Basic Math and Algebra Practice

30 Minutes – (Don't skip any questions)

1) If $a + 2(x + 1) = s$, what is $x + 1$, in terms of s and a?

   A. $\frac{s}{2a}$ B. $\frac{s-a}{2}$ C. $\frac{s+a}{2}$ D. $\frac{s}{2} - a$ E. $\frac{s}{2} + a$

2) At a bottling company, machine A fills a bottle with spring water and machine B accepts the bottle only if the number of fluid ounces is between $11\frac{7}{8}$ and $12\frac{1}{8}$. If machine B accepts a bottle containing n fluid ounces, which of the following describes all possible values of n?

   A. $|n - 12| = 1/8$ B. $|n + 12| = 1/8$ C. $|n - 12| < 1/8$ D. $|n + 12| < 1/8$ E. $|n - 12| > 1/8$

3) The least integer of a set of consecutive integers is -25. If the sum of these integers is 26, how many integers are in this set?

   A. 25   B. 26   C. 50   D. 51   E. 52

4) Dwayne has a newspaper route for which he collects k dollars each day. From this amount he pays out $\frac{k}{3}$ dollars per day for the cost of the papers, and he saves the rest of the money. In terms of k, how many days will it take Dwayne to save \$1000?

   A. $k/1500$ B. $k/1000$ C. $1000/k$ D. $1500/k$ E. $1500k$

5) Let the operations @ and # be defined for all real numbers a and b as follows:
   $a@b = a + 3b$ and $a\#b = a + 4b$
   If $4@(5y) = (5y)\#4$, what is the value of y?

   A. $1\frac{1}{2}$ B. $1\frac{1}{5}$ C. $1\frac{1}{3}$ D. $1\frac{1}{4}$ E. $1\frac{1}{6}$

6) If $(a + b)^{\frac{1}{2}} = (a - b)^{-\frac{1}{2}}$, which of the following must be true?
   A. $b = 0$ B. $a + b = 1$ C. $a - b = 1$ D. $a^2 + b^2 = 1$ E. $a^2 - b^2 = 1$

7) If $2x < y < 0$, which of the following is the greatest?
   A. $-2x$ B. $-(2x + y)$ C. $2x$ D. 0 E. $-y$

8) Set X has x members and set Y has y members. Set Z consists of all members that are in either set X or set Y with the exception of the k common members ($k > 0$). Which of the following represents the number of members in set Z?

A. $x + y + k$ B. $x + y - k$ C. $x + y + 2k$ D. $x + y - 2k$ E. $2x + 2y - 2k$

9) If m is the greatest prime factor of 38 and n is the greatest prime factor of 100, what is the value of $m + n$?

A. 7   B. 12   C. 24   D. 29   E. 44

10) Let the operation @ be defined by $a@b = \frac{a+b}{a-b}$ for all numbers a and b, where $a \neq b$. If $1@2 = 2@x$, what is x?

A. 4   B. 3   C. 2   D. 1   E. 0

11) During a sale, a customer can buy one shirt for x dollars. Each additional shirt he/she buys costs z dollars less than the first shirt. For example, the cost of the second shirt is $x - z$ dollars. Which of the following represents the customer's cost, in dollars, for n shirts bought during this sale?

A. $x + (n - 1)(x - z)$
B. $x + n(x - z)$
C. $n(x - z)$
D. $\frac{x+(x-z)}{n}$
E. $(x - z) + \frac{x-z}{n}$

12) $18\sqrt{18} = r\sqrt{t}$, where r and t are positive integers and $r > t$, which of the following could be the value of rt?

A. 18   B. 36   C. 108   D. 162   E. 324

13) A merchant sells three types of clocks that chime as indicated by the ~ sign in the table below. What is the total number of chimes of the inventory of clocks in the 90-minute period from $7:15$ to $8:45$?

INVENTORY OF CLOCKS AND FREQUENCY OF CHIMES

	No. of Clocks	Chimes n times on the nth hour	Chimes once on the hour	Chimes once on the half hour
Type A	10	~		~
Type B	5	~		
Type C	3		~	~

A. 31   B. 58   C. 149   D. 200   E. 209

14) If x is an integer greater than 1 and if $y = x + \frac{1}{x}$, which of the following must be true?

    I. $x \neq y$ II. y is an integer   III. $yx > x^2$

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

15) When the number w is multiplied by 4, the result is the same as when 4 is added to w. What is the value of $3w$?

  A. 3/4   B. 1   C. 4/3   D. 3   E. 4

16) Today Al is 3 times as old as Pat. In 13 years; Al will be one year less than twice as old as Pat will be then. How many years old is Al today?

  A. 12   B. 33   C. 36   D. 42   E. 49

17) When the integer n is divided by 17, the quotient is x and the remainder is 5. When n is divided by 23, the quotient is y and the remainder is 14. Which of the following is true?

  A. $23x + 17y = 19$
  B. $17x - 23y = 9$
  C. $17x + 23x = 19$
  D. $14x + 5y = 6$
  E. $5x - 14y = -6$

18) Positive integers x, y and z satisfy the equations $x^{-\frac{1}{2}} = \frac{1}{3}$ and $y^z = 16$. If $z > y$, what is the value of $x + z$?

  A. 5   B. 7   C. 11   D. 13   E. 15