Riviera International Academy

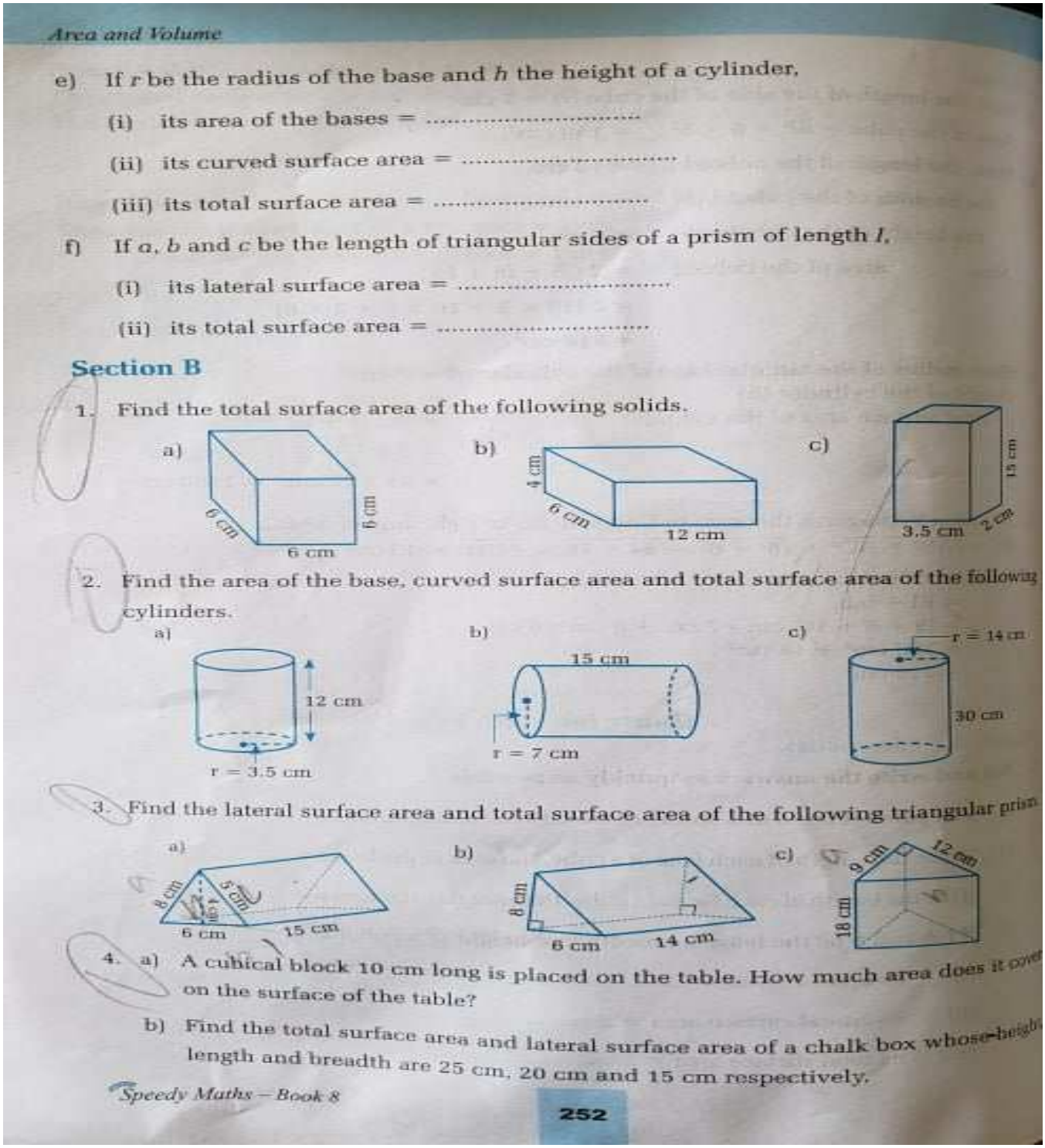
Assignment-2077

(Jestha 18, 2077, Sunday)

Class: Eight

Subject- Mathematics

Source: Photo of exercise is given below.



Area and Volume

e) If r be the radius of the base and h the height of a cylinder,

(i) its area of the bases = ...

