

AREA AND VOLUME

Form 1

Vol 7

Part 9B – Surface Area (B)

1. (a) The total surface area = $(8 + 10) \times 2 \times 15 + 2 \times [10 \times 3 + 4 \times (8 - 3)] = 640 \text{ m}^2$

(b) The percentage increase = $\frac{2[3 \times 10 + 4 \times (8 - 3)]}{640} \times 100\% = 15.625\%$

2. The total surface area

$$6 \times 4 \times x + 2 \times 6^2 = 288$$

$$24x + 72 = 288$$

$$x = 9$$

3. (a) The total surface area

$$(6 + 8 + 10)x + 2 \times \frac{6 \times 8}{2} = 336$$

$$24x + 48 = 336$$

$$x = 12$$

(b) The volume = $\frac{6 \times 8}{2} \times x = 288 \text{ cm}^3$

4. (a) Volume of the metal

$$= 8 \times 3^2 + 4 \times 3 \times h = 6^3$$

$$72 + 12h = 216$$

$$h = 12$$

(b) (i) The total surface area = $6^2 \times 6 = 216 \text{ cm}^2$

(ii) Final total surface area of the metal = $4 \times 3 \times 8 + 2 \times 3^2 + 2(3 + 4)h + 2 \times 3 \times 4 = 306 \text{ cm}^2$

$$\text{Percentage change of total surface area} = \frac{306 - 216}{216} \times 100\% = \frac{125}{3}\% \approx 41.7\%$$

5. (a) Let the required side length be l cm.

Volume of the solid

$$4l^3 = 4 \times 8 \times 27$$

$$l = 6$$

- (b) Initial total surface area = $2(8 + 4) \times 27 + 2(8 \times 4) = 712 \text{ cm}^2$

$$\text{Final total surface area} = 4(6 \times 6^2) = 864 \text{ cm}^2$$

$$\text{The change of total surface area} = 864 - 712 = 152 \text{ cm}^2$$

6. Final total surface area

$$\frac{(10+x)(12)}{2} \times 4 + 7(10+12+x+13) = 950$$

$$240 + 24x + 245 + 7x = 950$$

$$x = 15$$

7. (a) The total surface area = $(12+10+2+10)(6) + 2 \left[\frac{(12+18)(10-2)}{2} + 2 \times 18 \right] = 516 \text{ m}^2$

- (b) The cost = $516 \times 0.2 = \$103.2$

8. (a) (i) The total surface area = $(4 \times 6)x + 2(6^2) = 24x + 72 \text{ cm}^2$

(ii) The total surface area = $2(6+6+6) \times \frac{x}{2} + 2 \times 6 \times (6+6) = 18x + 144 \text{ cm}^2$

- (b) Percentage increase of total surface area

$$(24x + 72)(1 + 5\%) = 18x + 144$$

$$25.2x + 75.6 = 18x + 144$$

$$7.2x = 68.4$$

$$x = 9.5$$

9. The wet surface area

$$2[2x + 3(5 - 2)] + (5 + x + 5 + x - 3) \times 6 = 172$$

$$4x + 18 + 42 + 12x = 172$$

$$x = 7$$

10. The increase of total surface area = $2(10 \times 12) + 2(8 \times 12) + 2(8 \times 10) = 592 \text{ cm}^2$

11. The total surface area of the bookshelf = $2(36 + 27)(50) + 2(36)(27) + 2(36 - 4)(27 - 4) = 9716 \text{ cm}^2$

$$\text{The cost} = 9716(0.005) = \$48.58$$