ETS PRAXIS

The *PRAXIS*® Study Companion

Geometry (5163)

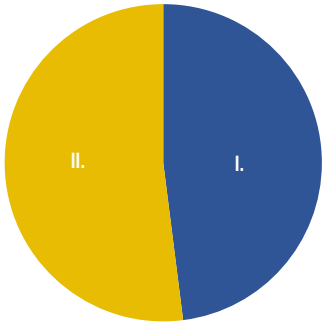
ETS Professional Educator PROGRAMS

www.ets.org/praxis

Table of Contents

Geometry (5163)

Test at a Glance

<table>
<tr><td>Test Name</td><td colspan="3">Geometry</td></tr>
<tr><td>Test Code</td><td colspan="3">5163</td></tr>
<tr><td>Time</td><td colspan="3">130 minutes</td></tr>
<tr><td>Number of Questions</td><td colspan="3">50</td></tr>
<tr><td>Format</td><td colspan="3">The test consists of a variety of selected-response and numeric entry questions. You can review the question types in Understanding Question Types.</td></tr>
<tr><td>Calculator</td><td colspan="3">An on-screen graphing calculator is provided.</td></tr>
<tr><td>Test Delivery</td><td colspan="3">Computer Delivered</td></tr>
<tr><td rowspan="4"> 
</td><td>Content Categories</td><td>Approximate Number of Questions*</td><td>Approximate Percentage of Examination</td></tr>
<tr><td>I. Properties of Geometric Plane Shapes, Congruence, Similarity, Proof, Constructions, and Trigonometry</td><td>24</td><td>48%</td></tr>
<tr><td>II. Coordinate Geometry, Circles, Three-Dimensional Geometry, and Geometric Modeling</td><td>26</td><td>52%</td></tr>
<tr><td colspan="3">* includes both scored and unscored (pretest) questions. Depending on the number of pretest questions included in each scoring category, the total number of questions in that category may vary from one form of the test to another.</td></tr>
</table>

About The Test

The *Praxis* Geometry test is designed to assess the mathematical knowledge and competencies necessary for a beginning Geometry teacher. Test takers have typically completed a bachelor's program with an emphasis in mathematics or mathematics education. The test taker will be required to understand and work with mathematical concepts, to reason mathematically, to make conjectures, to see patterns, to justify statements using informal logical arguments, and to construct simple proofs. Additionally, the examinee will be expected to solve problems by integrating knowledge from different areas of mathematics, to use various representations of concepts, to solve problems that have several solution paths, and to develop mathematical models and use them to solve real-world problems.

The test is not designed to be aligned with any particular school mathematics curriculum, but it is intended to be consistent with the recommendations of national studies on mathematics education, such as, the National Council of Teachers of Mathematics (NCTM) and the Council of the Accreditation of Educator Preparation (CAEP) *NCTM CAEP Standards* (2020), and the NCTM *Principles and Standards for School Mathematics* (2000).

This test may contain some questions that will not count toward your score.

On-Screen Graphing Calculator

During the test, test takers have access to an on-screen graphing calculator.

Please consult the Praxis Calculator Use web page for further information and review the directions for using the on-screen calculator.

Content Topics

This list details the topics that may be included on the test. All test questions cover one or more of these topics.

Note: The use of "e.g." to start a list of examples implies that only a few examples are offered and that the list is not exhaustive.

Discussion Questions

In this section, discussion questions provide examples of content that may be included in the questions you receive on testing day. They are open-ended questions or statements intended to help test your knowledge of fundamental concepts and your ability to apply those concepts to classroom or real-world situations. Answers for the discussion questions are **not** provided; however, thinking about the answers will help improve your understanding of fundamental concepts and may help you answer a broad range of questions on the test. Most of the questions require you to combine several pieces of knowledge to formulate an integrated understanding and response. The questions are intended to help you gain increased understanding and facility with the test's subject matter. You may want to discuss these questions with a teacher or mentor.

I. Properties of Geometric Plane Shapes, Congruence, Similarity, Proof, Constructions, and Trigonometry

Properties of Geometric Plane Shapes, Congruence, Proof, and Constructions

A. Knows properties of triangles, quadrilaterals (e.g., rectangle, rhombus, trapezoid), and other polygons

1. Solves problems involving special triangles; e.g., isosceles, equilateral, right, 30-60-90
2. Solves problems that involve medians, midpoints, and altitudes in triangles
3. Identifies geometric properties of various quadrilaterals
4. Identifies relationships among quadrilaterals
5. Solves problems involving sides, angles, or diagonals of polygons
6. Identifies the lines of symmetry in a polygon

B. Knows the properties of lines (e.g., parallel, perpendicular, intersecting) and angles

1. Solves problems involving parallel, perpendicular, and intersecting lines
2. Applies angle relationships (e.g., supplementary, vertical, alternate interior) to solve problems

