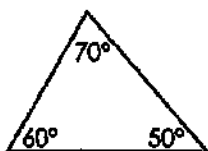Which triangle can be shown to be congruent to triangle MNO with only the given information?
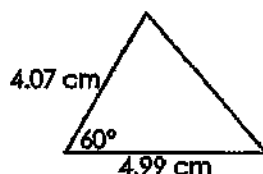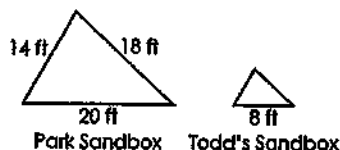
Ⓐ

Ⓒ

Ⓑ

Ⓓ

---

13 A park has a triangular sandbox. Todd wants to create a smaller sandbox at his backyard having the same angles as the park sandbox.
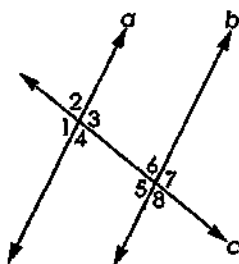
Drawings of both sandboxes are shown.

Park Sandbox   Todd's Sandbox

What is the perimeter, in feet (ft), of Todd's sandbox?

☐ *ft*

**14.** Two parallel lines, a and b, are cut by a transversal c as shown.

Drag a statement or reason to each blank in the table to complete the proof that $\angle 1 \cong \angle 7$.

Statements	Reasons
1. $a \parallel b$	1. Given
2. [ ]	2. [ ]
3. [ ]	3. [ ]
4. $\angle 1 \cong \angle 7$	4. [ ]

$\angle 4 \cong \angle 6$ $\angle 1 \cong \angle 4$ $\angle 4 \cong \angle 5$ $\angle 3 \cong \angle 5$

$\angle 3 \cong \angle 7$ $\angle 4 \cong \angle 8$ $\angle 5 \cong \angle 7$ $\angle 6 \cong \angle 7$

Transitive property   Vertical angles are congruent

Definition of supplementary angles

Corresponding angles formed by parallel lines are congruent

Alternate interior angles formed by parallel lines are congruent

Alternate exterior angles formed by parallel lines are congruent

15. A right triangle ABC is shown.

(Triangle with vertex C at top, right angle at B. Side AC = 17, side CB = 15, side AB = 8.)
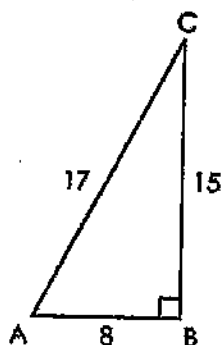
What is cos A?

[ ]

16. The two-way table shows the number of births, in thousands, in the United States for the years 2010 and 2011.

													Total
2010	324	303	340	327	325	338	346	359	350	342	337	326	4017
2011	322	299	330	315	328	335	348	362	346	331	328	322	3966

A baby born in 2011 is randomly selected.

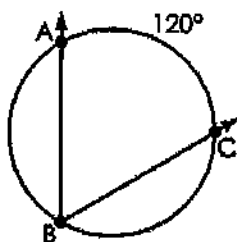What is the probability that the baby was born in February?

[ ]

17 A total of 50 students play either soccer or lacrosse.

- 20 girls play lacrosse.

- 20 boys play either soccer or lacrosse.

- 20 students play soccer.

What is the probability that a student plays soccer or is a girl?

---

18 Angle ABC is inscribed in a circle as shown.

120°

What is the measure, in degrees, of ∠ABC?

degrees

---

19 A triangle is shown.

30°

44 in.

a

What is the length, in inches (in.), of side a?

_in._

---

20 Which term is defined as two intersecting lines that form four right angles in a plane?

Ⓐ skew lines

Ⓑ straight lines

Ⓒ parallel lines

Ⓓ perpendicular lines