

AREA AND VOLUME

Form 1

Vol 7

Part 1 – Splitting / Filling

1. The area = $15 \times 6 - 10 \times 4 = 50 \text{ cm}^2$

2. The area = $9 \times 5 - \frac{9 \times 5}{2} = 22.5 \text{ cm}^2$

3. (a) The area = $12 \times 9 - \frac{9(12-8)}{2} - \frac{(4+8)(9-6)}{2} - \frac{4 \times 6}{2} = 60 \text{ cm}^2$

(b) $x = \frac{60}{12 \times 9} \times 100 = \frac{500}{9} \approx 55.6$

4. (a) $DC = \frac{4}{3} \times 3 = 4 \text{ cm}$

The area = $\frac{5 \times 4}{2} = 10 \text{ cm}^2$

(b) Area of $\triangle ABE = \frac{EB \times AE}{2} = \frac{EB \times ED}{2} = \text{Area of } \triangle DBE$

Thus, the area of $\triangle BDE = (\text{area of } \triangle ABD) \div 2 = 5 \text{ cm}^2$

5. The area = $\frac{(AB)(CE)}{2} + \frac{(AD)(CF)}{2} = \frac{(20-14)(15)}{2} + \frac{(24-20)(7)}{2} = 59 \text{ cm}^2$

6. The area = $\frac{(AE)(CD)}{2} + \frac{(AE)(DG)}{2} = \frac{(5+4)(5)}{2} + \frac{(5+4)(3)}{2} = 36 \text{ cm}^2$

7. Let $AF = x \text{ cm}$, $AE = y \text{ cm}$.

Considering the area of $\triangle AEF$, we have $xy = 3 \times 2 = 6$.

$CD = AB = 2x \text{ cm}$

$DE = 3y \text{ cm}$

$BC = AD = y + 3y = 4y \text{ cm}$

Area of $BDEF = (2x)(4y) - \frac{xy}{2} - \frac{(2x)(4y)}{2} = 3.5xy = 21 \text{ cm}^2$

Part 2 – Unknown Length

1. Let the height of $ABDE$ be h cm.

Height of $\triangle BCD$ with respect to base $BD = 2h$ cm

$$\text{Area of polygon } ABCDE = \frac{(6+10)h}{2} + \frac{10 \times 2h}{2} = 54 \text{ cm}^2$$

$$8h + 10h = 54$$

$$h = 3$$

$$\text{Thus, } x = h + 2h = 9.$$

2. (a) Let the height of $ADEF$ be h cm.

$$\text{Area of } ADEF = \frac{(4+10)h}{2} = 7h \text{ cm}^2$$

$$\text{Area of } \triangle BCE = \frac{10(7+h)}{2} = (35+5h) \text{ cm}^2$$

$$7h = 35 + 5h$$

$$h = 17.5$$

(b) The area = $35 + 5(17.5) = 122.5 \text{ cm}^2$

3. $CD = AB = 3 + 5 = 8$ cm

$$CE = DE = 8 \div 2 = 4 \text{ cm}$$

Let the height of $AECF$ be h cm.

$$\frac{(3+4)h}{2} = 21$$

$$h = 6$$

$$\text{Thus, the area of } ABCD = (3 + 5)(6) = 48 \text{ cm}^2$$

4. $GF = 12 - 4 = 8$ cm, $AG = (9 - x)$ cm

$$\text{Area of } ABCEF = (AB)(BC) + (EF)(FG) + \frac{(AG)(FG)}{2} = 36 + 8x + 4(9 - x) = (72 + 4x) \text{ cm}^2$$

$$72 + 4x = 84$$

$$x = 3$$

Part 3 – Overlap

1. The area = $(5+3) \times 5 + \frac{(5+2)(7)}{2} - \frac{5 \times 4}{2} = 54.5 \text{ m}^2$

2. The area = $6 \times 9 + 5 \times 9 - 3 \times 2 = 93 \text{ cm}^2$

3. Area of $ABCDEF = \frac{15x}{2} + 15x - \frac{15 \times 12}{2} = 22.5x - 90 = 360 \text{ cm}^2$

$x = 20$