Chapter 5
Geometry

This chapter contains GRE Quantitative Reasoning practice questions that involve geometry.

Geometry topics include parallel and perpendicular lines, circles, triangles—including isosceles, equilateral, and $30^\circ - 60^\circ - 90^\circ$ triangles—quadrilaterals, other polygons, congruent and similar figures, three-dimensional figures, area, perimeter, volume, the Pythagorean theorem, and angle measurement in degrees. The ability to construct proofs is not tested.

The questions are arranged by question type: Quantitative Comparison questions, followed by both types of Multiple-choice questions, and then Numeric Entry questions.

The answer key and the explanations for the answers for the Geometry Questions are in the separate document titled “GRADUATE RECORD EXAMINATIONS® Official GRE Quantitative Reasoning Practice Questions, Volume 1. Large Print (18 point) Edition. Chapter 5 – Geometry Answer Key with Answers and Explanations.”
Review the answers and explanations carefully, paying particular attention to explanations for questions that you answered incorrectly.

Before answering the practice questions, read the Quantitative Reasoning section directions that begin on page 4. Also, review the directions that precede each question type to make sure you understand how to answer the questions.
Quantitative Reasoning Section Directions

**Directions:** For each question, indicate the best answer, using the directions given.

**Notes:** All numbers used are real numbers.

All figures are assumed to lie in a plane unless otherwise indicated.

Geometric figures, such as lines, circles, triangles, and quadrilaterals, are not necessarily drawn to scale. That is, you should not assume that quantities such as lengths and angle measures are as they appear in a figure. You should assume, however, that lines shown as straight are actually straight, points on a line are in the order shown, and more generally, all geometric objects are in the relative positions shown. For questions with geometric figures, you should base your answers on geometric reasoning, not on estimating or comparing quantities from how they are drawn in the geometric figure.
Coordinate systems, such as $xy$-planes and number lines, are drawn to scale; therefore, you can read, estimate, or compare quantities in such figures from how they are drawn in the coordinate system.

Graphical data presentations, such as bar graphs, circle graphs, and line graphs, are drawn to scale; therefore, you can read, estimate, or compare data values from how they are drawn in the graphical data presentation.
Quantitative Comparison Questions

For Questions 1 to 5, compare Quantity A and Quantity B, using additional information centered above the two quantities if such information is given. Select one of the following four answer choices.

A Quantity A is greater.
B Quantity B is greater.
C The two quantities are equal.
D The relationship cannot be determined from the information given.

A symbol that appears more than once in a question has the same meaning throughout the question.

<table>
<thead>
<tr>
<th>Quantity A</th>
<th>Quantity B</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2)(6)</td>
<td>2 + 6</td>
</tr>
</tbody>
</table>

Example 1:

The correct answer choice for Example 1 is A. (2)(6), or 12, is greater than 2 + 6, or 8.
Example 2: \[ PS \] \[ SR \]

The correct answer choice is D. The relationship between \( PS \) and \( SR \) cannot be determined from the information given since equal measures cannot be assumed, even though \( PS \) and \( SR \) appear to be equal in the figure.
In the $xy$-plane, one of the vertices of square $S$ is the point $(2, 2)$. The diagonals of $S$ intersect at the point $(6, 6)$.

<table>
<thead>
<tr>
<th>Quantity A</th>
<th>Quantity B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The area of $S$</td>
<td>64</td>
</tr>
</tbody>
</table>

- Quantity A is greater.
- Quantity B is greater.
- The two quantities are equal.
- The relationship cannot be determined from the information given.
2. The length of a side of a regular pentagon with a perimeter of 12.5
   The length of a side of a regular hexagon with a perimeter of 15

A Quantity A is greater.
B Quantity B is greater.
C The two quantities are equal.
D The relationship cannot be determined from the information given.
A line in the \(xy\)-plane contains the point \((5, 4)\) and the point \((2, -1)\).

<table>
<thead>
<tr>
<th>Quantity A</th>
<th>Quantity B</th>
</tr>
</thead>
<tbody>
<tr>
<td>The slope of the line</td>
<td>0</td>
</tr>
</tbody>
</table>

A Quantity A is greater.
B Quantity B is greater.
C The two quantities are equal.
D The relationship cannot be determined from the information given.
Quantity A | Quantity B

4. \( x \) | 90

A) Quantity A is greater.
B) Quantity B is greater.
C) The two quantities are equal.
D) The relationship cannot be determined from the information given.
In the figure above, triangle $RST$ is inscribed in a circle. The measure of angle $RST$ is greater than $90^\circ$, and the area of the circle is $25\pi$.

