

Time—30 minutes

30 Questions

- Numbers:** All numbers used are real numbers.
- Figures:** Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.
- Lines shown as straight can be assumed to be straight.
- Figures can be assumed to lie in a plane unless otherwise indicated.
- Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

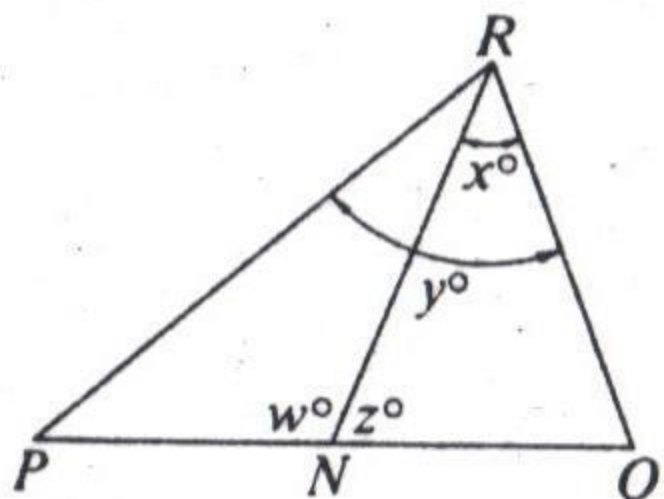

- A if the quantity in Column A is greater;
 B if the quantity in Column B is greater;
 C if the two quantities are equal;
 D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	<input checked="" type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D <input type="radio"/> E

Examples 2-4 refer to $\triangle PQR$.

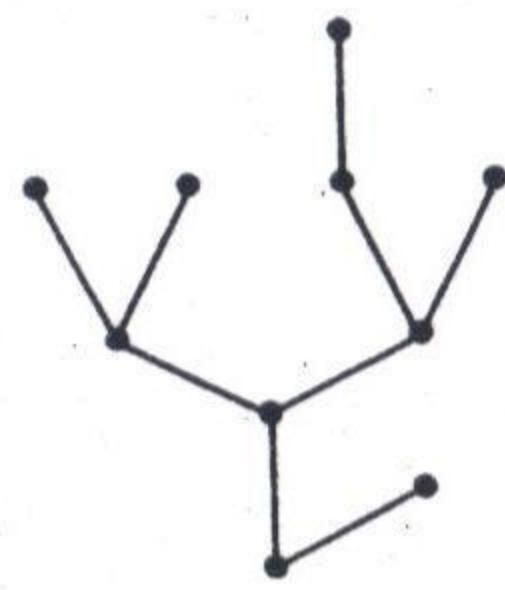


Example 2:			<input type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input checked="" type="radio"/> D <input type="radio"/> E (since equal measures cannot be assumed, even though PN and NQ appear equal)
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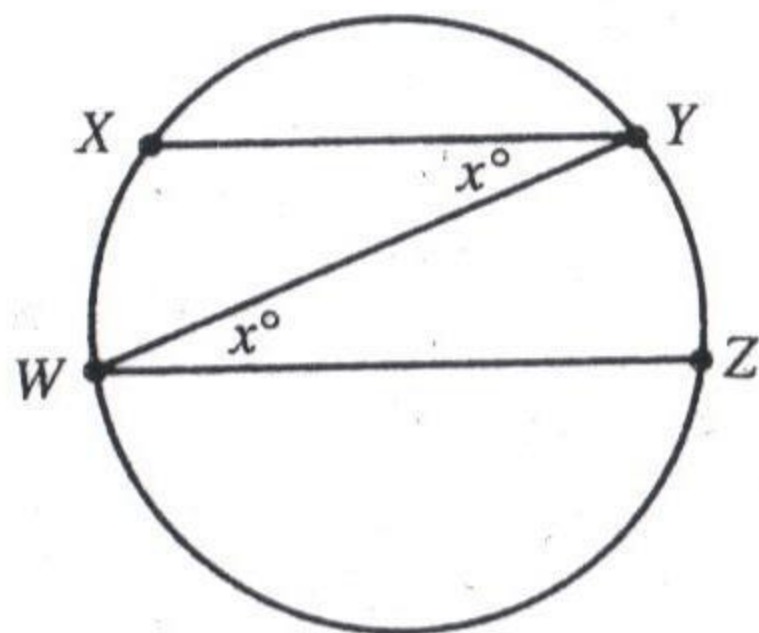
Example 3:	x	y	<input type="radio"/> A <input checked="" type="radio"/> B <input type="radio"/> C <input type="radio"/> D <input type="radio"/> E (since N is between P and Q)
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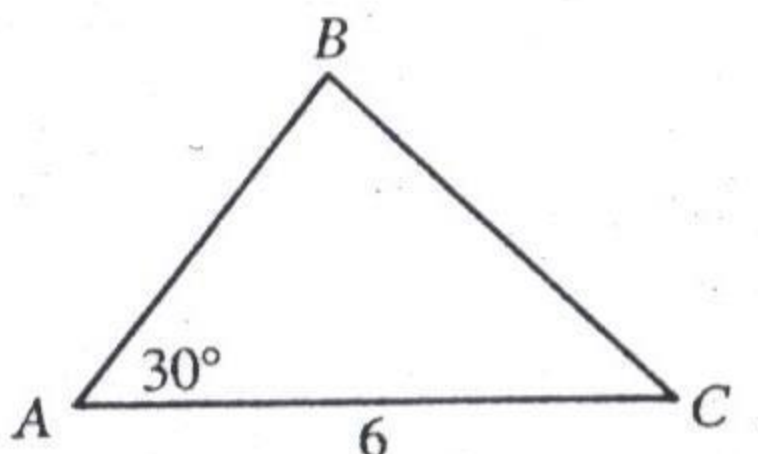
Example 4:	$w + z$	180	<input type="radio"/> A <input type="radio"/> B <input checked="" type="radio"/> C <input type="radio"/> D <input type="radio"/> E (since PQ is a straight line)
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- A if the quantity in Column A is greater;
 B if the quantity in Column B is greater;
 C if the two quantities are equal;
 D if the relationship cannot be determined from the information given.