(ii) its curved surface area = ...

(iii) its total surface area = ...

f) If a, b and c be the length of triangular sides of a prism of length l,

(i) its lateral surface area = ...

(ii) its total surface area = ...

Section B

1. Find the total surface area of the following solids.

a) 6 cm, 6 cm, 6 cm

b) 4 cm, 6 cm, 12 cm

c) 15 cm, 3.5 cm, 2 cm

2. Find the area of the base, curved surface area and total surface area of the following cylinders.

a) 12 cm, r = 3.5 cm

b) 15 cm, r = 7 cm

c) r = 14 cm, 30 cm

3. Find the lateral surface area and total surface area of the following triangular prism

a) 8 cm, 5 cm, 6 cm, 15 cm

b) 8 cm, 6 cm, 14 cm

c) 9 cm, 12 cm, 18 cm

4. a) A cubical block 10 cm long is placed on the table. How much area does it cover on the surface of the table?

b) Find the total surface area and lateral surface area of a chalk box whose height, length and breadth are 25 cm, 20 cm and 15 cm respectively.

The radius of the circular base of a thermos is 10.5 cm and it is 18 cm high. Find (i) its curved surface area (ii) total surface area.

What is the surface area of a triangular prism where the base area is 25 m², the base perimeter is 24 m, and the length is 12 m.

The sides of the triangular base of a prism are 10 cm, 8 cm and 6 cm respectively and it is 15 cm long. Find the total surface area of the prism.

10.6 Volume of solids

The space occupied by any object is called its volume. In the case of a solid, obviously, its base covers the area of surface and its height occupies the region above the surface. So, its area of the base times height gives its volume.

Thus, volume of a solid = Area of its base × its height

The base of a cuboid is covering the surface area of water which is equal to the area of the base of the cuboid.

The base of the cuboid occupies its height times the space of water inside the water which is the volume of a cuboid.

(i) Volume of cube

The area of the base of a cube is P, where l is the length of the sides of the base. The height of the cube is also equal to the length of the base.

∴ Volume of a cube = area of the base × height = $P \times l = l^3$

If the cube is of unit (say 1 cm) length, breadth and height, then its volume is 1 cm³. So, cm³, m³, etc. are the unit of the measurement of volume.

(ii) Volume of cuboid

Let, l, b and h be the length, breadth and height of a cuboid respectively. Then, area of the base of the cuboid = $l \times b$

∴ Volume of the cuboid = area of base × height

$= l \times b \times h$

(iii) Volume of cylinder

Let r be the radius of the base of a cylinder with height h.

Then, area of its circular base = πr^2

∴ Volume of the cylinder = area of the base × height

$= \pi r^2 \times h$

$= \pi r^2 h$

(iv) Volume of triangular prism

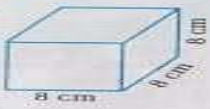
The base of a triangular prism is a triangle. So, the area of its base means the area of the triangle.

∴ Volume of triangular prism = Area of triangle × height (or length)

Worked out examples

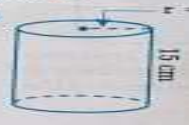
Example 1: Find the volume of the following solids.

a)



b)

c)



d)

Solution:

a) The length of the sides of the cube (l) = 8 cm

∴ Volume of the cube = $P = (8 \text{ cm})^3$ = 512 cm³.

b) The length of the cuboid (l) = 15 cm

breadth of the cuboid (b) = 5 cm

height of the cuboid (h) = 7 cm

∴ Volume of the cuboid = l × b × h

= 15 cm × 5 cm × 7 cm = 525 cm³

c) Here, radius of the circular base of the cylinder (r) = 7 cm

Height of the cylinder (h) = 15 cm

Now, volume of the cylinder = $\pi r^2 h = \frac{22}{7} \times 7 \times 7 \times 15 \text{ cm}^3$

