Comprehensive Fundamentals Drill

The answers can be found in Part IV.

1. $\dfrac{\sqrt[3]{\sqrt{3}+4(2+\sqrt[3]{5})}}{\sqrt{49+3(2+9)}} =$

   (A) 0.281
   (B) 0.477
   (C) 0.528
   (D) 1.223
   (E) 1.496

2. If x and y are odd integers, which of the following must be even?

   (A) $\dfrac{x}{y}$
   (B) $\dfrac{x^2y}{y}$
   (C) $\dfrac{x+y}{2}$
   (D) $x^{\frac{1}{2}}y^{\frac{1}{2}}$
   (E) $(x+1)(y-1)$

10. "The cube root of the sum of one-third m and n is the cube of one-third of the sum of m and n" is equivalent to which of the following?

    (A) $\dfrac{(m+n)^3}{3} = \sqrt[3]{\dfrac{m}{3}+n}$
    (B) $\left(\dfrac{m+n}{3}\right)^3 = \sqrt[3]{\dfrac{m}{3}+n}$
    (C) $\left(\dfrac{m+n}{3}\right)^3 = \dfrac{\sqrt[3]{m+n}}{3}$
    (D) $\dfrac{(m+n)^3}{3} = \dfrac{\sqrt[3]{m+n}}{3}$
    (E) $\left(\dfrac{m+n}{3}\right)^3 = \sqrt[3]{\dfrac{m+n}{3}}$

15. $\sqrt{x^3y^5} \bullet \sqrt[3]{x^2y} =$

    (A) $x^2y^2\sqrt[6]{xy^3}$
    (B) $x^2y^2\sqrt[6]{xy^5}$
    (C) $xy\sqrt[6]{x^2y^5}$
    (D) $xy\sqrt[5]{y}$
    (E) $x^5y^6\sqrt[5]{xy}$

18. If the average of a, b, c, d, and e is 86, the average of a, b, and c is 84, and the average of c, d, and e is 82, what is the value of c?

    (A) 68
    (B) 83
    (C) 85
    (D) 98
    (E) It cannot be determined from the information given.

20. If the surface area of cube A is x, and the surface area of cube B is $4x$, then the volume of cube B is what percent greater than the volume of cube A?

    (A) $\dfrac{x}{100}\%$
    (B) $4x\%$
    (C) 400%
    (D) 700%
    (E) 800%

23. $\dfrac{x^4+3x^3}{2x^5+6x^4}+\dfrac{x^3y+2x^2y}{2x^4y+4x^3y}=$

(A) $x+y$

(B) x

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

(D) $\dfrac{1}{2x}$

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

35. Paul buys a boat worth $4,395. Every year, the boat loses 10% of its value. If x is an integer, what is the least value of x for which the boat is worth less than $2,000 after x years?

(A) 1
(B) 5
(C) 7
(D) 8
(E) 9

37. If x, y, and z are consecutive negative integers, then which of the following COULD be false?

(A) $\dfrac{xyz}{2}$ is an integer.

(B) $\dfrac{xyz}{3}$ is an integer.

(C) $\dfrac{xyz}{4}$ is an integer.

(D) xyz is negative.

(E) $yz > x$

43. A gardener wishes to make 400 mL of a solution of plant food with a concentration of 45%. She will make the solution by mixing x mL of an 80% solution and y mL of a 30% solution. What is the value of x?

(A) 30
(B) 70
(C) 120
(D) 180
(E) 320

45. If x is an integer greater than 3, the average of set A which contains x elements is y, and the average of 3 elements of set A is z, then what is the average of the other elements in set A?

(A) $xy - 3z$

(B) $(xy - 3z)(x - 3)$

(C) $\dfrac{x}{y}-3z$

(D) $\dfrac{x-3z}{y}$

(E) $\dfrac{xy-3z}{x-3}$