STAR Test Sample Questions
8th Grade Geometry

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Geometry (End-of-course)
Angle Relationships, Constructions, and Lines (Performance Level: Advanced)
– Question 01

Two angles of a triangle have measures of 55°
and 65°. Which of the following could not be a
measure of an exterior angle of the triangle?
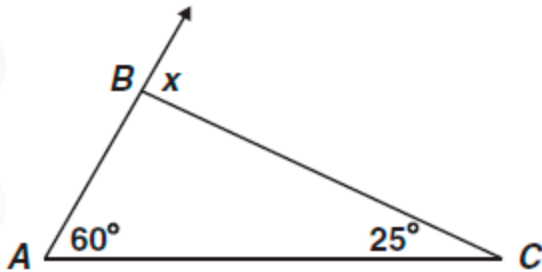
A   115°
B   120°
C   125°
D   130°

Geometry (End-of-course)

Angle Relationships, Constructions, and Lines (Performance Level: Advanced)
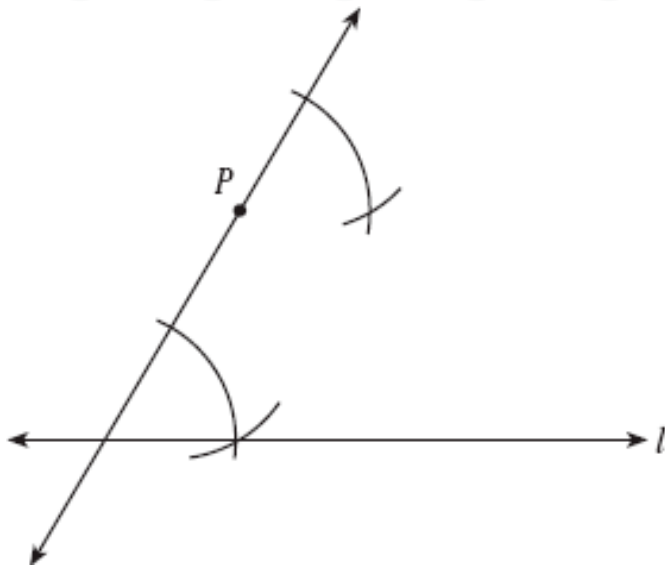*– Question 02*

What is $m\angle x$?

A   35°
B   60°
C   85°
D   95°

Geometry (End-of-course)

Angle Relationships, Constructions, and Lines (Performance Level: Advanced)
– Question 03

Marsha is using a straightedge and compass to
do the construction shown below.
Which best describes the construction Marsha
is doing?

A   a line through P parallel to line l
B   a line through P intersecting line l
C   a line through P congruent to line l
D   a line through P perpendicular to line l
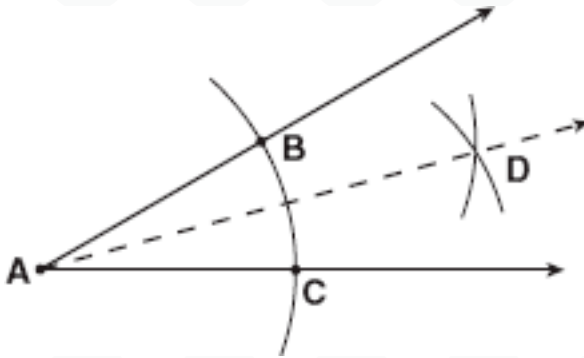
Geometry (End-of-course)

Angle Relationships, Constructions, and Lines (Performance Level: Advanced)
– Question 04

Given: angle A

**What is the first step in constructing the angle bisector of angle A?**

A   Draw ray

B   Draw a line segment connecting points B
    and C.

C   From points B and C, draw equal arcs
    that intersect at D.

D   From point A, draw an arc that intersects the
    sides of the angle at points B and C.

Geometry (End-of-course)
Angle Relationships, Constructions, and Lines (Performance Level: Advanced)
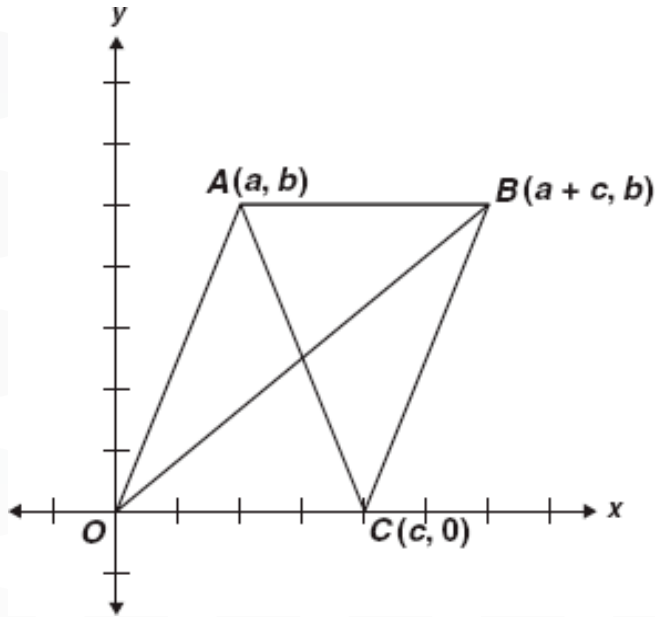*– Question 05*

The diagram shows $\triangle ABC$.
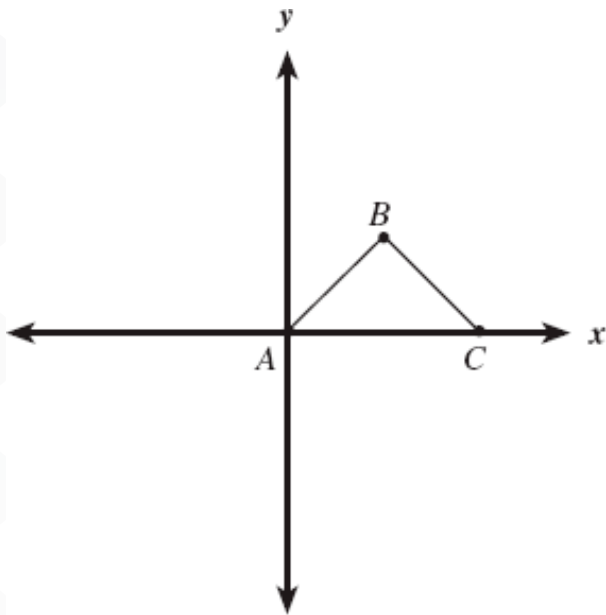
Which statement would prove that $\triangle ABC$ is a right triangle?