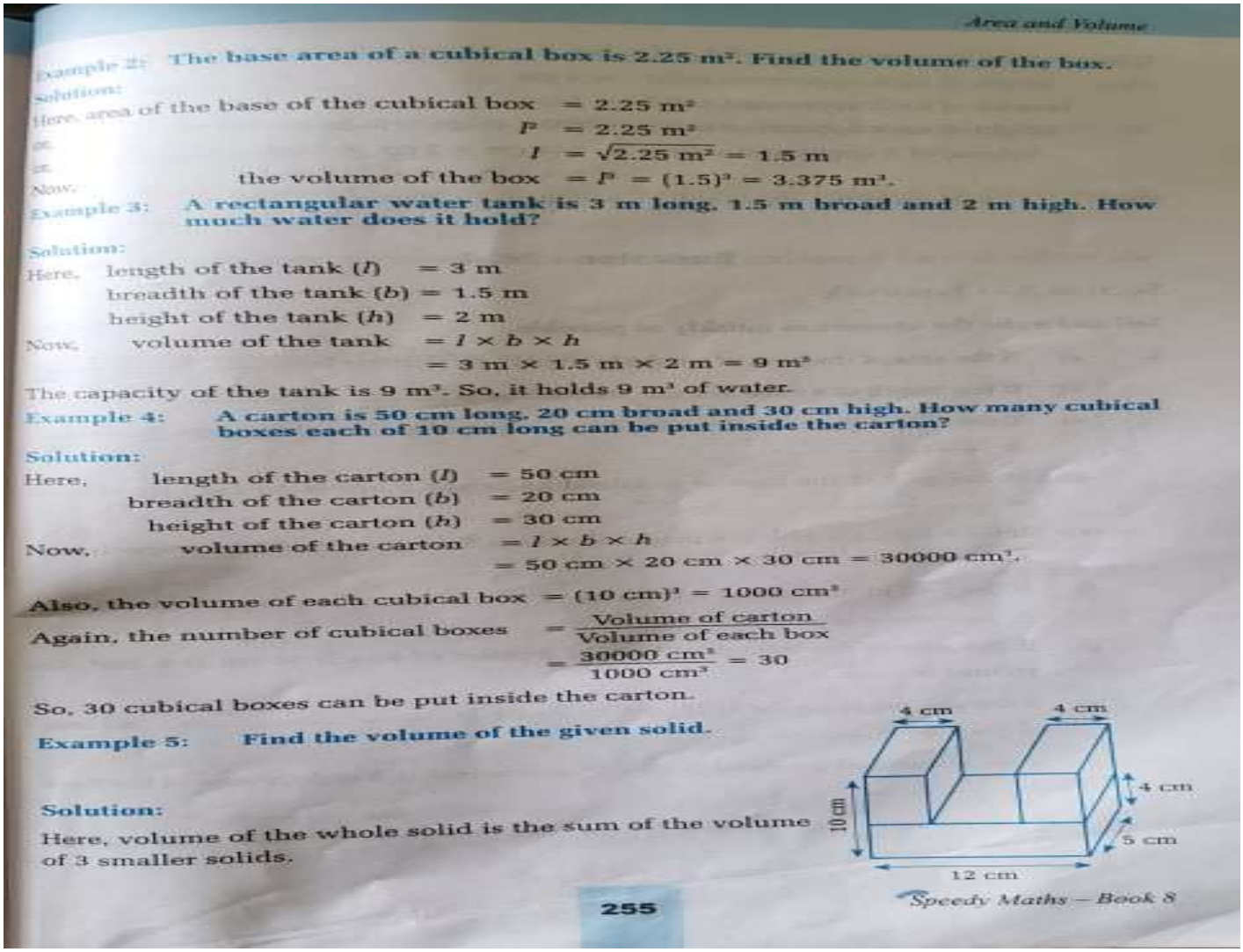
= 2310 cm³

d) Here, the triangular base is a right angled triangle.

∴ Area of the triangular base = $\frac{1}{2} \times 8 \text{ cm} \times 6 \text{ cm} = 24 \text{ cm}^2$

Now, volume of triangular prism = Area of triangular base × height

= 24 cm² × 12 cm = 288 cm³



Area and Volume

Example 2: The base area of a cubical box is 2.25 m². Find the volume of the box.

Solution:

Here, area of the base of the cubical box $= 2.25\ m^2$

$P = 2.25\ m^2$

$l = \sqrt{2.25\ m^2} = 1.5\ m$

Now, the volume of the box $= l^3 = (1.5)^3 = 3.375\ m^3$.