Column A	Column B
	
Each  represents a connection and each  represents a joint.	
1. The total number of joints	The total number of connections
$y = \frac{3x}{4}$, $x = \frac{2z}{3}$, and $z = 20$.	
2. y	11

	
3. The length of minor arc WX of the circle	The length of minor arc YZ of the circle
4. 0.203×10^2	2.03×10
5. 40 percent of \$250	80 percent of \$125

Column A	Column B
	$x \neq 0$
6. $3x^2$	$(3x)^2$
7. The greatest prime factor of 15	The greatest prime factor of 14
8. The total savings on 20 gallons of gasoline purchased for \$1.169 per gallon instead of \$1.259 per gallon.	\$1.80
Three ships, X , Y , and Z , are near the equator. X is 8 miles due west of Z , and Y is 7 miles due north of Z .	
9. The distance between X and Y	9 miles
	
10. AB	BC
A retail business has determined that its net income, in terms of x , the number of items sold, is given by the expression $x^2 + x - 380$.	
11. The number of items that must be sold for the net income to be zero	10

GO ON TO THE NEXT PAGE.

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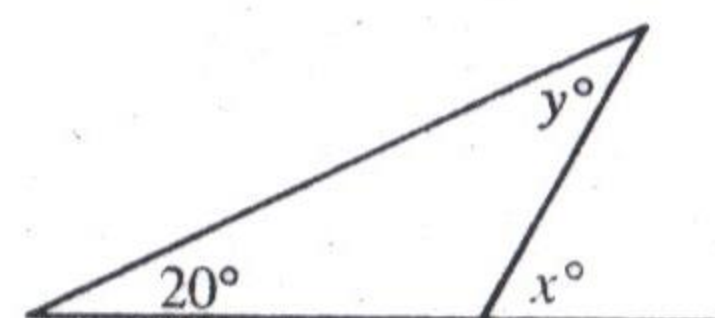
Column A

Column B

Rectangular region R has area 30.

12. The perimeter of R

25



$x < 90$

13.

y

70

Column A

Column B

$$x^2 = 16$$

$$y^3 = 64$$

14.

x

y

15.

