1

If d > 0 and 0 < 1 - c/d < 1, which of the following must be true?

I. c > 0
II. c/d < 1
III. c^2 + d^2 > 1

A. I only
B. II only
C. I and II only
D. II and III only
E. I, II and III

2

If 4x-12 >= x + 9, which of the following must be true

A. x > 6
B. x < 7
C. x > 7
D. x > 8
E. x < 8

3

Which of the following must be true if the square root of X is a positive integer?

I. X has an even number of distinct factors.
II. X has an odd number of distinct factors.
III. The sum of X's distinct factors is odd.

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

4

If 4<(7-x)/3, which of the following must be true?

I. 5<x
II. |x+3|>2
III. -(x+5) is positive

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

5

Stephanie, Regine, and Brian ran a 20 mile race. Stephanie and Regine's combined times exceeded Brian's time by exactly 2 hours. If nobody ran faster than 8 miles per hour, who could have won the race?

I. Stephanie
II. Regine
III. Brian

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

6

If x, a, and b are positive integers such that when x is divided by a, the remainder is b and when x is divided by b, the remainder is a-2, then which of the following must be true?

A. a is even
B. x+b is divisible by a
C. x-1 is divisible by a
D. b=a-1
E. a+2=b+1

7

The ratio of cupcakes to children at a particular birthday party is 104 to 7. Each child at the birthday party eats exactly x cupcakes (where x is a positive integer) and the adults attending the birthday party do not eat anything. If the number of cupcakes that remain uneaten is less than the number of children at the birthday party, what must be true about the number of uneaten cupcakes?

I. It is a multiple of 2.
II. It is a multiple of 3.
III. It is a multiple of 7.

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

8

If a and b are positive integers such that a – b and a/b are both even integers, which of the following must be an odd integer?

A. a/2
B. b/2
C. (a+b)/2
D. (a + 2)/2
E. (b+2)/2

9

If x is the average (arithmetic mean) of 5 consecutive even integers, which of the following must be true?

I. x is an even integer.
II. x is a nonzero integer.
III. x is a multiple of 5.

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

10

If y=−m^2, which of the following must be true?

I. y is negative.
II. m is non-negative.
III. If m is negative then y is negative.

A. I only
B. II only
C. III only
D. I and II only
E. II and III only

11

If a and b are different positive integers and $a + b = a(a + b)$, then which of the following must be true?

I. $a = 1$
II. $b = 1$
III. $a < b$

A. I only
B. II only
C. III only
D. I and II
E. I and III