C. Understands how to solve problems involving perimeter and area of polygons

1. Calculates and interprets perimeter and area of plane figures that can be composed of triangles and quadrilaterals
2. Calculates changes in perimeter and area as the dimensions of plane figures change

D. Understands rigid motions in a plane; e.g., translations, rotations, reflections

1. Uses rigid motions (e.g., translations, rotations, reflections) to transform figures
2. Recognizes that rigid motion transformations preserve distance and angle measure
3. Specifies a sequence of transformations that will map a given figure onto another figure
4. Given a figure, describes the transformations that map the figure onto itself

E. Understands the concept of congruence

1. Determines whether two figures are congruent using theorems (e.g., ASA , SAS , SSS)
2. Determines whether two figures are congruent by directly mapping one figure onto another using a sequence of one or more rigid motions
3. Uses congruence to solve problems with two-dimensional and three-dimensional figures

F. Understands how to prove geometric theorems such as those about lines and angles, triangles, and parallelograms

1. Proves theorems about lines and angles
2. Proves theorems about triangles
3. Proves theorems about parallelograms
4. Understands the nature and structure of geometric proofs, including direct and indirect proofs

G. Knows how geometric constructions are made

1. Identifies and describes formal geometric constructions made with a variety of tools and methods; e.g., copying a segment or an angle; bisecting a segment or an angle; constructing parallel and perpendicular lines; constructing an equilateral triangle, a square, and a regular hexagon inscribed in a circle

Similarity, Proof, and Trigonometry

A. Understands the concept of similarity

1. Uses dilations to transform figures
2. Recognizes that dilation transformations preserve angle measure but not distance

3. Determines whether two figures are similar using theorems (e.g., AA criterion)
4. Determines whether two figures are similar by directly mapping one figure onto another using a sequence of one or more transformations (dilations and/or rigid motions)
5. Uses similarity to solve problems with two-dimensional and three-dimensional figure

B. Understands how to prove theorems involving similarity

1. Proves theorems about triangles
2. Uses congruence and similarity criteria for triangles to prove relationships in geometric figures

C. Understands how trigonometry and the Pythagorean theorem are applied to right triangles

1. Understands that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles
2. Explains and uses the relationship between the sine and cosine of complementary angles
3. Uses trigonometric ratios to solve right triangles in geometric or applied problems
4. Uses the Pythagorean theorem to solve right triangles in geometric or applied problems
5. Knows the values of trigonometric functions of special angles; e.g., 30° , 45° , 60° , 90°

D. Understands how trigonometry is applied to general triangles

1. Applies the Law of Sines and the Law of Cosines to find unknown measurements in triangles

Discussion Questions: Properties of Geometric Plane Shapes, Congruence, Proof, and Constructions and Similarity, Proof, and Trigonometry

- Can you use the definitions and properties of special triangles (e.g., isosceles, equilateral, right, 30-60-90) and special polygons (e.g., regular polygon, parallelogram, trapezoid, rhombus, rectangle, square, and kite) ?
- Can you solve perimeter and area problems involving plane figures either directly or by decomposing into familiar shapes?
- Can you use the definitions and properties of angles, circles, line segments, perpendicular lines, and parallel lines?
- Can you translate, reflect, rotate, and dilate figures, describe these transformations as functions, and perform a sequence of transformations on a figure?
- Can you use the relationships of the angles formed when parallel lines are cut by a transversal?
- Can you prove and apply the theorems of supplementary angles, complementary angles, vertical angles, exterior angles, triangle sum, and base angles?
- Can you construct geometric figures using a straightedge and compass or recognize steps in common constructions?

- Can you describe or prove congruence and similarity in terms of transformations?
- Can you apply triangle congruence and similarity criteria to solve problems or prove theorems?
- Can you describe some real-life applications that involve the Pythagorean theorem and trigonometric ratios?
- Can you use the law of sines and the law of cosines to solve problems?
- Can you use trigonometric ratios to solve problems involving right triangles?
- Can you use the relationship between sine and cosine of complementary angles?
- Can you describe and use the properties of the median, altitude, and angle bisector of a triangle?
- Can you identify the lines of symmetry of a polygon?
- Can you calculate the changes in perimeter and area when the dimensions of a polygon are changed?