A $\left(\text{slope } \overline{AB}\right)\left(\text{slope } \overline{BC}\right)=1$

B $\left(\text{slope } \overline{AB}\right)\left(\text{slope } \overline{BC}\right)=-1$

C   distance from A to B = distance from B to C
D   distance from A to B = – (distance from B to C)

Geometry (End-of-course)

Angle Relationships, Constructions, and Lines (Performance Level: Advanced)
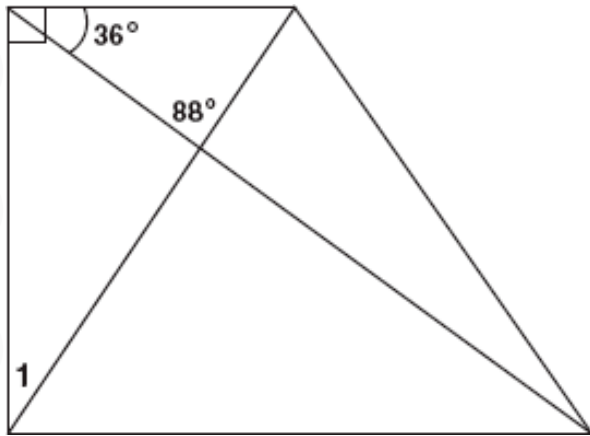*– Question 06*

Figure ABCO is a parallelogram.

What are the coordinates of the point of intersection of the diagonals?

A $\left(\dfrac{a}{2}, \dfrac{b}{2}\right)$

B $\left(\dfrac{c}{2}, \dfrac{b}{2}\right)$

C $\left(\dfrac{a+c}{2}, \dfrac{b}{2}\right)$

D $\left(\dfrac{a+c}{2}, \dfrac{a+b}{2}\right)$

Geometry (End-of-course)

Angle Relationships, Constructions, and Lines (Performance Level: Proficient) – Question 01
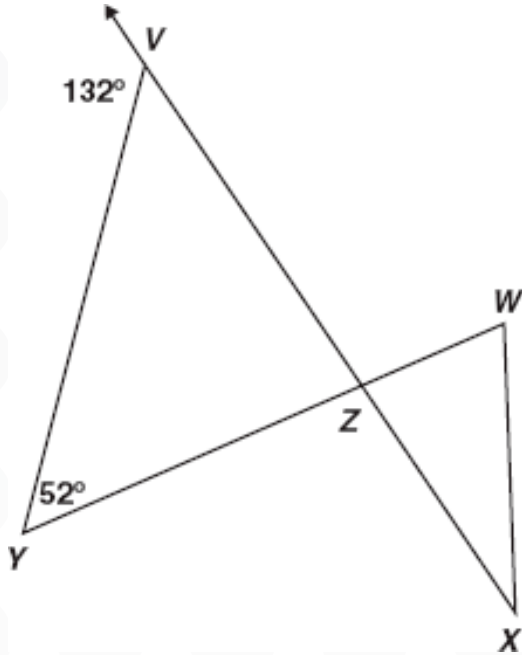
What is $m\angle 1$?

A   34°
B   56°
C   64°
D   92°

What is $m\angle WZX$?

A	80°
B	90°
C	100°
D	110°

Geometry (End-of-course)

Angle Relationships, Constructions, and Lines (Performance Level: Basic) – Question 01

The sum of the interior angles of a polygon is the same as the sum of its exterior angles. What type of polygon is it?

A   quadrilateral
B   hexagon
C   octagon
D   decagon

Geometry (End-of-course)
Logic and Geometric Proofs (Performance Level: Advanced) – Question 01

Which of the following best describes deductive reasoning?

A   using logic to draw conclusions based on accepted statements

B   accepting the meaning of a term without definition

C   defining mathematical terms to correspond with physical objects

D   inferring a general truth by examining a number of specific examples

Geometry (End-of-course)
Logic and Geometric Proofs (Performance Level: Advanced) – Question 02

**Theorem: A triangle has at most one obtuse angle.**

Eduardo is proving the theorem above by contradiction. He began by assuming that in $\triangle ABC$ ÐA and ÐB are both obtuse. Which theorem will Eduardo use to reach a contradiction?

A   If two angles of a triangle are equal, the sides opposite the angles are equal.

B   If two supplementary angles are equal, the angles each measure 90°.

C   The largest angle in a triangle is opposite the longest side.

D   The sum of the measures of the angles of a triangle is 180°.

In the figure below, $AB > BC.$
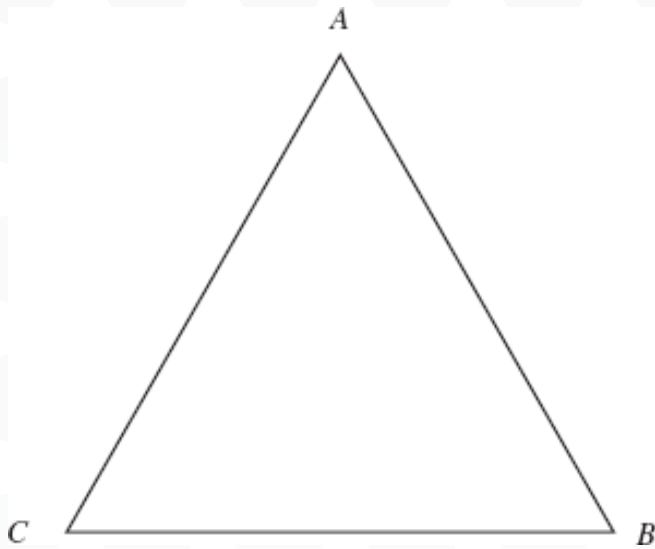
If we assume that $\angle A = m\angle C,$ it follows that $AB = BC.$ This contradicts the given statement that $AB > BC.$ W

What conclusion can be drawn from this contradiction?

