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# GCSE Mathematics

## Volume & Surface Area of Cylinders

Mark Scheme - GCSE Maths Practice

M = method mark, A = accuracy mark (dependent on the preceding M mark), B = independent mark.

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## Edexcel-style questions

**Q1** Grade 5 Edexcel style

**Total: 2**

| Part | Mark scheme                | Marks |
|------|----------------------------|-------|
| (a)  | $\pi \times 4^2 \times 10$ | M1    |
| (a)  | $160\pi \text{ cm}^3$      | A1    |

**Q2** Grade 5 Edexcel style

**Total: 2**

| Part | Mark scheme                      | Marks |
|------|----------------------------------|-------|
| (a)  | $2 \times \pi \times 3 \times 9$ | M1    |
| (a)  | $54\pi \text{ cm}^2$             | A1    |

**Q3** Grade 5 Edexcel style

**Total: 2**

| Part | Mark scheme                        | Marks |
|------|------------------------------------|-------|
| (a)  | $250\pi = \pi \times 5^2 \times h$ | M1    |
| (a)  | $h = 250 \div 25 = 10 \text{ cm}$  | A1    |

**Q4** Grade 6 Edexcel style

**Total: 2**

| Part | Mark scheme                                                  | Marks |
|------|--------------------------------------------------------------|-------|
| (a)  | volume = $3.14 \times 20^2 \times 100 = 125600 \text{ cm}^3$ | M1    |
| (a)  | $125600 \div 1000 = 125.6 \text{ litres}$                    | A1    |

**Q5** Grade 6 Edexcel style

**Total: 2**

| Part | Mark scheme                                                          | Marks |
|------|----------------------------------------------------------------------|-------|
| (a)  | cross-sectional area = $3.14 \times (6^2 - 4^2) = 62.8 \text{ cm}^2$ | M1    |
| (a)  | volume = $62.8 \times 15 = 942 \text{ cm}^3$                         | A1    |

## AQA-style questions

**Q6** Grade 5 AQA style**Total: 2**

| Part | Mark scheme                | Marks |
|------|----------------------------|-------|
| (a)  | $3.14 \times 5^2 \times 8$ | M1    |
| (a)  | $628 \text{ cm}^3$         | A1    |

**Q7** Grade 5 AQA style**Total: 3**

| Part | Mark scheme                                                                   | Marks |
|------|-------------------------------------------------------------------------------|-------|
| (a)  | curved surface area = $2 \times 3.14 \times 4 \times 6 = 150.72 \text{ cm}^2$ | M1    |
| (a)  | area of both ends = $2 \times 3.14 \times 4^2 = 100.48 \text{ cm}^2$          | M1    |
| (a)  | total = $150.72 + 100.48 = 251.2 \text{ cm}^2$                                | A1    |

**Q8** Grade 6 AQA style**Total: 2**

| Part | Mark scheme                            | Marks |
|------|----------------------------------------|-------|
| (a)  | $r^2 = 942 \div (3.14 \times 12) = 25$ | M1    |
| (a)  | $r = 5 \text{ cm}$                     | A1    |

**Q9** Grade 6 AQA style**Total: 3**

| Part | Mark scheme                                                        | Marks |
|------|--------------------------------------------------------------------|-------|
| (a)  | volume of Tin A = $\pi \times 3^2 \times 16 = 144\pi \text{ cm}^3$ | M1    |
| (a)  | $144\pi = \pi \times 6^2 \times h$                                 | M1    |
| (a)  | $h = 144 \div 36 = 4 \text{ cm}$                                   | A1    |

**Q10** Grade 6 AQA style**Total: 2**

| Part | Mark scheme                                                             | Marks |
|------|-------------------------------------------------------------------------|-------|
| (a)  | full cylinder volume = $\pi \times 7^2 \times 20 = 980\pi \text{ cm}^3$ | M1    |
| (a)  | trough volume = $980\pi \div 2 = 490\pi \text{ cm}^3$                   | A1    |