II. Coordinate Geometry, Circles, Three-Dimensional Geometry, and Geometric Modeling

Coordinate Geometry

A. Uses coordinates to prove simple geometric theorems algebraically

1. Identifies the characteristics of ordered pairs located in quadrants and on the axes of the coordinate plane
2. Uses coordinate geometry to represent and identify the properties of geometric shapes (e.g., Pythagorean theorem, area of a rectangle)
3. Determines the distance between two points
4. Determines the midpoint of the segment joining two points
5. Uses the slope criteria for parallel and perpendicular lines to solve geometric problems
6. Uses coordinates to compute perimeters of polygons and areas of triangles and quadrilaterals
7. Uses coordinates to prove simple geometric theorems algebraically

Circles

A. Understands properties of circles

1. Solves problems involving diameter and radius of a circle
2. Solves problems involving measures of inscribed angles, central angles, circumscribed angles, and arcs
3. Uses properties of tangent lines to circles to solve problems
4. Proves theorems about circles
5. Solves problems involving the inscribed and circumscribed circles of a triangle, a square, and a regular hexagon, including the constructions of the circles

B. Understands how to solve problems involving length of arcs and area of sectors

1. Solves problems involving circumference and area of a circle
2. Solves problems involving length of arcs and area of sectors

C. Knows how to translate between the geometric description and the equation for a circle

1. Knows and uses the geometric description of a circle
2. Determines and uses the equation of a circle of given center and radius
3. Finds the center and radius of a circle given by an equation in standard form
4. Completes the square to find the center and radius of a circle given by an equation

Three-Dimensional Geometry and Geometric Modeling

A. Knows how to solve problems involving surface area and volume of solids

1. Calculates and interprets surface area and volume of solids; e.g., prisms, pyramids, cones, cylinders, spheres
2. Calculates changes in surface area and volume as the dimensions of a solid change

B. Knows how to visualize relationships (e.g., cross section, nets, rotations) between two-dimensional and three-dimensional objects

1. Identifies the shapes of two-dimensional cross sections of three-dimensional objects, and identifies three-dimensional objects generated by rotations of two-dimensional objects
2. Uses two-dimensional representations of three-dimensional objects to visualize and solve problems

C. Knows how to apply geometric concepts in real-world situations

1. Uses geometric shapes, their measures, and their properties to describe objects
2. Applies geometric methods to solve design problems

Discussion Questions: Coordinate Geometry, Circles, and Three-Dimensional Geometry and Geometric Modeling

- Can you use the definitions, properties, and theorems about circles, such as inscribed and central angles, radii, chords, arcs, tangents, secants, circumference, and area?
- Can you derive and use the formula for the arc length and the sector area of a circle?
- Can you use definitions and properties of the coordinate plane (e.g., quadrants) ?
- Can you derive the equation of a circle given its graph in the coordinate plane?
- Can you find the center and radius of a circle from a given equation?
- Can you compute the perimeter of a polygon and the area of a triangle and a quadrilateral using coordinates?
- Can you use coordinates to compute the length or the midpoint of a line segment?
- Can you use coordinates to compute the slope of a line, given the end points?
- Can you use the slope criteria for parallel and perpendicular lines graphed in the coordinate plane?

- Can you apply the correct formula to compute the surface area and volume of prisms, cylinders, pyramids, cones, and spheres?
- Can you identify two-dimensional cross sections of three-dimensional shapes, including the conic sections?
- Can you visualize three-dimensional shapes that result when a two-dimensional shape is rotated about a line?
- Can you use two-dimensional nets to represent three-dimensional objects?
- Can you calculate the changes in surface area and volume when the dimensions of a solid are changed?

Geometry (5163) Sample Test Questions

Information about Questions That Is Specific to the Geometry Test

- **General**
  - All numbers used are real numbers.
  - Rectangular coordinate systems are used unless otherwise stated.
  - Figures that accompany questions are intended to provide information that is useful in answering questions.
    - Figures are drawn to scale unless otherwise stated.
    - Lines shown as straight are straight, and angle measures are positive.
    - Positions of points, angles, regions, etc., exist in the order shown.
- **Types of questions that may be on the test**
  - Selected-response questions—select one answer choice
    - These are questions that ask you to select only one answer choice from a list of four choices. In the computer delivered test, these questions are marked with ovals beside the answer choices. See question 1 in the Sample Test Questions.
  - Selected-response questions—select one or more answer choices
    - These are questions that ask you to select one or more answer choices from a list of choices. A question may or may not specify the number of choices to select. In the computer delivered test, these questions are marked with square boxes beside the answer choices, not circles or ovals. See question 13 in the Sample Test Questions.
    - A question of this type will have at least one correct answer choice. For example, if a question of this type has exactly three answer choices, one, two, or three of the choices may be correct.
  - Fraction questions
    - These questions ask you to enter your answer as a fraction in two separate boxes—one box for the numerator and one box for the denominator. Enter integers in each of the two boxes. A negative sign can be entered in either box. Equivalent forms of the correct answer, such as $\frac{1}{2}$ and $\frac{6}{12}$, are all correct, though there may be