A $m\angle A = m\angle B$

B $m\angle A \neq m\angle B$

C $m\angle A = m\angle C$

D $m\angle A \neq m\angle C$
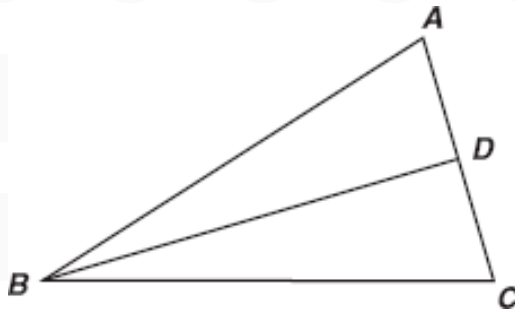
Use the proof to answer the question below.

Given: $\overline{AB} \cong \overline{BC}$; D ; D is the midpoint of

Prove: $\triangle ABD \cong \triangle CBD$

Statement	Reason
1. $\overline{AB} \cong \overline{BC}$; D; D is the midpoint of $\overline{AC}$	1. Given
2. $\overline{AD} \cong \overline{CD}$	2. Definition of Midpoint
3. $\overline{BD} \cong \overline{BD}$	3. Reflexive Property
4. $\triangle ABD \cong \triangle CBD$	4.?

What reason can be used to prove that the triangles are congruent?

A   AAS
B   ASA
C   SAS
D   SSS

A conditional statement is shown below.

" If a quadrilateral has perpendicular
diagonals, then it is a rhombus. "

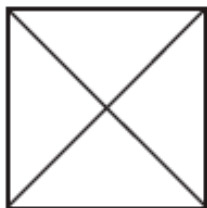**Which of the following is a counterexample to
the statement above?**

A

C

B

D

In parallelogram FGHI, diagonals $\overline{IG}$ and $\overline{FH}$ are drawn and intersect at point M. Which of the following statements must be true?

A. △*FGI* must be an obtuse triangle.

B. △*HIG* must be an acute triangle.

C. △*FMG* must be congruent to △*HMG*.

D. △*GMH* must be congruent to △*IMF*.

Geometry (End-of-course)
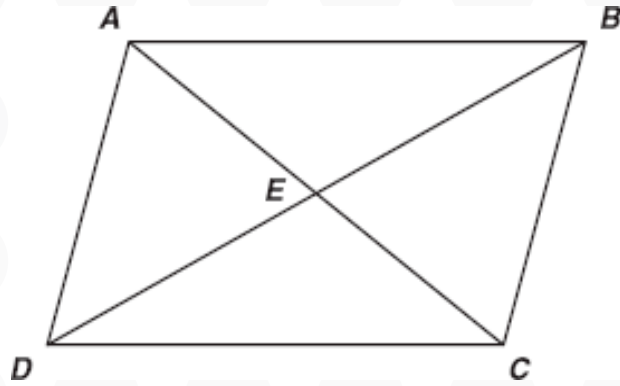*Logic and Geometric Proofs (Performance Level: Advanced) – Question 07*

Which triangles must be similar?

A two obtuse triangles
B two scalene triangles with congruent bases
C two right triangles
D two isosceles triangles with congruent
   vertex angles

Parallelogram ABCD is shown below.

Which pair of triangles can be established to be congruent to prove that $\angle DAB \cong \angle BCD$?

A $\triangle ADC$ and $\triangle BCD$

B $\triangle AED$ and $\triangle BEC$

C $\triangle DAB$ and $\triangle BCD$

D $\triangle DEC$ and $\triangle BEA$

If $\triangle ABC$ and $\triangle XYZ$ are two triangles such that

$$\frac{AB}{XY} = \frac{BC}{YZ},$$ which of the following would be

sufficient to prove the triangles are similar?

A $\angle A \cong \angle X$
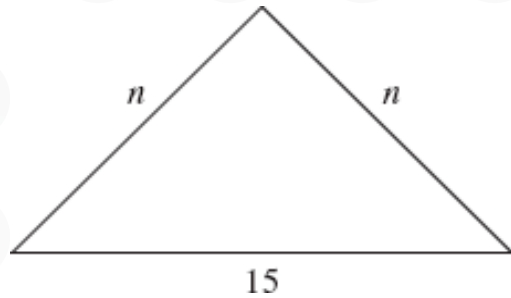
B $\angle B \cong \angle Y$

C $\angle C \cong \angle Z$

D $\angle X \cong \angle Y$

In the figure below, n is a whole number.
What is the smallest possible value for n?

A   1
B   7
C   8
D   14

Given: $\overline{AB}$ and $\overline{CD}$ intersect at point E; $\angle 1 \cong \angle 2$
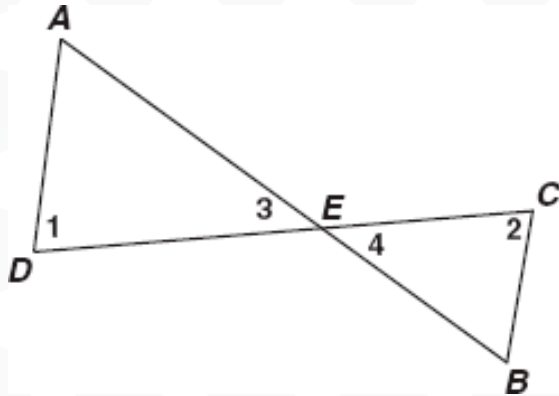
Which theorem or postulate can be used to prove
$\triangle AED \sim \triangle BEC$?

A   AA
B   SSS
C   ASA
D   SAS

In the diagram below, $\angle 1 \cong \angle 4$
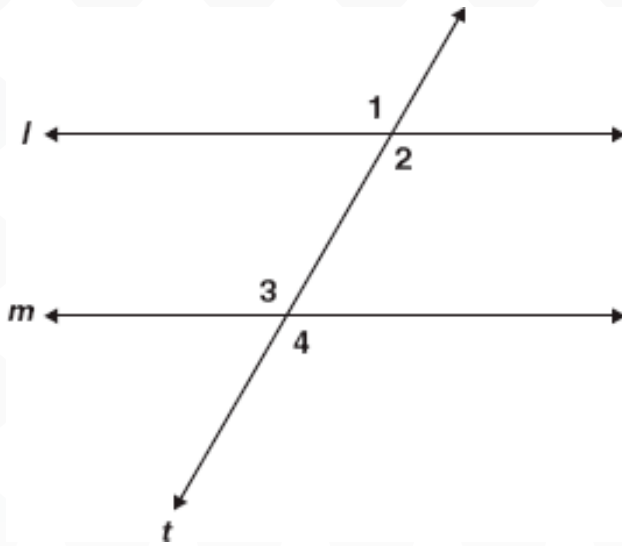
Which of the following conclusions does not have to be true?

