# Math Diagnostic Test

**20 Questions**
**35 Minutes**

For questions in the Quantitative Comparison format ("Quantity A" and "Quantity B" given), the answer choices are always as follows:

(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.

Where answer choices do not appear on Quantitative Comparison questions in this book, you should choose A, B, C or D based on the above.

For questions followed by a numeric entry box ☐, you are to enter your own answer in the box. For questions followed by fraction-style numeric entry boxes $\frac{\square}{\square}$, you are to enter your answer in the form of a fraction. You are not required to reduce fractions. For example, if the answer is $\frac{1}{4}$, you may enter $\frac{25}{100}$ or any equivalent fraction.

All numbers used are real numbers. All figures are assumed to lie in a plane unless otherwise indicated. Geometric figures are not necessarily drawn to scale. You should assume, however, that lines that appear to be straight are actually straight, points on a line are in the order shown, and all geometric objects are in the relative positions shown. Coordinate systems, such as *xy*-planes and number lines, as well as graphical data presentations, such as bar charts, circle graphs, and line graphs, *are* drawn to scale. A symbol that appears more than once in a question has the same meaning throughout the question.

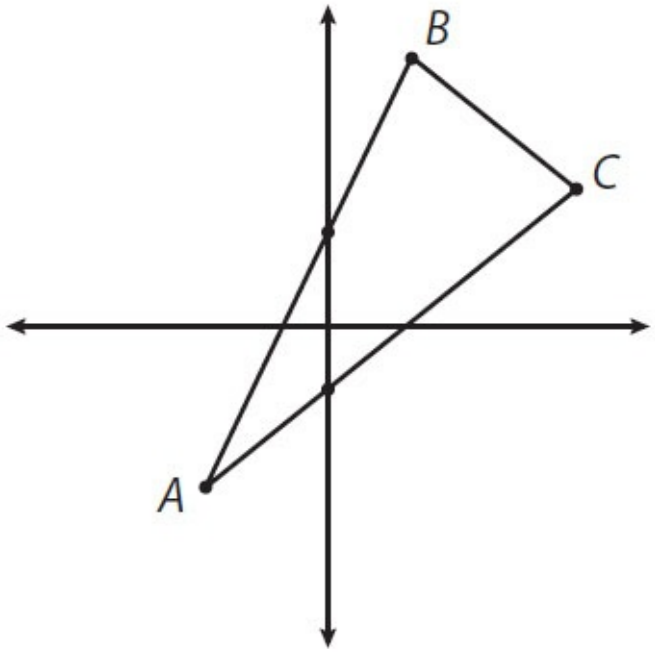
| | **Quantity A** | **Quantity B** |
|---|---|---|
| 1. | $0.0\overline{1410}$ | $0.\overline{0141}$ |

A certain bookstore sells only paperbacks and hardbacks. Each of the 200 paperbacks in stock sells for a price between \$8 and \$12, and each of the 100 hardbacks in stock sells for a price between \$14 and \$18.

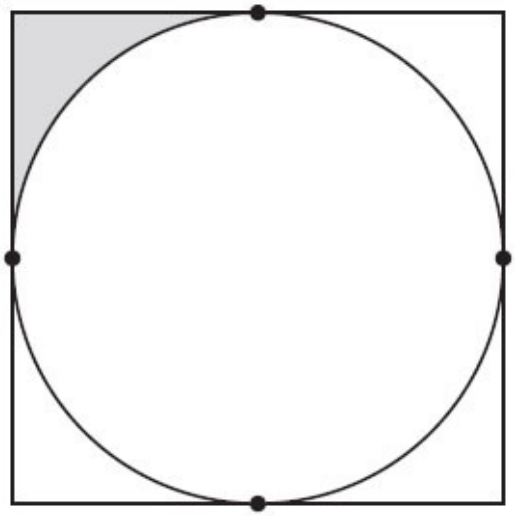
| | **Quantity A** | **Quantity B** |
|---|---|---|
| 2. | The average price of the books in stock at the bookstore | \$9.99 |

$2 < x < 4$

| | **Quantity A** | **Quantity B** |
|---|---|---|
| 3. | $\frac{x-3}{-x}$ | $\frac{3-x}{-x}$ |




| | Quantity A | Quantity B |
|---|---|---|
| 4. | The slope of line segment *AB* | The slope of line segment *AC* |



In the figure above, the circle is inscribed in a square that has area 16.

| | Quantity A | Quantity B |
|---|---|---|
| 5. | The area of the shaded region | 1 |

$a > 1$
$b > 5$

| | **Quantity A** | **Quantity B** |
|---|---|---|
| 6. | $(5b)^a$ | $(b^2)^a$ |

| | **Quantity A** | **Quantity B** |
|---|---|---|
| 7. | $(5 + a)(3 + a)$ | $a^2 + 2a + 15$ |

In triangle $ABC$, $AB = 12$, $AC = 10$, and $BC = 5$.