$$\frac{2^{30} - 2^{29}}{2}$$

$$2^{28}$$

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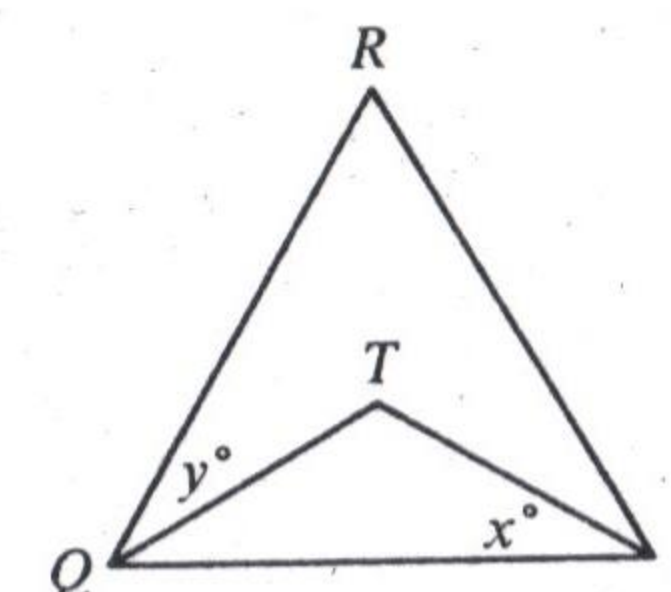
Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. A certain post office imposes a service charge of \$0.75 per order on any money order in the amount of \$25.00 or less, and \$1.00 per order on any money order in an amount from \$25.01 through \$700.00. If Dan purchases 3 money orders in the amounts of \$18.25, \$25.00, and \$127.50, what is the total service charge for his money orders?

- (A) \$1.75
 (B) \$2.25
 (C) \$2.50
 (D) \$2.75
 (E) \$3.00

17. If $\frac{1}{4}(1 - x) = \frac{1}{16}$, then $x =$

- (A) $\frac{15}{64}$
 (B) $\frac{1}{4}$
 (C) $\frac{3}{4}$
 (D) $\frac{15}{16}$
 (E) 4



Note: Figure not drawn to scale.

18. In the figure above, QRS is an equilateral triangle and QTS is an isosceles triangle. If $x = 47$, what is the value of y ?

- (A) 13
 (B) 23
 (C) 30
 (D) 47
 (E) 53

19. $\frac{m+n}{4+5} =$

- (A) $\frac{m+n}{4} + \frac{m+n}{5}$
 (B) $\frac{m+n}{9} + \frac{m+n}{9}$
 (C) $\frac{m}{5} + \frac{n}{4}$
 (D) $\frac{m}{4} + \frac{n}{5}$
 (E) $\frac{m}{9} + \frac{n}{9}$

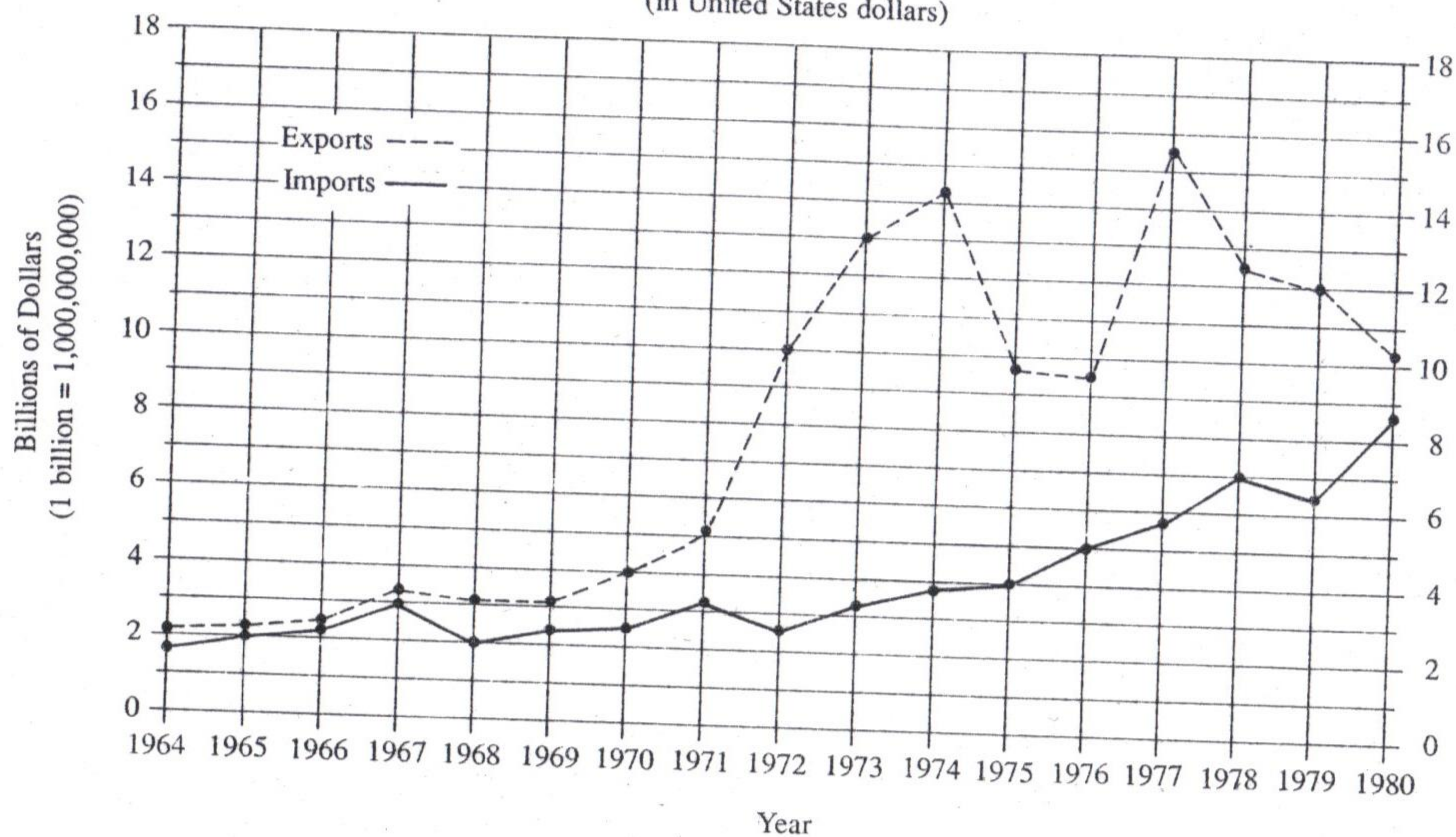
20. What is the circumference of a circle with radius 8?