A $\angle 3$ and $\angle 4$ are supplementary angles.

B   Line l is parallel to line m.

C $\angle 1 \cong \angle 3$

D $\angle 2 \cong \angle 3$

Geometry (End-of-course)
Logic and Geometric Proofs (Performance Level: Proficient) – Question 02

"Two lines in a plane always intersect in exactly one point."

Which of the following best describes a counterexample to the assertion above?

A   coplanar lines
B   parallel lines
C   perpendicular lines
D   intersecting lines

Geometry (End-of-course)
Logic and Geometric Proofs (Performance Level: Proficient) – Question 03

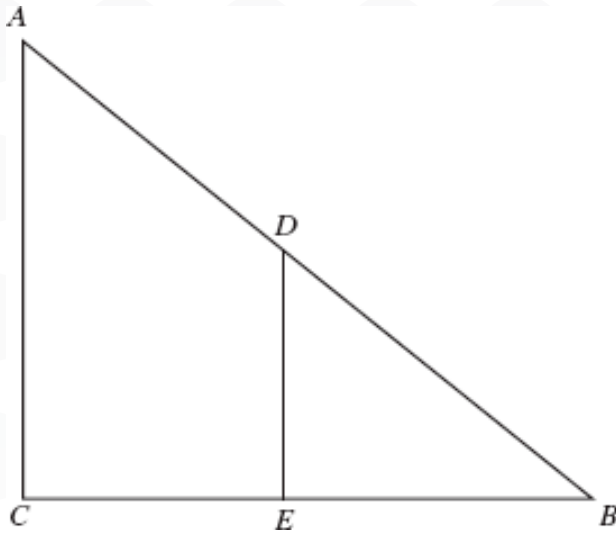**Which figure can serve as a counterexample to the conjecture below?**

"If one pair of opposite sides of a quadrilateral is parallel, then the the quadrilateral is a parallelogram."

A   rectangle
B   rhombus
C   square
D   trapezoid

Which of the following facts would be sufficient to prove that triangles ABC and DBE are similar?
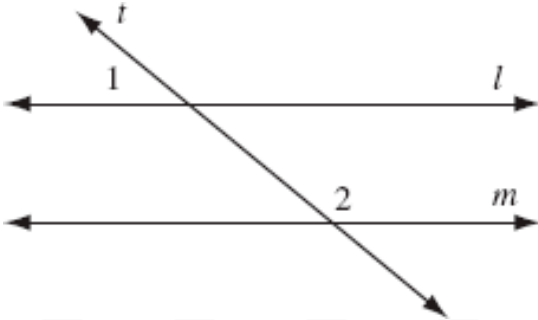

A $\overline{CE}$ and $\overline{BE}$ are congruent.

B   ÐACE is a right angle.

C $\overline{AC}$ and $\overline{DE}$ are parallel.

D   ÐA and ÐB are congruent.

Geometry (End-of-course)
Logic and Geometric Proofs (Performance Level: Proficient) – Question 05

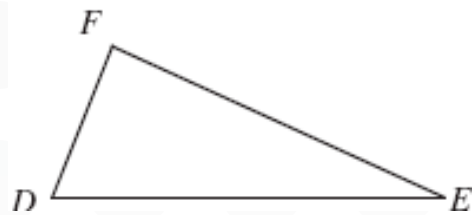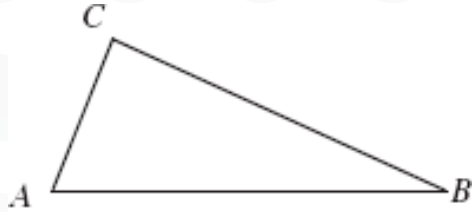In the accompanying diagram, parallel lines l and m are cut by transversal t.

Which statement about angles 1 and 2 must be true?

A $\angle 1 \cong \angle 2.$

B $\angle 1$ is the complement of $\angle 2$.

C $\angle 1$ is the supplement of $\angle 2$.

D $\angle 1$ and $\angle 2$ are right angles.

In the figure below, $\overline{AC} \simeq \overline{DF}$ and $\angle A \simeq \angle D$.

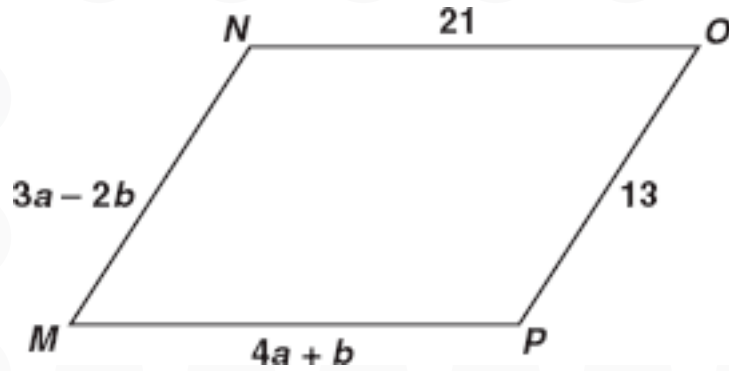
Which additional information would be enough to prove that
$\triangle ABC \cong \triangle DEF$?

A $\overline{AB} \cong \overline{DE}$

B $\overline{AB} \cong \overline{BC}$

C $\overline{BC} \cong \overline{EF}$

D $\overline{BC} \cong \overline{DE}$

What values of a and b make quadrilateral MNOP a parallelogram?