- Numeric-entry questions
  - These questions ask you to enter your answer as an integer or a decimal in a single answer box. Equivalent forms of the correct answer, such as 2.5 and 2.50, are all correct. Note that in these questions, the exact answer should be entered unless the question asks you to round your answer. Therefore, if one of these questions does not ask you to round your answer, you should be able to enter the exact answer in the numeric-entry box. If you are unable to do so, this may indicate that your answer is incorrect.
- Multiple-numeric-entry questions
  - These questions ask you to enter your answer as an integer or a decimal in two or more answer boxes. Equivalent forms, such as 2.5 and 2.50, of the correct answer in each answer box are all correct. See question 4 in the Sample Test Questions. Note that in these questions, the exact answer should be entered unless the question asks you to round your answer.
- Drag-and-drop questions
  - These questions ask you to pair up given phrases or expressions by dragging (with your computer mouse) phrases or expressions from one location and matching them with given phrases or expressions in another location.
- Table grid questions
  - These questions refer to a table in which statements appear in the first column. For each statement, select the correct properties by selecting the appropriate cell(s) in the table.
- Text completion questions
  - These questions ask you to select one or more answer choices to complete one or more sentences. The choices may be located in columns of choices at the end of the question. You will select one answer choice from each column of choices.
- Selected-response questions—select an area
  - These are questions that ask you to select one or more locations on a picture or a figure (e.g., the *xy*-plane).
- Other types of questions
  - New question formats are developed from time to time to find new ways of assessing knowledge. If you see a format you are not familiar with, read the directions of the question carefully. The directions always give clear instructions on how you are expected to respond.

FORMULAS

Volume

Sphere with radius r: $V = \frac{4}{3}\pi r^3$

Right circular cone with height h and base of radius r: $V = \frac{1}{3}\pi r^2 h$

Right circular cylinder with height h and base of radius r: $V = \pi r^2 h$

Pyramid with height h and base of area B: $V = \frac{1}{3}Bh$

Right prism with height h and base of area B: $V = Bh$

Surface Area

Sphere with radius r: $A = 4\pi r^2$

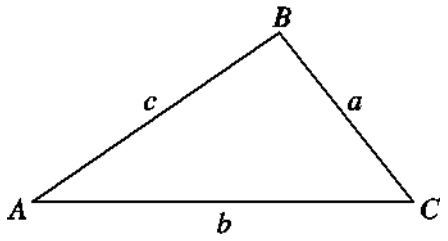
Right circular cone with radius r and slant height s: $A = \pi rs + \pi r^2$

Distance from point (x_1, y_1) to line $Ax + By + C = 0$

$$d = \frac{\left|Ax_1 + By_1 + C\right|}{\sqrt{A^2 + B^2}}$$

Law of Sines

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$



Law of Cosines

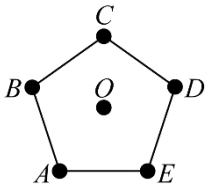
$$c^2 = a^2 + b^2 - 2ab(\cos C)$$

Sample Questions

The sample questions that follow illustrate the kinds of questions in the test. They are not, however, representative of the entire scope of the test in either content or difficulty. Answers with explanations follow the questions.

Directions: The test consists of a variety of selected-response questions, where you select one or more answer choices, and questions where you enter a numeric answer in a box.

1.



The figure above shows regular pentagon *ABCDE* with center *O*. Which of the following plane transformations will map the regular pentagon onto itself?

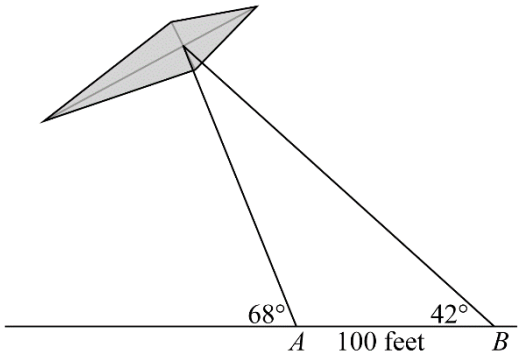
(A) A clockwise rotation of 72° about point *E*

(B) A clockwise rotation of 108° about point *O*

(C) A counterclockwise rotation of 72° about point *O*

(D) A counterclockwise rotation of 108° about point *E*

2.



A kite is being flown as shown in the figure above. Points *A* and *B* on the ground are 100 feet apart. The angle of elevation from the ground to the kite from point *A* is 68°, and from point *B* it is 42°. What is the distance from point *A* to the kite, rounded to the nearest foot?

(A) 67 feet

(B) 72 feet

(C) 139 feet

(D) 153 feet

3. A circle in the *xy*-plane has a radius of 16 and has its center at $(-p,q)$, where p and q are positive constants. What is the equation of the circle?

   (A) $(x-p)^2+(y+q)^2=4$

   (B) $(x-p)^2+(y+q)^2=256$

   (C) $(x+p)^2+(y-q)^2=4$

   (D) $(x+p)^2+(y-q)^2=256$

For the following question, enter your answers in the answer boxes.

4. What are the coordinates (x,y) of the midpoint of the line segment that has $(-2,3)$ and $(4,-5)$ as endpoints?

   (☐ , ☐)

5. A tree casts a shadow that has a length of 92 feet. The angle of elevation from the end of the shadow to the top of the tree is 60°. Which of the following is the best estimate for the height of the tree, in feet?

