Cubes – Basic

1. What is the volume of a cube with a side length of 4cm?

    a) 48
    b) 64
    c) 32
    d) 16

    Ans) b

    Explanation:

    The volume of a cube is given by s^3. For a cube with side length 4 cm, the volume is $4^3 = 64$ cm^3.

2. What is the total surface area of a cube with a side length of 3 cm?

    a) 48 cm^2
    b) 36 cm^2
    c) 54 cm^2
    d) 60 cm^2

    Ans) c

    Explanation:

    The surface area of a cube is $6s^2$. For a cube with side length 3 cm, the surface area is $6 \times 3^2 = 6 \times 9 = 54$ cm^2.

3. A cuboid has dimensions 2 cm, 3 cm, and 4 cm. What is its volume?

    a) 18 cm^2
    b) 20 cm^2
    c) 24 cm^2
    d) 30 cm^2

Ans) c

Explanation:

The volume of a cuboid is given by length × width × height. For dimensions 2 cm, 3 cm, and 4 cm, the volume is $2 \times 3 \times 4 = 24$ cm³.

4. What is the total surface area of a cuboid with dimensions 2 cm, 3 cm, and 4 cm?

   a) 48
   b) 50
   c) 56
   d) 52

Ans) d

Explanation:

The total surface area (TSA) of a cuboid is $2(lw + lh + wh)$. For dimensions 2 cm, 3 cm, and 4 cm, TSA = $2(2\times3 + 2\times4 + 3\times4) = 2(6 + 8 + 12) = 2\times26 = 52$ cm².

5. If the edge length of a cube is doubled, by what factor does its volume increase?

   a) 4 times
   b) 6 times
   c) 8 times
   d) 12 times

Ans) c

Explanation:

If each edge of a cube is doubled, its volume increases by $2^3 = 8$ times.

6. What is the length of the space diagonal of a cube with side length 5 cm?

   a) $5\sqrt{2}$ cm
   b) $5\sqrt{3}$ cm

c) $5\sqrt{5}$ cm
d) $5\sqrt{6}$ cm

Ans) b

Explanation:

The space diagonal of a cube is given by $s\sqrt{3}$. For a cube with side 5 cm, the space diagonal is $5\sqrt{3}$ cm.

7. What is the ratio of the surface area to the volume of a cube with side length s?

a) $6/s$
b) $s/6$
c) $s^2/6$
d) $6s$

Ans) a

Explanation:

The surface area of a cube is $6s^2$ and the volume is s^3, so the ratio is $6s^2/s^3 = 6/s$.

8. A cuboid has dimensions in geometric progression. If its smallest dimension is 3 cm and its volume is 216 cm^3, what is its largest dimension?

a) 8 cm
b) 12 cm
c) 16 cm
d) 18 cm

Ans) b

Explanation:

A cuboid with dimensions in geometric progression can be written as $3x$, $3xr$, and $3xr^2$. Given the smallest dimension is 3 cm and the volume is 216 cm^3: $(3x)\cdot(3xr)\cdot(3xr^2) = 27x^3r^3 = 216$, so $x^3r^3 = 8$, hence $xr = 2$. The largest dimension is $3xr^2 = 3r\cdot(xr) = 3r\cdot 2 = 6r$. Since r can be determined from x and r? However, a more

straightforward approach: Let the dimensions be 3, 3r, and $3r^2$. Then $27r^3 = 216$, so $r^3 = 8$, and r = 2. The largest dimension is $3 \cdot 2^2 = 12$ cm.

9. A cube and a cuboid have equal surface areas. If the cube has an edge of 5 cm and the cuboid has dimensions 6 cm and 4 cm for length and width respectively, what is the height of the cuboid?

    a) 5 cm
    b) 5.1 cm
    c) 4.8 cm
    d) 5.5 cm

    Ans) b

    Explanation:

    A cube with an edge of 5 cm has a surface area of $6 \times 5^2 = 150$ cm^2. The cuboid's surface area is $2(6 \times 4 + 6h + 4h) = 2(24 + 10h) = 48 + 20h$. Setting these equal: $48 + 20h = 150$ yields $20h = 102$, so h = 5.1 cm (approximately).

10. A cuboid has a volume of 360 cm^3 and its dimensions are in the ratio 2:3:5. What is its approximate total surface area?

    a) 320 cm^2
    b) 324.9 cm^2
    c) 330 cm^2
    d) 340 cm^2

    Ans) b

    Explanation:

    For a cuboid with dimensions in the ratio 2:3:5 and volume 360 cm^3, let the dimensions be 2x, 3x, and 5x. Then $30x^3 = 360$, so $x^3 = 12$ and $x \approx 2.289$. The surface area is $2[(2x \cdot 3x)+(3x \cdot 5x)+(2x \cdot 5x)] = 2[6x^2+15x^2+10x^2] = 2 \cdot 31x^2 = 62x^2 \approx 62 \times (2.289^2) \approx 62 \times 5.24 = 324.88$ cm^2 (approximately).

11. If the volume of a cube is 343 cm^3, what is its total surface area?

    a) 294 cm^2
    b) 343 cm^2
    c) 210 cm^2
    d) 392 cm^2

    Ans) b

    Explanation:

    A cube with volume 343 cm^3 has edge 7 cm and surface area $6 \times 49 = 294$ cm^2.

12. A cuboid has dimensions in geometric progression. If its smallest dimension is 3 cm and its volume is 216 cm^3, what is its largest dimension?

    a) 12 cm
    b) 9 cm
    c) 15 cm
    d) 18 cm

    Ans) b

    Explanation:

    A cuboid with dimensions in geometric progression with smallest dimension 3 cm and volume 216 cm^3 has dimensions 3, 6, and 12 cm, so the largest dimension is 12 cm.