N   21   O

$3a - 2b$

13

M $4a + b$ P

A $a = 1, b = 5$

B $a = 5, b = 1$

C $a = \dfrac{11}{7}, b = \dfrac{34}{7}$

D $a = \dfrac{34}{7}, b = \dfrac{11}{7}$

If ABCD is a parallelogram, what is the length of segment BD?
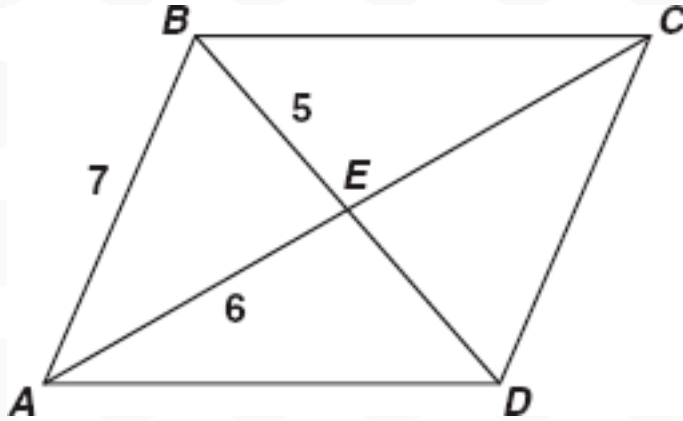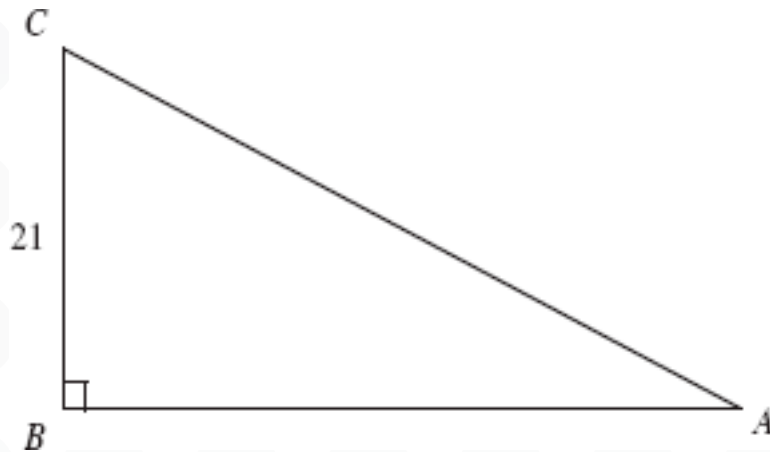

A   10
B   11
C   12
D   14

Geometry (End-of-course)

Trigonometry (Performance Level: Advanced) – Question 01
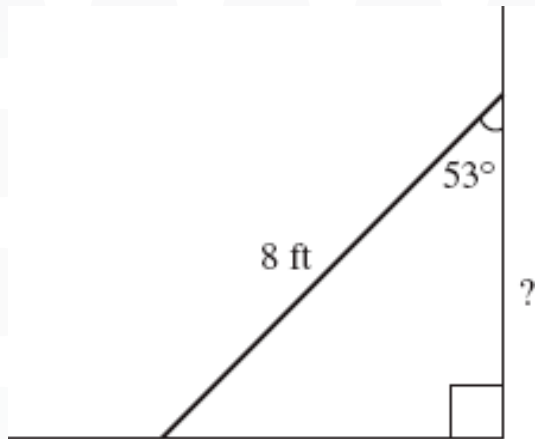
In the figure below, $\sin A = 0.7.$

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

A   14.7
B   21.7
C   30
D   32

Geometry (End-of-course)
Trigonometry (Performance Level: Advanced) – Question 02

The diagram shows an 8-foot ladder leaning against a wall. The ladder makes a 53° angle with the wall. Which is closest to the distance up the wall the ladder reaches?
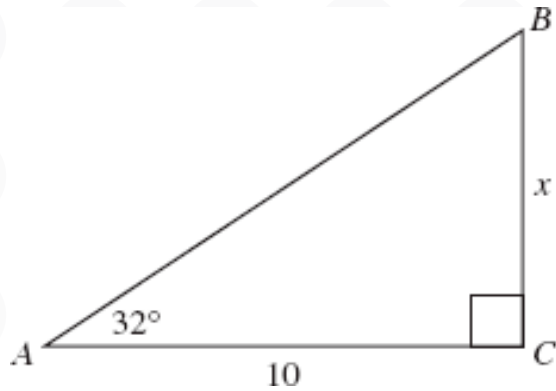

$$\sin 53° \approx 0.80$$
$$\cos 53° \approx 0.60$$
$$\tan 53° \approx 1.33$$

A   3.2 ft
B   4.8 ft
C   6.4 ft
D   9.6 ft

In the accompanying diagram, $m\angle A = 32°$ and $AC = 10.$ Which equation could be used to find x in $\triangle ABC$?

A $x = 10 \sin 32°$
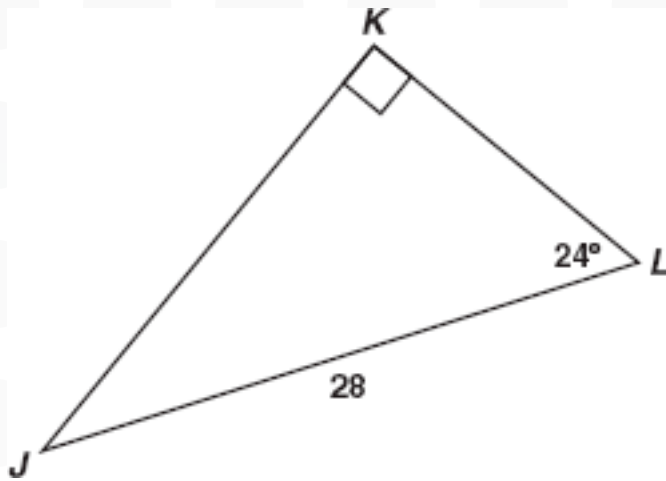
B $x = 10 \cos 32°$

C $x = 10 \tan 32°$

D $x = \dfrac{10}{\cos 32°}$

Triangle JKL is shown below.

Which equation should be used to find the length of $\overline{JK}$?

A $\sin 24° = \dfrac{JK}{28}$

B $\sin 24° = \dfrac{28}{JK}$

C $\cos 24° = \dfrac{JK}{28}$

D $\cos 24° = \dfrac{28}{JK}$

Geometry (End-of-course)
Trigonometry (Performance Level: Advanced) – Question 05

A square is circumscribed about a circle. What is the ratio of the area of the circle to the area of the square?