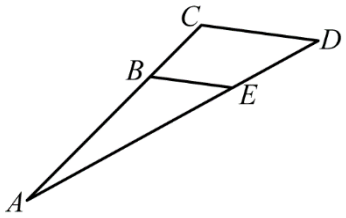
   (A) 53

   (B) 65

   (C) 130

   (D) 159

6.



In triangle *ACD* above, $\frac{AB}{AC} = \frac{AE}{AD}$. In order to provide that sides $\overline{BE}$ and $\overline{CD}$ are parallel, Madeline indicates that $\angle A$ is congruent to itself by the reflexive property, and so triangles *ABE* and *ACD* are similar by the side-angle-side similarity theorem. Which of the following statements completes Madeline's proof?

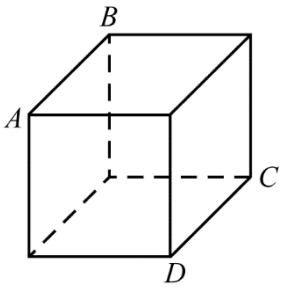
(A) Because triangles *ABE* and *ACD* are similar, then sides $\overline{BE}$ and $\overline{CD}$ are proportional, and proportional sides in similar triangles are parallel.

(B) Because triangles *ABE* and *ACD* are similar, then $\angle ABE$ and $\angle CBE$ must be supplementary, which means that sides $\overline{BE}$ and $\overline{CD}$ must be parallel.

(C) Because triangles *ABE* and *ACD* are similar, then $\angle AEB$ and $\angle CBE$ must be congruent alternate interior angles, which means that sides $\overline{BE}$ and $\overline{CD}$ must be parallel.

(D) Because triangles *ABE* and *ACD* are similar, then $\angle ABE$ and $\angle ACD$ must be congruent, which means that they are congruent corresponding angles and sides $\overline{BE}$ and $\overline{CD}$ must be parallel.

7.



If a plane passes through points *A*, *B*, and *C* in the cube above, which of the following is the most precise classification of the polygon that results from this cross section?

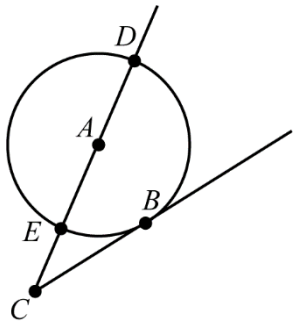
(A) Parallelogram

(B) Rectangle

(C) Square

(D) Trapezoid

8.



In the figure above, line *CB* is tangent to the circle with center *A*. If the measure of arc *DB* is 125°, what is the measure of angle *EAB*?

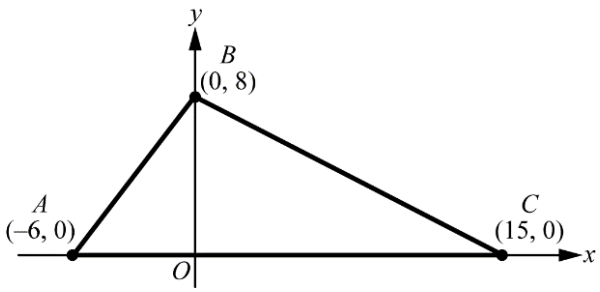
(A) 27.5°

(B) 35°

(C) 55°

(D) 62.5°

9.



What is the perimeter of triangle *ABC* in the *xy*-plane above?

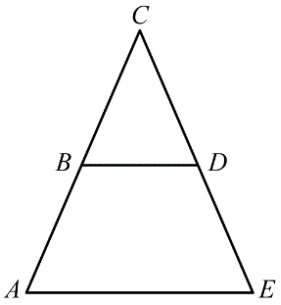
(A) 48

(B) 49

(C) 50

(D) 51

10.



	Statement		Statement
1	Segment $\overline{BD}$ is parallel to segment $\overline{AE}$.	1	Given
2	$\angle C \cong \angle C$	2	Reflexive property
3	?	3	Corresponding angles formed by parallel lines are congruent
4	$\Delta ACE \sim \Delta BCD$	4	The AA (angle-angle) similarity theorem

In triangle *ACE* above, segment $\overline{BD}$ is parallel to segment $\overline{AE}$. Based on the reasons in the proof above, which of the following is the correct statement for step 3 in the proof that $\Delta ACE \sim \Delta BCD$ triangle?

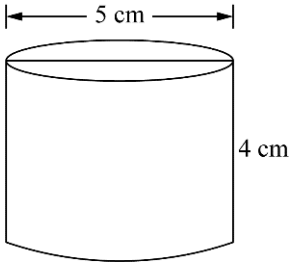
(A) $\angle ABD \cong \angle CBD$

(B) $\angle ABD \cong \angle BDC$

(C) $\angle AED \cong \angle CBD$

(D) $\angle AED \cong \angle BDC$

11.



