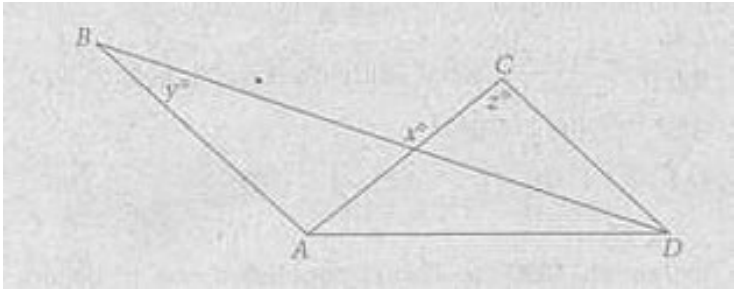
MATHEMATICS LEVEL IC

1.

A band wants to distribute its music on compact discs (CD's). The equipment to produce the CD's costs $ 250, and blank CD's cost $ 5.90 for a package of 10. Which of the following represents the total cost, in dollars, to produce *n* CD's, where *n* is a multiple of 10?

(A) (250 + 0.59)*n*
(B) 250 + 0.59*n*
(C) (250 + 5.90)*n*
(D) 250 + 5.90*n*
(E) 250*n* + 5.90

2.



In the figure above, $\overline{AB}$ and $\overline{CD}$ are parallel. What is *x* in terms of *y* and *z?*

(A) y + z
(B) 2y + z
(C) 2y - z
(D) 180 - y - z
(E) 180 + y - z

3.

If $\log_c a = x$, which of the following must be true?
(A) $a^c = x$
(B) $a^x = c$
(C) $c^a = x$
(D) $c^x = a$
(E) $x^c = a$

4.

A number *n* is increased by 8. If the cube root of that result equals - 0.5, what is the value of *n*?

(A) - 15.625
(B) - 8.794
(C) - 8.125
(D) - 7.875
(E) 421.875

5.

If *a* and *b* are real numbers, $i^2 = -1$, and $(a + b) + 5i = 9 + 5i$, what is the value of *b?*

(A) 4
(B) 5
(C) 9
(D) 4+5i
(E) 5+4i

6.

What are all values of *x* for which $4 - x^2 \geq x - 2$?

(A) $x \geq -3$
(B) $-5 \leq x \leq 0$
(C) $-3 \leq x \leq 2$
(D) $x \leq -3$ or $x \geq 2$
(E) $-2 \leq x \leq 3$

7.

If f(x)= x + 3 and *g(x)* = $\frac{x^2 - 9}{x - 3}$, how are the graphs of *f* and *g* related?

(A) They are exactly the same.
(B) They are the same except when $x = 3$.
(C) They are the same except when $x = -3$.
(D) They have the same shape but only a finite number of points in common.
(E) They have no points in common.

8.

If line ℓ is the perpendicular bisector of the line segment with endpoints (2,0) and (0, - 2), what is the slope of line ℓ ?

(A) 2
(B) 1
(C) 0
(D) - 1
(E) - 2

9.

Twenty students have each sampled one or more of three kinds of candy bars that a school store sells. If 3 students have sampled all three kinds, and 5 have sampled exactly two kinds, how many of these students have sampled only one kind?

(A) 8
(B) 12
(C) 15
(D) 17
(E) 18

10.

If the measure of one angle of a rhombus is 60°, then the ratio of the length of its longer diagonal to the length of its shorter diagonal is

(A) 2
(B) $\sqrt{3}$
(C) $\sqrt{2}$
(D) $\frac{\sqrt{3}}{2}$
(E) $\frac{\sqrt{2}}{2}$

11.

In a certain community, 70 percent of the families reported household incomes equal to or greater than $25,000 per year. Which of the following must be greater than or equal to $25,000?

I. The mean income
II. The mode of the incomes
III. The median income

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

12.

The front, side, and bottom faces of a rectangular solid have areas of 24 square centimeters, 8 square centimeters, and 3 square centimeters, respectively. What is the volume of the solid, in cubic centimeters?

(A) 24
(B) 96
(C) 192
(D) 288
(E) 576

13.

If $f(x) = x^4 - 3x^3 - 9x^2 + 4$, for how many real numbers k does $f(k) = 2$?

(A) None.
(B) One.
(C) Two.
(D) Three.
(E) Four.