A $\dfrac{1}{4}$
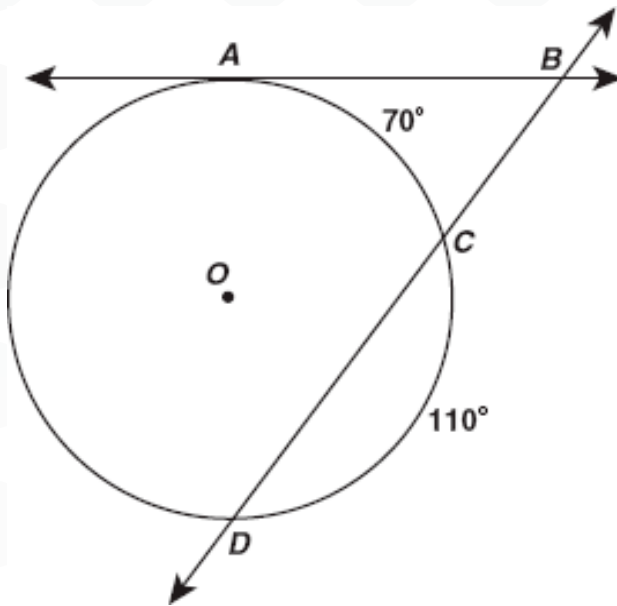
B $\dfrac{1}{2}$

C $\dfrac{2}{\pi}$

D $\dfrac{\pi}{4}$

In the figure below, $\overleftrightarrow{AB}$ is tangent to circle O at

point A, $\overrightarrow{BD}$ secant intersects circle O at points

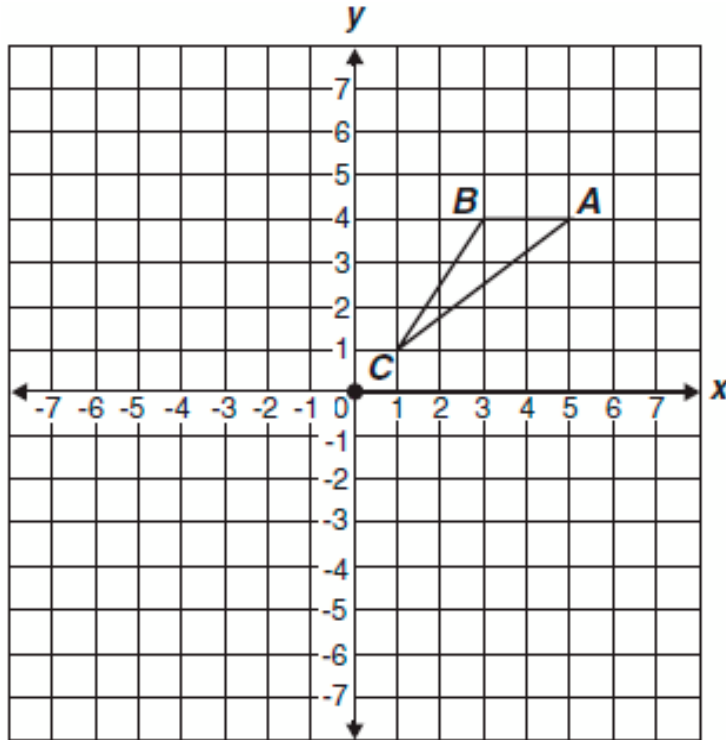C and D , $m\widehat{AC} = 70°$, and $m\widehat{CD} = 110°$.

What is m Ð ABC?

A   20°
B   40°
C   55°
D   70°

If triangle ABC is rotated 180 degrees about the origin, what are the coordinates of A' ?
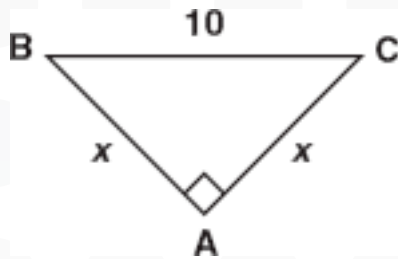

A $(-5,-4)$

B $(-5,4)$

C $(-4,5)$

D $(-4,-5)$

Geometry (End-of-course)
Trigonometry (Performance Level: Advanced) – Question 08
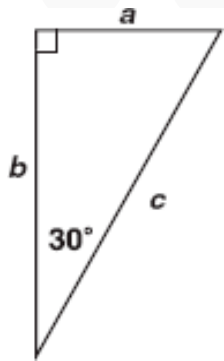
What is the value of x in the triangle below?

A   5

B $5\sqrt{2}$

C $10\sqrt{3}$

D   20

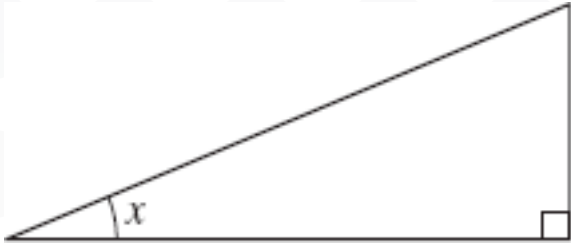If $a = 3\sqrt{3}$ in the right triangle below, what is the value of b?

A   9

B $6\sqrt{3}$

C $12\sqrt{3}$

D   18

Geometry (End-of-course)

Trigonometry (Performance Level: Proficient) – Question 01

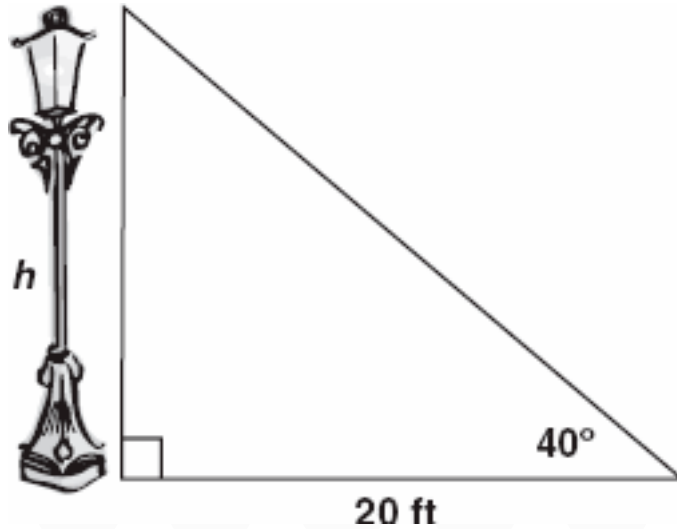In the figure below, if $\sin x = \dfrac{5}{13}$, what

are cos x and tan x?

