

Topic 17 Area and volume (Post-TT) [35] MARKSCHEME

1.

18.2	<p>M1 for $\frac{260}{360} \times \pi \times 8$ oe or $\frac{100}{360} \times \pi \times 8$ oe</p> <p>A1 for 18.1 to 18.2</p>
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2.

$$\pi \times 2^2 \times 1.5 \text{ or } 6\pi$$

M1

$$\frac{1}{3} \pi \times 2^2 \times 0.9 \text{ or } 1.2\pi$$

M1

$$7.2\pi$$

A1

[3]

3. Area = $\frac{1}{2} \times 15 \times 16 \times \sin 100$ [M1]
118 [A1]

4.

Use of $\frac{4}{3} \pi \times 4^3 \div 2$

M1

Must use 4 or 8 as radius.

(Volume hemisphere =) 133.9
to 134.1 (inclusive)

A1

133.97 if $\pi = 3.14$ used.

(Volume paperweight =)
500+(their 134) (=634)

Alf

If M1 awarded.

cm³

B1

This mark is independent

[4]

5.

75 π	<p>P1 starts process by using $\frac{250}{3} \pi$ and $\frac{1}{2} \times \frac{4}{3} \pi r^3$ to find radius as 5</p> <p>P1 starts process using $\frac{1}{2}$ curved surface area eg $(4 \times \pi \times 5^2) \div 2$</p> <p>P1 complete process shown eg $(4 \times \pi \times 5^2) \div 2 + (\pi \times 5^2)$</p> <p>A1 for 75$\pi$</p>
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6.

$$\frac{1}{2} \times 11 \times 16 \times \sin x = 70$$

[M1]

Attempt to rearrange: $\sin x = \frac{70}{88}$

[M1]

$$52.7^\circ$$

[A1]

7.

$$\text{Extra volume} = 50 \times 34 \times 4.5 = 7650 \quad \text{M1}$$

$$1912.5 \quad \text{A1}$$

$$\frac{4}{3} \pi r^3 = \text{their } 1912.5 \quad \text{M1}$$

Dependent on 'their 1912.5' coming from a volume calculation.

$$r^3 = (3 \times \text{their } 1912.5) \div 4\pi \quad \text{DM1}$$

Allow $(3 \times 7650) \div 4\pi$

$$R = 7.7, 7.70, 7.700\dots \quad \text{A1}$$

[5]

8.

$$\text{Angle at centre} = 2 \times \sin^{-1}(3.5/6) \quad \text{M1}$$

Half angle $\sin^{-1}(3.5/6)$ gets M1

$$= 71.(\dots) \quad \text{A1}$$

$$\text{Area sector} = \text{'their } 71' \div 360 \times \pi \times 6^2 \quad \text{M1}$$

M for use of area sector formula not for $\pi^2 \div 4$ for example.

$$\text{Area sector} = 22.4(\dots) \quad \text{A1}$$

$$\text{Their sector} - \text{their triangle area} \quad \text{DM1}$$

Must make a valid attempt at calculating the area of the triangle. (17.06...) and at least one of the previous M marks must be awarded.

$$\text{Area segment} = 5.3\dots \quad \text{A1}$$

[6]

9.

$$(a) \quad \text{Vol large cone} = 1/3 \times \pi \times 12^2 \times 10 \quad \text{M1}$$

Or

$$\text{Vol small cone} = 1/3 \times \pi \times 6^2 \times 5$$

Subtraction of cone volumes M1

$$480\pi \text{ or } 60\pi \quad \text{A1}$$

$$\text{Vol frustum} = 420\pi \quad \text{A1}$$

Or Vol frustum = $1/8$ of Vol large cone

$1/3 \pi 1260$ scores 3 marks altogether

allow $\pi 420$

$$(b) \quad 1/3 \times \pi \times r^2 \times 35 = \text{their } 420\pi \quad \text{M1}$$

$$r^2 = 36 \quad \text{A1}$$

$$r = 6 \quad \text{A1}$$

M1 for equating volumes

[7]