Example 3: A rectangular water tank is 3 m long, 1.5 m broad and 2 m high. How much water does it hold?

Solution:

Here, length of the tank (l) $= 3\ m$

breadth of the tank (b) $= 1.5\ m$

height of the tank (h) $= 2\ m$

Now, volume of the tank $= l \times b \times h$

$= 3\ m \times 1.5\ m \times 2\ m = 9\ m^3$

The capacity of the tank is 9 m³. So, it holds 9 m³ of water.

Example 4: A carton is 50 cm long, 20 cm broad and 30 cm high. How many cubical boxes each of 10 cm long can be put inside the carton?

Solution:

Here, length of the carton (l) $= 50\ cm$

breadth of the carton (b) $= 20\ cm$

height of the carton (h) $= 30\ cm$

Now, volume of the carton $= l \times b \times h$

$= 50\ cm \times 20\ cm \times 30\ cm = 30000\ cm^3$.

Also, the volume of each cubical box $= (10\ cm)^3 = 1000\ cm^3$

Again, the number of cubical boxes $= \frac{\text{Volume of carton}}{\text{Volume of each box}}$

$= \frac{30000\ cm^3}{1000\ cm^3} = 30$

So, 30 cubical boxes can be put inside the carton.

Example 5: Find the volume of the given solid.

Solution:

Here, volume of the whole solid is the sum of the volume of 3 smaller solids.

Homework:

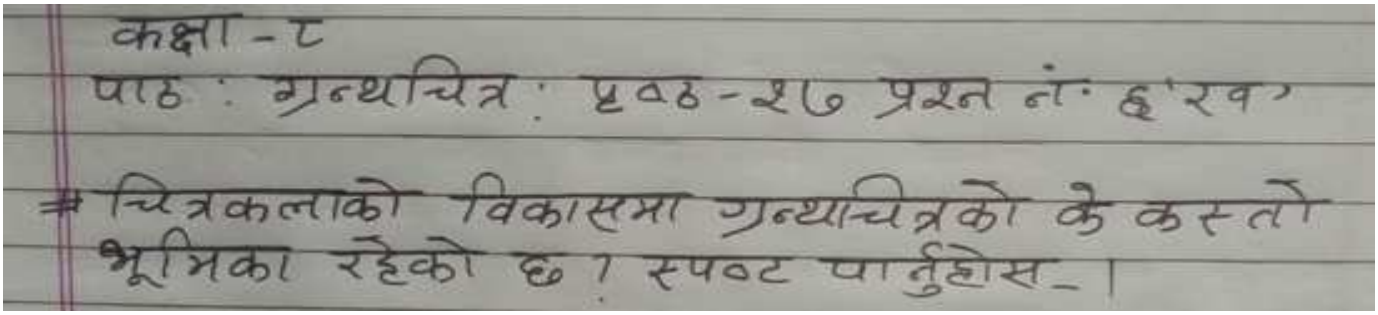
- Read & write all formulae.
- Do all the examples.
- Complete all exercises from page 252 & 253.

You are not allowed to use calculator.

Subject- Opt. Mathematics

1. If A = 60°, B = 45° and cos(A – B) = cosA · cosB + sinA · sinB, find the value of cos15°
2. If A = 30°, B = 45°, find the value of sin75° when sin(A + B) = sinA · cosB + cosA · sinB
3. If A = 60°, B = 45° and cos(A + B) = cosA · cosB – sinA · sinB, find the value of cos105°.
4. If A = 30° and B = 45°, find the value of tan75° when $\tan(A + B) = \frac{\tan A + \tan B}{1 - \tan A \cdot \tan B}$
5. If A = 90° and B = 45°, then find the value of sin135° when sin(A + B) = sinA · cosB + cosA · sinB.

विषय – नेपाली


कक्षा - ८
पाठ : ग्रन्थचित्र : पृष्ठ - २७ प्रश्न नं: ६ 'ख'

चित्रकलाको विकासमा ग्रन्थचित्रको के कस्तो भूमिका रहेको छ ? स्पष्ट पार्नुहोस् ।

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