The figure above shows a right circular cylinder with a height of 4 centimeters and a diameter of 5 centimeters. If the height and diameter of the cylinder are both doubled in length, which of the following gives the new volume of the resulting cylinder, in cubic centimeters?

(A) 50π

(B) 100π

(C) 200π

(D) 800π

12. The point with coordinates $(-5,4)$ lies in which quadrant of the *xy*-plane?

(A) Quadrant I

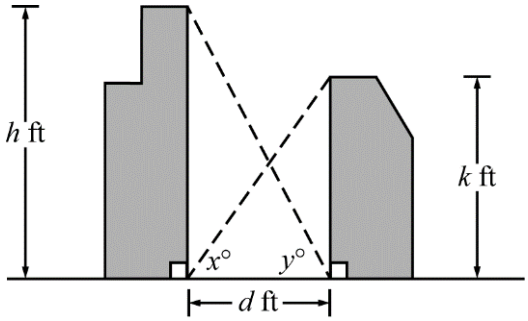
(B) Quadrant II

(C) Quadrant III

(D) Quadrant IV

For the following question, select all the answer choices that apply.

13.



The figure above represents two buildings d feet apart. The heights of the buildings are h feet and k feet, respectively, and the angles formed by the lines of sight from the base of each building to the top of the other building measure x degrees and y degrees, respectively. Which of the following sets of quantities are sufficient to determine the value of k ?

Select all that apply.

(A) d and x

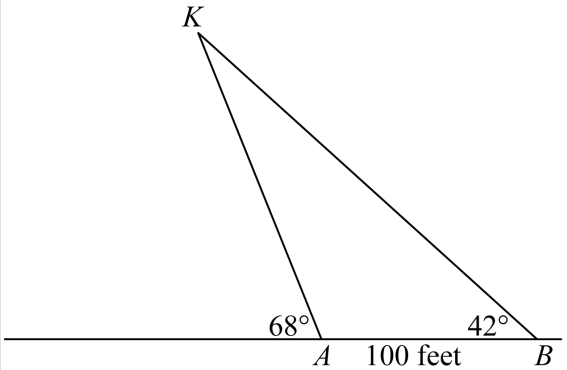
(B) d, h, and y

(C) h, x, and y

Answers

1. Option (C) is correct. Since the five angles *AOB*, *BOC*, *COD*, *DOE*, and *EOA* are congruent and the sum of their measures is 360°, it follows that the measure of each of the angles *AOB*, *BOC*, *COD*, *DOE*, and *EOA* is $\frac{360°}{5}$, or 72°. A counterclockwise rotation of 72° about point *O*, the center of regular pentagon *ABCDE*, will map the pentagon to itself.

2. Option (D) is correct.

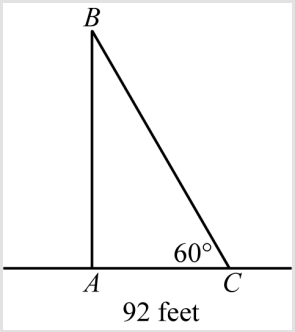


If point *K* represents the kite, as shown in the figure above, then in triangle *KAB*, the measure of angle *KBA* is 42°, the measure of angle *KAB* is $180-68$, or 112°, and the measure of angle *AKB* is $180-42-112$, or 26°. Using the law of sines in triangle *KAB*, we get $\frac{KA}{\sin(42°)}=\frac{AB}{\sin(26°)}$, which, when solved for $\overline{KA}$, gives $\frac{100\times\sin(42°)}{\sin(26°)}$, or approximately 152.6 feet. The distance from point *A* to the kite, rounded to the nearest foot, is 153 feet.

3. Option (D) is correct. Recall that the equation of a circle is the *xy*–plane with the center at (h,k) and a radius of *r* is $(x-h)^2+(y-k)^2=r^2$. When $(h,k)=(-p,q)$ and $r=16$, the equation of the circle is $(x-(-p))^2+(y-q)^2=16^2$, or $(x+p)^2+(y-q)^2=256$.

4. The correct answer is $(1,-1)$. Recall that the midpoint of the line segment connecting points (x_1,y_1) and (x_2,y_2) is $\left(\frac{x_1+x_2}{2},\frac{y_1+y_2}{2}\right)$. The midpoint of the line segment connecting $(-2,3)$ and $(4,-5)$ is $\left(\frac{(-2)+4}{2},\frac{3+(-5)}{2}\right)$ or $(1,-1)$.

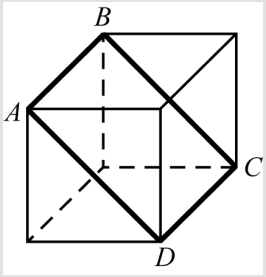
5. Option (D) is correct.



