Quant Session 2 – Numbers / Inequalities / Absolute Values (Modulus) / General Algebra

(This is the most important topic for GMAT Quant)

1. If x, y, and z are integers and xy + z is an odd integer, is x an even integer?
(1) xy + xz is an even integer (2) y + xz is an odd integer

2. If w, x, y and z are integers such that w/x and y/z are integers, is w/x + y/z odd?
(1) wx + yz is odd (2) wz + yx is odd

3. The integers m and p are such that 2 < m < p, and m is not a factor of p. If r is the remainder when p is divided by m, is r > 1?
(1) the greatest common factor of m and p is 2 (2) the least common multiple of m and p is 30

4. If the integer n is greater than 1, is n equal to 2?
(1) n has exactly two positive factors (2) The difference between any two distinct positive factors is odd.

5. The function f is defined for all positive integers n by the following rule: f(n) is the number of positive integers each of which is less than n and also has no positive factor in common with n other than 1. If p is a prime number then f(p) = ?
p – 1 p – 2 (p + 1) / 2 (p – 1) / 2 2

6. For every positive even integer n, the function h(n) is defined to be the product of all the even integers from 2 to n, inclusive. If p is the smallest prime factor of h(100) + 1, then p is
A. between 2 and 10 B. between 10 and 20 C. between 20 and 30
D. between 30 and 40 E. greater than 40

7. Is the integer n odd?
(1) n is divisible by 3 (2) 2n is divisible by twice as many positive integers as n

8. If d is a positive integer, f is the product of the first 30 positive integers, what is the value of d?
(1) 10^d is a factor of f (2) d > 6

9. The product of the units digit, the tens digit, and the hundreds digit of the positive integer *m* is 96. What is the unit's digit of *m*?
(1) *m* is odd (2) The hundreds digit of *m* is 8

10. How many different prime numbers are factors of the positive integer n?
(1) four different prime numbers are factors of 2n
(2) four different prime numbers are factors of n^2.

11. Does the integer k have a factor p such that 1 < p < k?
(1) k > 4! (2) 13! + 2 ≤ k ≤ 13! + 13.

12. The positive integer k has exactly two positive prime factors, 3 and 7. If K has a total of 6 positive factors, including 1 and k, what is the value of K?
(1) 3^2 is a factor of k (2) 7^2 is NOT a factor of k

13. If n and t are positive integers, what is the greatest prime factor of the product nt?
(1) The greatest common factor of n and t is 5.
(2) The least common multiple of n and t is 105.

14. If t is a positive integer and r is the remainder when $t^2 + 5t + 6$ is divided by 7, what is the value of r?
(1) when t is divided by 7, the remainder is 6 (2) when t^2 is divided by 7, the remainder is 1

15. If p is a positive odd integer, what is the remainder when p is divided by 4?
(1) When p is divided by 8, the remainder is 5.
(2) p is the sum of the squares of two positive integers.

16. If p, x, and y are positive integers, y is odd, and $p = x^2 + y^2$, is x divisible by 4?
(1) When p is divided by 8, the remainder is 5. (2) $x - y = 3$.

17. If n and m are positive integers, what is the remainder when $3^{4n+2} + m$ is divided by 10?
(1) $n = 2$ (2) $m = 1$

18. If n is a positive integer and r is the remainder when $(n - 1)(n + 1)$ is divided by 24, what is the value of r?
(1) n is not divisible by 2 (2) n is not divisible by 3

19. If N is a positive integer, is $(N^3 - N)$ divisible by 4?
(1) $n = 2k + 1$, where K is an integer. (2) $n^2 + n$ is divisible by 6

20. If m and r are two numbers on a number line, what is the value of r?
(1) The distance between r and 0 is 3 times the distance between m and 0
(2) 12 is halfway between m and r

21. On the number line shown, is zero halfway between r and s? ——r——s——t——
(1) s is right to the zero
(2) the distance between t and r is the same as the distance between t and (–s)

22. If s and t are two different numbers on the number line, is $s + t = 0$?
(1) The distance between s and 0 is the same as the distance between t and 0
(2) 0 is between s and t

