Comprehensive Solid Geometry Drill

The answers can be found in Part IV.

24. If the volume of a cube is 100, how long is the diagonal of the cube?

    (A) 4.64
    (B) 6.56
    (C) 8.04
    (D) 10.42
    (E) 13.76

29. A rectangular solid has a length of 6, a width of 3, and a height of 4. If each dimension is decreased by 20%, what is the volume of the resulting solid?

    (A) 36.86
    (B) 46.08
    (C) 57.60
    (D) 72.00
    (E) 124.42

30. In a certain cube, the ratio of surface area (in square units) to the volume (in cubic units) is 3 to 1. What is the length of the side of the cube (in units)?
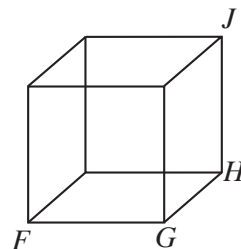
    (A) 1
    (B) 2
    (C) 3
    (D) 4
    (E) 5

34. A sphere and a cube have equal volumes. If the diameter of the sphere is 8, what is the surface area of the cube?

    (A)   6.5
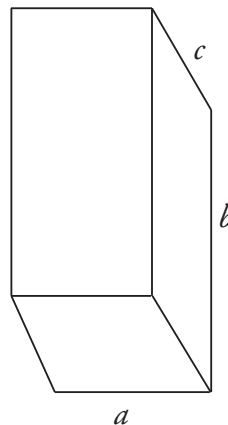   (B)   41.6
    (C) 210.6
    (D) 249.5
    (E) 268.1

38. A pyramid has a square base with an area of 16 and a height of 6. If the height were to increase by 50% and the volume of the pyramid was to remain constant, what would be the value of the side of the base?

    (A) 1.64
    (B) 3.27
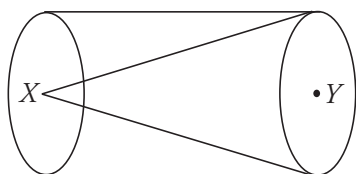   (C) 3.56
    (D) 5.65
    (E) 10.67

39. In the figure above, the cube has edge of length 4. What is the distance from vertex F to the midpoint of edge HJ ?

    (A) 2
    (B) $\sqrt{20}$
    (C) $4\sqrt{2}$
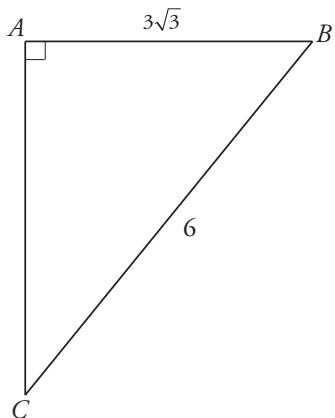   (D) 6
    (E) $\sqrt{30}$

40. In the figure above, if $a = \dfrac{1}{2}b$ and $b = 5c$, what is the volume of the rectangular solid in terms of a ?

    (A) $\dfrac{3}{4}a^3$

    (B) $\dfrac{3}{5}a^3$

    (C) $\dfrac{4}{5}a^3$

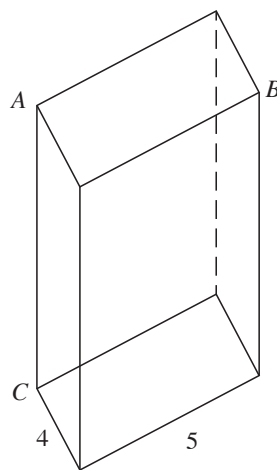   (D) a^3

    (E) $\dfrac{5}{4}a^3$

42. A right circular cone is inscribed in a right circular cylinder as shown in the figure above. *X* and *Y* are the centers of the bases. If the height of the cylinder is 4 and the radius of the base is 5, what is the volume of the cone?

(A) 51.33
(B) 83.77
(C) 104.72
(D) 251.33
(E) 314.16

43. In the figure above, if triangle *ABC* is rotated about side *AB*, what is the volume of the cone that is generated?

(A) 12.5π
(B) $9\pi\sqrt{3}$
(C) 18π
(D) 20π
(E) $18\pi\sqrt{3}$

47. In the figure above, if two sides of a rectangular solid have lengths 4 and 5 as shown, and $BC = 15$, what is the length of *AC* ?

(A) 6.4
(B) 13.6
(C) 14.2
(D) 16.0
(E) 21.4

50. A sphere has a volume of 8,000 cubic units. If a right cylinder with a diameter equal to its height is inscribed inside the sphere, then what is the volume of the cylinder?

(A) 530
(B) 3,818
(C) 4,243
(D) 13,328
(E) 35,682