In the figure above, $\overline{AB}$ represents the tree and $\overline{AC}$ represents the shadow of the tree. Triangle *ABC* is a 30°-60°-90° triangle. Recall that in a 30°-60°-90° triangle, the length of the longest leg is $\sqrt{3}$ times the length of the shortest leg. (This is equivalent to the fact that $\tan(60°) = \sqrt{3}$.) Since the length of the shadow (that is, the length of the shortest leg) is 92 feet, the height of the tree (that is, the length of the longest leg) is $\sqrt{3} \times 92$, or approximately 159 feet.

6. Option (D) is correct. Since $\angle ABE$ and $\angle ACD$ are corresponding angles in the similar triangles *ABE* and *ACD*, it follows that they are congruent angles. Since $\angle ABE$ and $\angle ACD$ are corresponding angles when transversal $\overline{AC}$ intersects line segments $\overline{BE}$ and $\overline{CD}$, and since the two angles are congruent, it follows that line segments $\overline{BE}$ and $\overline{CD}$ are parallel.

7. Option (B) is correct.



Since the plane passes through points *A*, *B*, and *C*, the plane will also pass through the point *D*, as shown in the figure above. The cross section polygon is quadrilateral *ABCD*, which is a rectangle because the opposite sides are equal to each other and because $\overline{AB}$ is perpendicular to $\overline{AD}$.

8. Option (C) is correct. Since $\overline{DE}$ is a diameter of the circle, the sum of the measures of arcs *DB* and *EB* is 180°, and therefore the measure of arc *EB* is $180 - 125$, or 55 degrees. Since the measure of central angle *EAB* is the same as the measure of arc *EB*, it follows that the measure of central angle *EAB* is 55°.

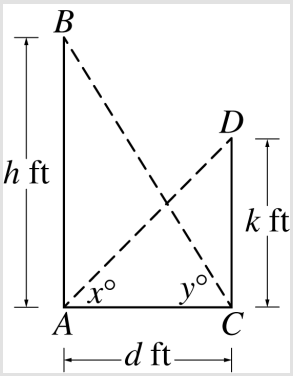
9. Option (A) is correct. The Pythagorean theorem applied to right triangle *OAB* implies that $AB = \sqrt{6^2 + 8^2} = 10$. The Pythagorean theorem applied to right triangle *OBC* implies that $BC = \sqrt{8^2 + 15^2} = 17$. From the figure, we can conclude that $AC = 21$, so the perimeter of triangle *ABC* is $10 + 17 + 21$, or 48.

10. Option (D) is correct. Since angles *AED* and *BDC* are corresponding angles when transversal $\overline{CE}$ intersects parallel lines $\overline{BD}$ and $\overline{AE}$, it follows that the two angles are congruent. This information can be used in step 4 in conjunction to the AA similarity theorem to conclude that triangles *ACE* and *BCD* are similar.

11. Option (C) is correct. Recall that the volume of a right circular cylinder with height *h* and base radius *r* is $\pi r^2 h$. The new cylinder has a height of 8 centimeters and a diameter of 10 centimeters. The volume of the new cylinder is $\pi \times \left(\frac{10}{2}\right)^2 \times 8$, or 200π cubic centimeters.

12. Option (B) is correct. Since the *x*-coordinate of the point is negative and the *y*-coordinate of the point is positive, the point lies in quadrant II.

13. Options (A) and (C) are correct. In the figure below, the two buildings are represented by line segments $\overline{AB}$ and $\overline{CD}$.



Option (A): in right triangle *ACD*, $\tan\left(x^\circ\right) = \frac{k}{d}$, and therefore $k = \tan\left(x^\circ\right) \times d$. The values of *d* and *x* are sufficient to determine the value of *k*.

Option (C): In right triangle *ABC*, $\tan\left(y^\circ\right) = \frac{h}{d}$, and therefore $d = \frac{h}{\tan\left(y^\circ\right)}$. In right triangle *ACD*, $\tan\left(x^\circ\right) = \frac{k}{d}$, and therefore $k = \tan\left(x^\circ\right) \times d = \tan\left(x^\circ\right) \times \frac{h}{\tan\left(y^\circ\right)}$. The values of *h*, *x*, and *y* are sufficient to determine the value of *k*.

Understanding Question Types

The *Praxis*® assessments include a variety of question types: constructed response (for which you write a response of your own); selected response, for which you select one or more answers from a list of choices or make another kind of selection (e.g., by selecting a sentence in a text or by selecting part of a graphic); and numeric entry, for which you enter a numeric value in an answer field. You may be familiar with these question formats from seeing them on other standardized tests you have taken. If not, familiarize yourself with them so that you won't have to spend time during the test figuring out how to answer them.

Understanding Selected-Response and Numeric-Entry Questions

For most questions you will respond by selecting an oval to choose a single answer from a list of answer choices.

However, interactive question types may also ask you to respond by doing the following.