<table>
<thead>
<tr>
<th>Quantity A</th>
<th>Quantity B</th>
</tr>
</thead>
<tbody>
<tr>
<td>The length of line segment $RT$</td>
<td>10</td>
</tr>
</tbody>
</table>

- Quantity A is greater.
- Quantity B is greater.
- The two quantities are equal.
- The relationship cannot be determined from the information given.
Multiple-choice Questions—Select One Answer Choice

This question has five answer choices. Select the best **one** of the answer choices given.

6. A construction company will produce identical metal supports in the shape of a right triangle with legs of length 3 feet and 4 feet. The three sides of each triangular support are to be constructed of metal stripping. If the company has a total of 6,000 feet of metal stripping and there is no waste of material in the construction of the supports, what is the greatest possible number of supports that the company can produce?

   - A  428
   - B  500
   - C  545
   - D  600
   - E  1,000
This question has five answer choices. Select the best one of the answer choices given.

7. What is the area of triangle ABC shown above?

- A 18
- B 20
- C $12\sqrt{3}$
- D $18\sqrt{3}$
- E 36
This question has five answer choices. Select the best **one** of the answer choices given.

8. The volume $V$ of a right circular cylinder is $V = \pi r^2 h$, where $r$ is the radius of the base and $h$ is the height of the cylinder. If the volume of a right circular cylinder is $45\pi$ and its height is 5, what is the circumference of its base?

A 3
B 9
C $3\pi$
D $6\pi$
E $9\pi$
This question has five answer choices. Select the best one of the answer choices given.

9. In the figure above, if the square inscribed in the circle has an area of 16, what is the area of the shaded region?

- (A) $2\pi - 1$
- (B) $2\pi - 4$
- (C) $4\pi - 2$
- (D) $4\pi - 4$
- (E) $8\pi - 4$
This question has five answer choices. Select the best one of the answer choices given.

10. The radius of circle A is $r$, and the radius of circle $B$ is $\frac{3}{4}r$.

What is the ratio of the area of circle $A$ to the area of circle $B$?

A 1 to 4
B 3 to 4
C 4 to 3
D 9 to 16
E 16 to 9
Multiple-choice Questions—Select One or More Answer Choices

This question has eight answer choices. Select all the answer choices that apply. The correct answer to a question of this type could consist of as few as one or as many as all eight of the answer choices.

11. A flat, rectangular flower bed with an area of 2,400 square feet is bordered by a fence on three sides and by a walkway on the fourth side. If the entire length of the fence is 140 feet, which of the following could be the length, in feet, of one of the sides of the flower bed?

Indicate all such lengths.

A  20
B  30
C  40
D  50
E  60
F  70
G  80
H  90
This question has four answer choices. Select all the answer choices that apply. The correct answer to a question of this type could consist of as few as one or as many as all four of the answer choices.

12. The quadrants of the $xy$-plane are shown in the figure above. In the $xy$-plane, line $m$ (not shown) has a positive slope and a positive $x$-intercept. Line $m$ intersects which of the quadrants?

Indicate all such quadrants.

A. Quadrant I
B. Quadrant II
C. Quadrant III
D. Quadrant IV
Numeric Entry Questions

Question 13 requires a number to be entered by circling entries on a grid.

1. Your answer may be an integer, a decimal, or a fraction, and it may be negative.
2. Equivalent forms of the correct answer, such as 2.5 and 2.50, are all correct. Although fractions do not need to be reduced to lowest terms, they may need to be reduced to fit in the grid.
3. Enter the exact answer unless the question asks you to round your answer.
4. If a question asks for a fraction, the grid will have a built-in division slash (/). Otherwise, the grid will have a decimal point.
5. Start your answer in any column, space permitting. Circle no more than one entry in any column of the grid. Columns not needed should be left blank.
6. Write your answer in the boxes at the top of the grid and fill in the corresponding entries. **You will receive credit only if your grid entries are clearly marked, regardless of the number written in the boxes at the top.**
This question does not have any answer choices; it is a numeric entry question. To answer this question, enter a number by circling entries in the grid provided. The number can include a decimal point, and can be positive, negative, or zero. The number entered cannot be a fraction.

13. In the figure above, if \( \frac{r}{r + s} = \frac{5}{8} \), what is the value of \( r \)?

\[
\begin{array}{cccccccc}
- & . & . & . & . & . & . & . & . \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\
2 & 2 & 2 & 2 & 2 & 2 & 2 & 2 \\
3 & 3 & 3 & 3 & 3 & 3 & 3 & 3 \\
4 & 4 & 4 & 4 & 4 & 4 & 4 & 4 \\
5 & 5 & 5 & 5 & 5 & 5 & 5 & 5 \\
6 & 6 & 6 & 6 & 6 & 6 & 6 & 6 \\
7 & 7 & 7 & 7 & 7 & 7 & 7 & 7 \\
8 & 8 & 8 & 8 & 8 & 8 & 8 & 8 \\
9 & 9 & 9 & 9 & 9 & 9 & 9 & 9 \\
\end{array}
\]
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