Practice Set 5

1. If $p = -2$ and $q = 3$, then $p^3q^2 + p^2q =$
   (A) -84
   (B) -60
   (C) 36
   (D) 60
   (E) 84

2. If a is negative, which of the following must also be negative?

   (A) $a + 2$
   (B) a^2
   (C) $(-a)^2$
   (D) $a - 2$
   (E) $(-a)^3$

3. What is the value of $x^2 - 2x$ when $x = -2$?

   (A) -8
   (B) -4
   (C) 0
   (D) 4
   (E) 8

4. If $5 - 2x = 15$, then $x =$

   (A) -10
   (B) -1
   (C) 1
   (D) 5
   (E) 10

5. Ed is faster than Dave but slower than Chuck. Fred is faster than Dave, but slower than Ed. Which is the correct order for their speeds, from least to greatest?

   (A) Chuck, Ed, Fred, Dave
   (B) Chuck, Fred, Ed, Dave
   (C) Chuck, Dave, Ed, Fred
   (D) Dave, Fred, Ed, Chuck
   (E) Dave, Ed, Fred, Chuck

6. If n is an odd number, which of the following must be even?

(A) $\dfrac{n+1}{2}$

(B) $\dfrac{n-1}{2}$

(C) $n^2 + 2n$

(D) $2n + 2$

(E) $3n^2 - 2n$

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7. What is the average (arithmetic mean) of n, $n +1$, $n + 2$, and $n +3$?

(A) $n + 1$

(B) $n + 1\dfrac{1}{2}$

(C) $n + 2$

(D) $n + 2\dfrac{1}{2}$

(E) $n + 6$

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8. If $2^{x+1} = 16$, what is the value of x?

(A) 2
(B) 3
(C) 4
(D) 5
(E) 6

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9. $(a^2 + b)^2 - (a^2 - b)^2 =$

(A) $-4a^2b$
(B) 0
(C) $(2ab)^2$
(D) $4a^2b$
(E) b^2

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10. If $gh > 0$, which of the following must be true?

(A) $\dfrac{g}{h} > 0$

(B) $\dfrac{h}{g} < 0$

(C) $g + h > 0$
(D) $g - h > 0$
(E) $g + h < 0$

11. What is the average (arithmetic mean) of $2x + 5$, $5x - 6$, and $-4x + 2$?

    (A) $x + \dfrac{1}{3}$

    (B) $x + 1$

    (C) $3x + \dfrac{1}{3}$

    (D) $3x + 3$

    (E) $3x + 3\dfrac{1}{3}$

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12. If $x - 1$ is a multiple of 3, which of the following must be the next greater multiple of 3?

    (A) x
    (B) $x + 2$
    (C) $x + 3$
    (D) $3x$
    (E) $3x - 3$

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13. If r and s are positive, then r is how much greater than $r - s$?

    (A) $r + s$
    (B) $r - s$
    (C) s
    (D) r
    (E) $-s$

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14. In a certain building, there are 10 floors and the number of rooms on each floor is R. If each room has exactly C chairs, which of the following gives the total number of chairs in the building?

    (A) $10R + C$
    (B) $10R + 10C$
    (C) $\dfrac{10}{RC}$
    (D) $10RC$
    (E) $100RC$

15. If $r \neq -s$ and $a = \dfrac{r-s}{r+s}$, then $a + 1 =$

(A) $\dfrac{2r}{r+s}$

(B) $\dfrac{r-s+1}{r+s}$

(C) $\dfrac{2r-2s}{r+s}$

(D) $\dfrac{2s}{r+s}$

(E) $\dfrac{1-r+s}{r+s}$

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16. If $2(2^a) = 8^4$, then $a =$

(A) 6
(B) 8
(C) 9
(D) 10
(E) 11

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17. A college class is made up of f freshman and s sophomores. If 5 freshman drop this class, the number of sophomores in the class is 3 times the number of freshman. Which of the following equations represents s in terms of f?

(A) $s = \dfrac{f-5}{3}$

(B) $s = \dfrac{f+5}{3}$

(C) $s = 3(f-5)$
(D) $s = 3(f+5)$
(E) $s = 5(f-3)$

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18. If $x = 9a^2$ and $a > 0$, then $\sqrt{x} =$

(A) $-3a$
(B) $3a$
(C) $9a$
(D) $3a^2$
(E) $81a^4$

19. If a tree grew 5 feet in n years, what was the average rate, in inches per year, at which the tree grew during those years?

(A) $60n$

(B) $\dfrac{5}{n}$

(C) $\dfrac{5}{12n}$

(D) $\dfrac{12n}{5}$

(E) $\dfrac{60}{n}$

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20. What is the set of all values of x for which $x^2 - 3x - 18 = 0$?

(A) $\{-6\}$
(B) $\{-3\}$
(C) $\{-3, 6\}$
(D) $\{3, 6\}$
(E) $\{2, 6\}$

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21. If $n > 4$, which of the following is equivalent to $\dfrac{n - 4\sqrt{n} + 4}{\sqrt{n} - 2}$?

(A) $\sqrt{n}$
(B) $2\sqrt{n}$
(C) $\sqrt{n} + 2$
(D) $\sqrt{n} - 2$
(E) $n + \sqrt{n}$

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22. If a and b are integers, and if $-a > b$, which of the following must be true?

    I. $ab < 0$
    II. $-a < -b$
    III. $a > -b$

(A) None
(B) I only
(C) II only
(D) III only
(E) I and III

23. If $\sqrt{a} + \sqrt{b} = 12$, and a and b are integers, then $a + b$ could equal all of the following except

   (A) 144
   (B) 108
   (C) 90
   (D) 80
   (E) 72

24. If N is the square of a positive integer, which of the following must be equal to the square of the next greater integer?

   (A) $\sqrt{N+1}$
   (B) $N+1$
   (C) N^2+1
   (D) N^2+2N+1
   (E) $N + 2\sqrt{N} + 1$

25. The lengths of two sides of a triangle are $(x-2)$ and $(x+2)$, where $x > 2$. Which of the following ranges includes all and only the possible values of the third side y?
   (A) $0 < y < x$
   (B) $0 < y < 2x$
   (C) $2 < y < x$
   (D) $4 < y < x$
   (E) $4 < y < 2x$