- (A) $\frac{8}{\pi}$
 (B) $\frac{16}{\pi}$
 (C) 8π
 (D) 16π
 (E) 64π

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Questions 21-25 refer to the following graph.

FOREIGN TRADE OF COUNTRY X, 1964-1980
(in United States dollars)



Note: Drawn to scale.

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21. For which year shown on the graph did exports exceed the previous year's exports by the greatest dollar amount?
- (A) 1972
(B) 1973
(C) 1975
(D) 1977
(E) 1980

22. Which of the following is closest to the amount, in billions of dollars, by which the increase in exports from 1971 to 1972 exceeds the increase in exports from 1972 to 1973?
- (A) 1.9
(B) 3.9
(C) 5.0
(D) 6.1
(E) 8.0

23. In 1974 the dollar value of imports was approximately what percent of the dollar value of exports?
- (A) 4%
(B) 17%
(C) 27%
(D) 79%
(E) 367%

24. For how many years shown on the graph did exports exceed imports by more than 5 billion dollars?
- (A) Nine
(B) Seven
(C) Six
(D) Five
(E) Four

25. If it were discovered that the import dollar amount shown for 1978 was incorrect and should have been \$5.3 billion instead, then the average (arithmetic mean) import dollar amount per year for the 17 years would be how much less?
- (A) \$100 million
(B) \$53 million
(C) \$47 million
(D) \$17 million
(E) \$7 million

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26. On the number line, 1.4 is halfway between which of the following pairs of numbers?

(A) -1.4 and 2.4
(B) -1 and 2
(C) -0.3 and 3.1
(D) 0.15 and 1.55
(E) 0.4 and 1

27. If a and b are both positive even integers, which of the following must be even?

I. a^b
II. $(a + 1)^b$
III. $a^{(b + 1)}$

(A) I only
(B) II only
(C) I and II only
(D) I and III only
(E) I, II, and III

28. If t tablets cost c cents, then at this rate how many cents will 5 tablets cost?

(A) $5ct$
(B) $\frac{5c}{t}$
(C) $\frac{c}{5t}$
(D) $\frac{5t}{c}$
(E) $\frac{t}{5c}$

29. If a rectangular block that is 4 inches by 4 inches by 10 inches is placed inside a right circular cylinder of radius 3 inches and height 10 inches, the volume of the unoccupied portion of the cylinder is how many cubic inches?

(A) $6\pi - 16$
(B) $9\pi - 16$
(C) $160 - 30\pi$
(D) $60\pi - 160$
(E) $90\pi - 160$

$$\begin{aligned}x - y + z &= 0 \\2x + y + 3z &= 0\end{aligned}$$

30. In the system of equations above, if $z \neq 0$, then the ratio of x to z is

(A) $-\frac{2}{1}$
(B) $-\frac{4}{3}$
(C) $-\frac{1}{2}$
(D) $\frac{3}{4}$
(E) $\frac{4}{3}$