A $\cos x = \dfrac{12}{13}$ and $\tan x = \dfrac{5}{12}$

B $\cos x = \dfrac{12}{13}$ and $\tan x = \dfrac{12}{5}$

C $\cos x = \dfrac{13}{12}$ and $\tan x = \dfrac{5}{12}$

D $\cos x = \dfrac{13}{12}$ and $\tan x = \dfrac{13}{5}$

Geometry (End-of-course)
Trigonometry (Performance Level: Proficient) – Question 02

Approximately how many feet tall is the streetlight?
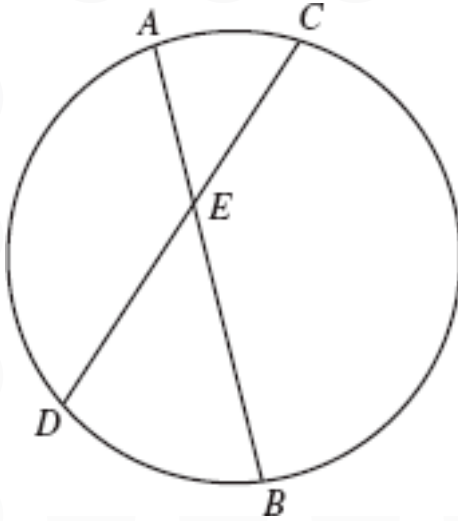

$$\sin 40° \approx 0.64$$
$$\cos 40° \approx 0.77$$
$$\tan 40° \approx 0.84$$

A   12.8
B   15.4
C   16.8
D   23.8

In the circle below, $\overline{AB}$ and $\overline{CD}$ are chords intersecting at E.

If $AE = 5$, $BE = 12$, and $CE = 6$, what is the length of $\overline{DE}$?

A   7
B   9
C   10
D   13
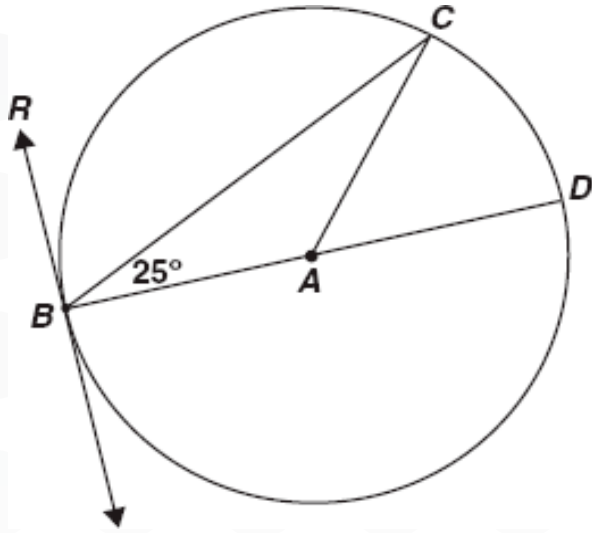
The vertices of $\triangle ABC$ are A(2, 1), B(3, 4), and

C(1, 3). If $\triangle ABC$ is translated 1 unit down and

3 units to the left to create $\triangle DEF$, what are the

coordinates of the vertices of $\triangle DEF$?

A   D(0, 1), E(1, 2), F(1, 3)
B   D(0, –1), E(0, 3), F(–2, –2)
C   D(–2, 2), E(0, 3), F(–1, 0)
D   D(–1, 0), E(0, 3), F(–2, 2)

$\overrightarrow{RB}$ is tangent to a circle, whose center is A, at point B. $\overline{BD}$ is a diameter.

What is $m\angle CBR$?

A   50°
B   65°
C   90°
D   130°

A right circular cone has radius 5 inches and
height 8 inches.
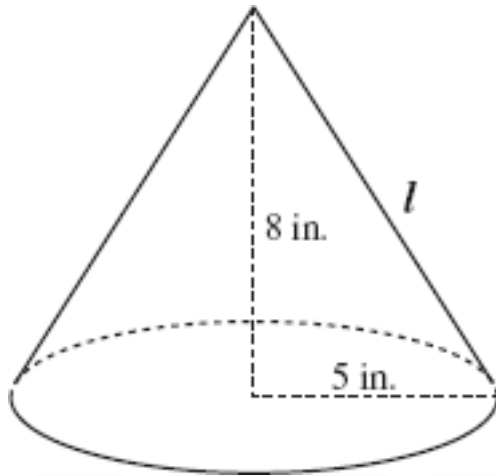
What is the lateral area of the cone? (Lateral
area of $\text{cone} = \pi r l$, where $l = \text{slant height}$)

A $\quad 40\pi$ sq in.

B $\quad 445\pi$ sq in.

C $\quad 5\pi\sqrt{39}$ sq in.

D $\quad 5\pi\sqrt{89}$ sq in.

If RSTW is a rhombus, what is the area of $\triangle WXT$?
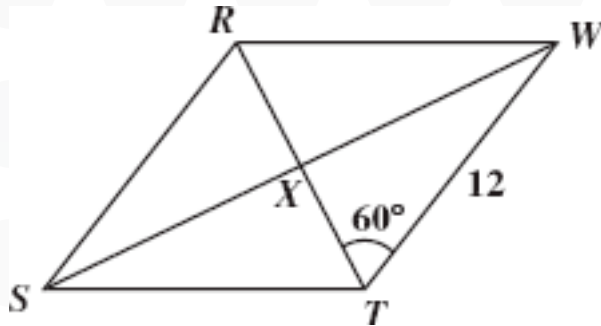
A $18\sqrt{3}$

B $36\sqrt{3}$

C   36
D   48

Geometry (End-of-course)
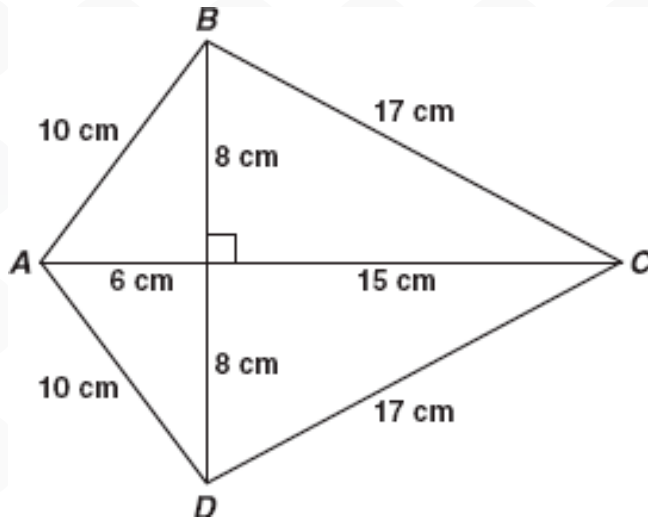*Volume and Area Formulas (Performance Level: Advanced) – Question 03*

The perimeters of two squares are in a ratio
of 4 to 9. What is the ratio between the areas
of the two squares?