- Selecting more than one choice from a list of choices.
- Typing in a numeric-entry box. When the answer is a number, you may be asked to enter a numerical answer. Some questions may have more than one entry box to enter a response. Numeric-entry questions typically appear on mathematics-related tests.
- Selecting parts of a graphic. In some questions, you will select your answers by selecting a location (or locations) on a graphic such as a map or chart, as opposed to choosing your answer from a list.
- Selecting sentences. In questions with reading passages, you may be asked to choose your answers by selecting a sentence (or sentences) within the reading passage.
- Dragging and dropping answer choices into targets on the screen. You may be asked to select answers from a list of choices and to drag your answers to the appropriate location in a table, paragraph of text, or graphic.
- Selecting answer choices from a drop-down menu. You may be asked to choose answers by selecting choices from a drop-down menu (e.g., to complete a sentence).

Remember that with every question, you will get clear instructions.

Understanding Constructed-Response Questions

Some tests include constructed-response questions, which require you to demonstrate your knowledge in a subject area by writing your own response to topics. Essay questions and short-answer questions are types of questions that call for a constructed response.

For example, an essay question might present you with a topic and ask you to discuss the extent to which you agree or disagree with the opinion stated. For such questions, you must support your position with specific reasons and examples from your own experience, observations, or reading.

Following are a few sample essay topics to review.

- *Brown* v. *Board of Education of Topeka*

  "We come then to the question presented: Does segregation of children in public schools solely on the basis of race, even though the physical facilities and other 'tangible' factors may be equal, deprive the children of the minority group of equal educational opportunities? We believe that it does."

  - What legal doctrine or principle, established in Plessy v. Ferguson (1896), did the Supreme Court reverse when it issued the 1954 ruling quoted above?
  - What was the rationale given by the justices for their 1954 ruling?

- *In his self-analysis, Mr. Payton says that the better-performing students say small-group work is boring and that they learn more working alone or only with students like themselves. Assume that Mr. Payton wants to continue using cooperative learning groups because he believes they have value for all students.*

  - Describe **TWO** strategies he could use to address the concerns of the students who have complained.
  - Explain how each strategy suggested could provide an opportunity to improve the functioning of cooperative learning groups. Base your response on principles of effective instructional strategies.

- *"Minimum-wage jobs are a ticket to nowhere. They are boring and repetitive and teach employees little or nothing of value. Minimum-wage employers take advantage of people because they need a job."*

  - Discuss the extent to which you agree or disagree with this opinion. Support your views with specific reasons and examples from your own experience, observations, or reading.

Keep the following things in mind when you respond to a constructed-response question.

1. **Answer the question accurately.** Analyze what each part of the question is asking you to do. If the question asks you to describe or discuss, you should provide more than just a list.

2. **Answer the question completely.** If a question asks you to do three distinct things in your response, you should cover all three things for the best score. Otherwise, no matter how well you write, you will not be awarded full credit.

3. **Answer the question that is asked.** Do not change the question or challenge the basis of the question. You will receive no credit or a low score if you answer another question or if you state, for example, that there is no possible answer.

4. **Give a thorough and detailed response.** You must demonstrate that you have a thorough understanding of the subject matter. However, your response should be straightforward and should not be filled with unnecessary information.

5. **Take notes on scratch paper so that you don't miss any details**. Then you'll be sure to have all the information you need to answer the question.

6. **Reread your response.** Check that you have written what you intended to write. Do not leave sentences unfinished or omit clarifying information.

General Assistance For The Test

Praxis® Interactive Practice Test

This full-length *Praxis*® practice test lets you practice answering one set of authentic test questions in an environment that simulates the computer-delivered test.

- Timed just like the real test
- Correct answers with detailed explanations
- Practice test results for each content category

ETS provides a free interactive practice test with each test registration. You can learn more here.

Doing Your Best

Strategy and Success Tips

Effective *Praxis* test preparation doesn't just happen. You'll want to set clear goals and deadlines for yourself along the way. Learn from the experts. Get practical tips to help you navigate your Praxis test and make the best use of your time. Learn more at Strategy and Tips for Taking a *Praxis* Test.

Develop Your Study Plan

Planning your study time is important to help ensure that you review all content areas covered on the test. View a sample plan and learn how to create your own. Learn more at Develop a Study Plan.

Helpful Links

Ready to Register – How to register and the information you need to know to do so.

Disability Accommodations – Testing accommodations are available for test takers who meet ETS requirements.

PLNE Accommodations (ESL) – If English is not your primary language, you may be eligible for extended testing time.

What To Expect on Test Day – Knowing what to expect on test day can make you feel more at ease.

Getting Your Scores – Find out where and when you will receive your test scores.

State Requirements – Learn which tests your state requires you to take.

Other Praxis Tests – Learn about other *Praxis* tests and how to prepare for them.

To search for the *Praxis* test prep resources that meet your specific needs, visit:

www.ets.org/praxis/testprep

To purchase official test prep made by the creators of the *Praxis* tests, visit the ETS Store:

www.ets.org/praxis/store

www.ets.org