| | **Quantity A** | **Quantity B** |
|---|---|---|
| 8. | The measure of angle $A$ | The measure of angle $C$ |

9. If $\frac{52}{x}$ is a positive integer, how many integer values are possible for $x$?

(A) 5

(B) 6

(C) 7

(D) 8

(E) 10

10. If $3x + 6y = 69$ and $2x - y = 11$, what is the value of $y$?

11. If $7^9 + 7^9 + 7^9 + 7^9 + 7^9 + 7^9 + 7^9 = 7^x$, what is the value of $x$?

(A) 9

(B) 10

(C) 12

(D) 63

(E) $9^7$

12. In a certain election race, all of the 8,400 votes were cast for either candidate A or candidate B. If votes for candidate A and votes for candidate B were cast in a 4 to 3 ratio, how many votes were cast for candidate A?

13. What is the sum of all the integers from –457 to 459, inclusive?

14. $a^3b^4c^7 > 0$. Which of the following statements must be true?

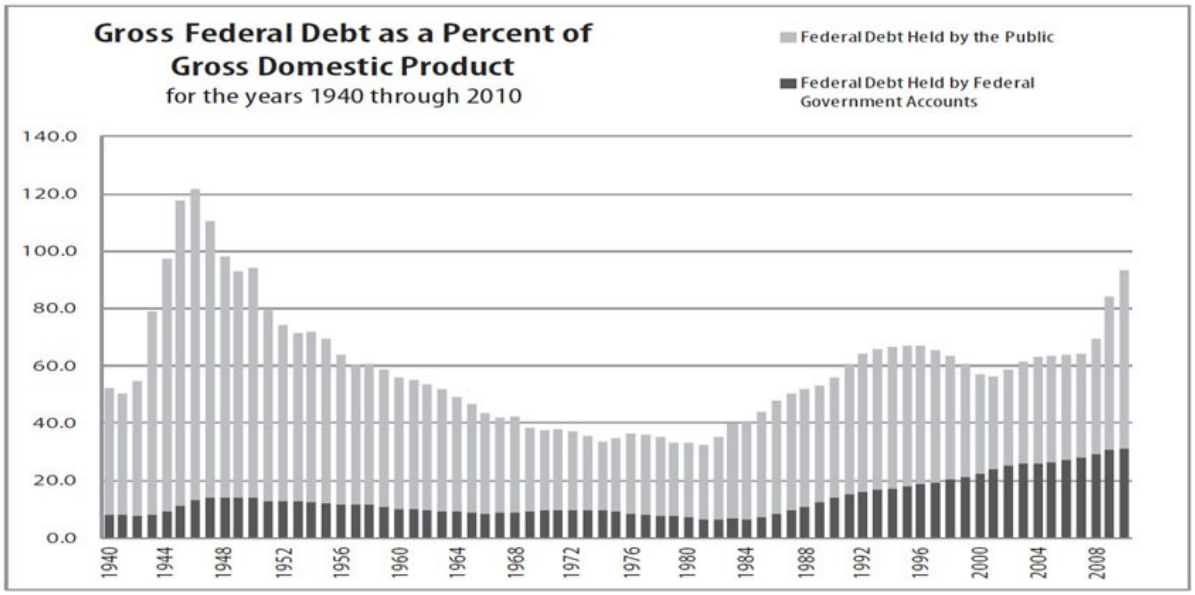
Indicate <u>all</u> such statements.

☐ $ab$ is negative.

☐ $abc$ is positive.

☐ $ac$ is positive.

**Questions 15 to 17 are based on the following chart.**




15. In how many years between 1940 and 2010, inclusive, did the gross federal debt exceed the gross domestic product?

(A) Three

(B) Four

(C) Five

(D) Six

(E) More than six

16. During which decade was federal debt held by federal government accounts closest to half of all federal debt?

(A) 1960s

(B) 1970s

(C) 1980s

(D) 1990s

(E) 2000s

17. At its highest point, what was the approximate ratio of federal debt held by the public to that held by federal government accounts?

(A) 1 : 1

(B) 2 : 1

(C) 5 : 1

(D) 8 : 1

(E) 12 : 1

18. A number $x$ is 32% of a number $y$. If $y$ is 20% of $z$, what is $z$ in terms of $x$?

(A) $0.064x$

(B) $0.64x$

(C) $6.4x$

(D) $\frac{x}{0.064}$

(E) $\frac{x}{0.64}$

19. If $S^2 > T^2$, which of the following must be true?

(A) $S > T$

(B) $S^2 > T$

(C) $ST > 0$

(D) $|S| > |T|$

(E) $ST < 0$

20. In a certain nation, every citizen is assigned an identification number consisting of the last two digits of the person's birth year, followed by five other numerical digits. For instance, a person born in 1963 could have the identification number 6344409. How many identification numbers are possible for people born in the years 1980–1982, inclusive?

(A) 360

(B) 2,880

(C) 288,800

(D) 300,000

(E) 2,400,000