A   2 to 3
B   4 to 9
C   16 to 27
D   16 to 81

Geometry (End-of-course)

Volume and Area Formulas (Performance Level: Proficient) – Question 01
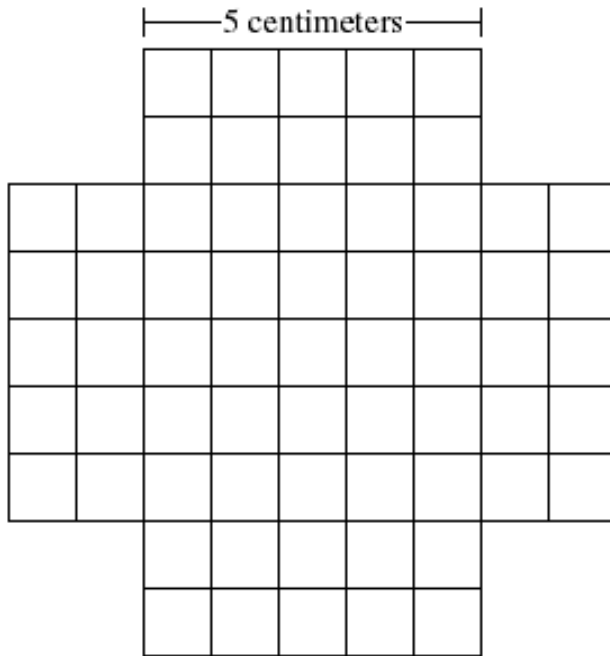
Figure ABCD is a kite.

What is the area of figure ABCD, in square centimeters?

A   120
B   154
C   168
D   336

Geometry (End-of-course)
Volume and Area Formulas (Performance Level: Proficient) – Question 02

The four sides of this figure will be folded up
and taped to make an open box.

5 centimeters

What will be the volume of the box?

A   50 cm3
B   75 cm3
C   100 cm3
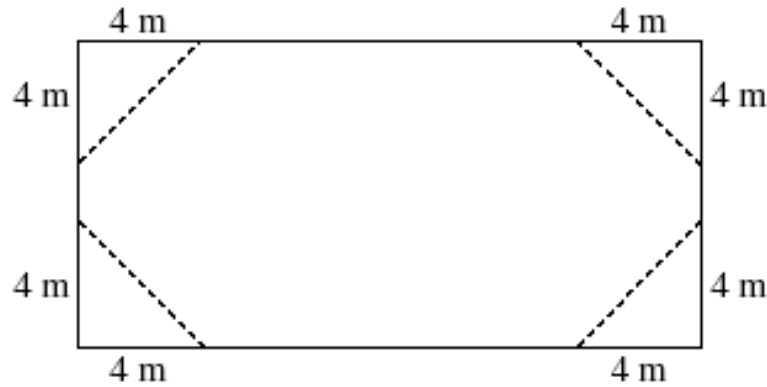D   125 cm3

A classroom globe has a diameter of 18 inches.

Which of the following is the approximate surface area, in square inches, of the globe?

A   113.0

B   226.1

C   254.3

D   1017.4

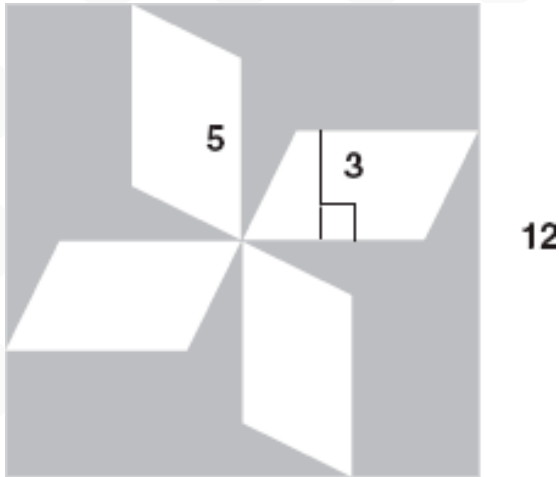The rectangle shown below has length
20 meters and width 10 meters.

If four triangles are removed from the
rectangle as shown, what will be the area of the
remaining figure?

A 136 m2
B 144 m2
C 168 m2
D 184 m2

The figure below is a square with four congruent parallelograms inside. What is the area, in square units, of the shaded portion?
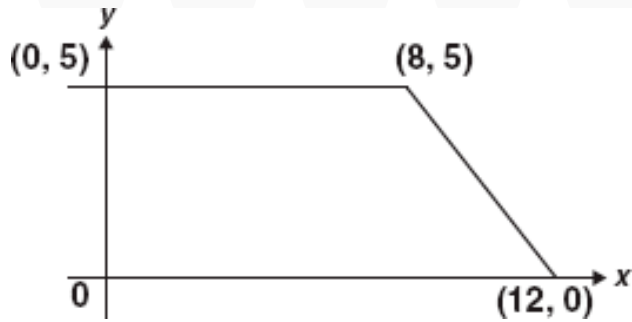

A   60
B   84
C   114
D   129

Geometry (End-of-course)
Volume and Area Formulas (Performance Level: Proficient) – Question 06

What is the area, in square units, of the trapezoid shown below?

A   37.5
B   42.5
C   50
D   100

Geometry (End-of-course)
Volume and Area Formulas (Performance Level: Proficient) – Question 07

Lea made two candles in the shape of right rectangular prisms. The first candle is 15 cm high, 8 cm long, and 8 cm wide. The second candle is 5 cm higher but has the same length and width. How much additional wax was needed to make the taller candle?

A   320 cm3
B   640 cm3
C   960 cm3
D   1280 cm3

Geometry (End-of-course)
Volume and Area Formulas (Performance Level: Below Basic) – Question 01

If a cylindrical barrel measures 22 inches in diameter, how many inches will it roll in 8 revolutions along a smooth surface?

A 121π in.

B 168π in.

C 176π in.

D 228π in.