23. If each term in the sum *a1 + a2+… an* is either 7 or 77 and the sum equals 350, which of the following cold be the value of n?
38 39 40 41 42

24. $2 + 2 + 2^2 + 2^3 + 2^4 + 2^5 + 2^6 + 2^7 + 2^8$?
2^9 2^{10} 2^{16} 2^{35} 2^{37}

25. A certain list contains several different integers. Is the product of the integers in the list positive?
(1) The product of the greatest and the smallest of the integers in the list is positive
(2) There is an even number of integers in the list

26. If there are more than two numbers in a certain list, is each of the numbers in the list equal to 0?
(1) The product of any two numbers in the list is equal to 0.
(2) The sum of any two numbers in the list is equal to 0.

27. If the operation ^ is one of the four arithmetic operations addition, subtraction, multiplication, and division, is $(6 \text{ ^ } 2) \text{ ^ } 4 = 6 \text{ ^ } (2 \text{ ^ } 4)$?
(1) $3 \text{ ^ } 2 > 3$ (2) $3 \text{ ^ } 1 = 3$

28. If n and P are integers, is $p > 0$? (1) $n + 1 > 0$ (2) $np > 0$

29. Is $x^4 + y^4 > z^4$? (1) $x^2 + y^2 > z^2$ (2) $x + y > z$

30. A certain jar contains only "b" black marbles, "w" white marbles and "r" red marbles. If one marble is to be chosen at random from the jar, is the probability that the marble chosen is red greater than the probability that the marble chosen will be white?
(1) $r / (b + w) > w / (b + r)$ (2) $b - w > r$

31. If X and Y are positive, which of the following must be greater than $1 / \sqrt{(x + y)}$?
I. $[\sqrt{(X+Y)}] / 2x$ II. $[(\sqrt{X}) + (\sqrt{Y})] / (x + y)$ III. $[(\sqrt{X}) - (\sqrt{Y})] / (x + y)$
A. None B. I only C. II only D. I & III E. II & III

32. If $y \geq 0$, what is the value of x? (1) $|x - 3| \geq y$ (2) $|x - 3| \leq -y$

33. Is $|x| = y - z$? (1) $x + y = z$ (2) $x < 0$

34. If $m > 0$ and $n > 0$, is $(m + x) / (n + x) > m / n$? (1) $m < n$ (2) $x > 0$

35. If x is positive which of the following could be correct ordering of 1/x, 2x, x^2?
I. $x^2 < 2x < 1/x$ II. $x^2 < 1/x < 2x$ III. $2x < x^2 < 1/x$
A. None B. I Only C. III Only D. I and II only E. I, II & III

36. If x is not equal to –y, is $(x - y) / (x + y) > 1$? (1) $x > 0$ (2) $y < 0$

37. If k is not equal to 0, 1, or –1, is $1/k > 0$? (1) $1 / (k - 1) > 0$ (2) $1 / (k + 1) > 0$

38. If $w + x < 0$, is $w - y > 0$? (1) $x + y < 0$ (2) $y < x < w$

39. If $x < 0$, then $\sqrt{(-x \times |x|)}$ is
A. –x B. –1 C. 1 D. x E. $\sqrt{x}$

40. Is $\sqrt{[(x-5)^2]} = 5-x$? (1) $-x|x| > 0$ (2) $5 - x > 0$

41. Is $\sqrt{[(x-3)^2]} = 3-x$? (1) $x \neq 3$ (2) $-x|x| > 0$

42. Is $1 / (a-b) < (b-a)$? (1) $a < b$ (2) $1 < |a-b|$

43. Is $|x| < 1$? (1) $|x + 1| = 2|x - 1|$ (2) $|x - 3| > 0$

44. If $x > y^2 > Z^4$, which of the following statements could be true?
I. $x > y > z$ II. $z > y > x$ III. $x > z > y$
A. I only B. I and II only C. I and III only D. II and III only E. I, II, and III

45. If p, q, r, and s are consecutive integers, with $p < q < r < s$, is $pr < qs$?
(1) $pq < rs$ (2) $ps < qr$

46. If y is an integer and $y = |x| + x$, is y=0? (1) $x < 0$ (2) $y < 1$

47. Is $M + Z > 0$ (1) $M - 3Z > 0$ (2) $4Z - M > 0$

48. If $zy < xy < 0$, is $|x - z| + |x| = |z|$ (1) $z < x$ (2) $y > 0$

49. If $Z^n = 1$, what is the value of Z? (1) n is a non zero integer (2) $Z > 0$

50. If $a < y < z < b$, is $|y - a| < |y - b|$? (1) $|z - a| < |z - b|$ (2) $|y - a| < |z - b|$

51. The numbers x and y are not integers. The value of x is closest to which integer?
(1) 4 is the integer that is closest to $x + y$ (2) 1 is the integer that is closest to $x - y$

52. Are positive integers P and Q both greater than N?
(1) P – Q is greater than N (2) Q > P

53. Is Z an integer? (1) Z^3 is an integer (2) 3Z is an integer

54. Are x and y both positive (1) $2x - 2y = 1$ (2) $x/y > 1$

55. Is $mx + ky > kx + my$? (1) $m > k$ (2) $x > y$

56. If 500 is the multiple of 100 that is closest to X and 400 is the multiple of 100 closest to Y, then which multiple of 100 closest to X + Y?
(1) X < 500 (2) Y < 400

57. Is $w > 1$? (1) $w + 2 > 0$ (2) $w^2 > 1$

58. $1 / p > [r / (r^2 + 2)]$ (1) $p = r$ (2) $r > 0$

59. Is $X + Y < 1$? (1) $X < 8 / 9$ (2) $Y < 1 / 8$

60. If *a* and *b* are distinct integers and their product is not equal to zero, is $a > b$?
(1) $(a^3b - b^3a)/(a^3b + b^3a - 2a^2b^2) < 0$ (2) $b < 0$

61. If m, r, x, and y are positive, is the ratio of m to r equal to the ratio of x to y?
(1) The ratio of m to y is equal to the ratio of x to r
(2) The ratio of m + x to r + y is equal to the ratio of x to y

62. If $-2x > 3y$, is x negative? (1) $y > 0$ (2) $2x + 5y - 20 = 0$

63. If $a + b = 200$ and $a < b$, is $a + b > c + d$? (1) $c + d < 200$ (2) $b + c + d = 300$

64. If $0 < r < 1 < s < 2$, which one is less than 1
I. r/s II. rs III. s – r
I only II only III only I & II I & III

65. Did one of the three members of a certain team sell at least 2 raffle tickets yesterday?
(1) The three members sold a total of 6 raffle tickets yesterday
(2) No two of the members sold the same number of raffle tickets yesterday

66. If $z \times t < -3$, is $z < 4$? (1) $z < 9$ (2) $t < -4$

67. If a, b, c are integers such that $b > a$, is $b + c > a$? (1) $c > a$ (2) $abc > 0$

68. Is $|x - y| > |x| - |y|$? (1) $y < x$ (2) $xy < 0$

69. Is $x - y + 1$ greater than $x + y - 1$? (1) $x > 0$ (2) $y < 0$

70. If x and y are integers and $x > 0$, is $y > 0$? (1) $7x - 2y > 0$ (2) $-y < x$

71. Is z the median of any 3 positive integers x, y and z? (1) $x < y + z$ (2) $y = z$

72. On the number line, the distance between x and y is greater than the distance between x and z. Does z lie between x and y on the number line?
(1) $xyz < 0$ (2) $xy < 0$

73. One kilogram of a certain coffee brand consists of x kilograms of Type I coffee and y kilograms of Type II coffee. The cost of the brand is C dollars per kilogram, where $C = 6.5x + 8.5y$. Is $x < 0.8$?
(1) $y \geq 0.15$ (2) $C \geq 7.30$

74. If $mv < pv < 0$, is $v > 0$? (1) $m < p$ (2) $m < 0$

75. If x is not equal to 0, then $\sqrt{[(x)^2]} / x = ?$
–1 0 1 x |x| / x