## OCR-style questions

**Q11** Grade 5 OCR style**Total: 3**

| Part | Mark scheme                 | Marks |
|------|-----------------------------|-------|
| (a)  | radius = $6 \div 2 = 3$ cm  | M1    |
| (a)  | $3.14 \times 3^2 \times 12$ | M1    |
| (a)  | $339.12 \text{ cm}^3$       | A1    |

**Q12** Grade 5 OCR style**Total: 3**

| Part | Mark scheme                       | Marks |
|------|-----------------------------------|-------|
| (a)  | radius = $10 \div 2 = 5$ cm       | M1    |
| (a)  | $2 \times 3.14 \times 5 \times 7$ | M1    |
| (a)  | $219.8 \text{ cm}^2$              | A1    |

**Q13** Grade 5 OCR style**Total: 2**

| Part | Mark scheme                                | Marks |
|------|--------------------------------------------|-------|
| (a)  | $100\pi = 2 \times \pi \times r \times 10$ | M1    |
| (a)  | $r = 100 \div 20 = 5$ cm                   | A1    |

**Q14** Grade 6 OCR style**Total: 3**

| Part | Mark scheme                                                         | Marks |
|------|---------------------------------------------------------------------|-------|
| (a)  | volume of rod = $\pi \times 5^2 \times 20 = 500\pi \text{ cm}^3$    | M1    |
| (a)  | volume of one disc = $\pi \times 5^2 \times 1 = 25\pi \text{ cm}^3$ | M1    |
| (a)  | $500\pi \div 25\pi = 20$ discs                                      | A1    |

**Q15** Grade 6 OCR style**Total: 3**

| Part | Mark scheme                                                        | Marks |
|------|--------------------------------------------------------------------|-------|
| (a)  | volume of candle = $3.14 \times 5^2 \times 18 = 1413 \text{ cm}^3$ | M1    |
| (a)  | $1413 = 10 \times 10 \times h$                                     | M1    |
| (a)  | $h = 1413 \div 100 = 14.13$ cm                                     | A1    |

## Teachably-style questions

**Q16** Grade 5 Teachably style

**Total: 2**

| Part | Mark scheme                | Marks |
|------|----------------------------|-------|
| (a)  | $\pi \times 7^2 \times 15$ | M1    |
| (a)  | $735\pi \text{ cm}^3$      | A1    |

**Q17** Grade 5 Teachably style

**Total: 3**

| Part | Mark scheme                                                                 | Marks |
|------|-----------------------------------------------------------------------------|-------|
| (a)  | curved surface area = $2 \times \pi \times 6 \times 4 = 48\pi \text{ cm}^2$ | M1    |
| (a)  | area of both ends = $2 \times \pi \times 6^2 = 72\pi \text{ cm}^2$          | M1    |
| (a)  | total = $48\pi + 72\pi = 120\pi \text{ cm}^2$                               | A1    |

**Q18** Grade 6 Teachably style

**Total: 2**

| Part | Mark scheme                              | Marks |
|------|------------------------------------------|-------|
| (a)  | $h = 1017.36 \div (3.14 \times 6^2)$     | M1    |
| (a)  | $h = 1017.36 \div 113.04 = 9 \text{ cm}$ | A1    |

**Q19** Grade 6 Teachably style

**Total: 2**

| Part | Mark scheme                                                       | Marks |
|------|-------------------------------------------------------------------|-------|
| (a)  | volume of tank = $3.14 \times 10^2 \times 20 = 6280 \text{ cm}^3$ | M1    |
| (a)  | $6280 \div 785 = 8 \text{ minutes}$                               | A1    |

**Q20** Grade 6 Teachably style

**Total: 4**

| Part | Mark scheme                                                                                               | Marks |
|------|-----------------------------------------------------------------------------------------------------------|-------|
| (a)  | from the volume: $r^2 \times h = 150$                                                                     | M1    |
| (a)  | from the curved surface area: $2 \times r \times h = 60$ , so $r \times h = 30$ , meaning $h = 30 \div r$ | M1    |
| (a)  | substituting: $r^2 \times (30 \div r) = 150$ , so $30r = 150$ , giving $r = 5$                            | M1    |
| (a)  | $r = 5 \text{ cm}$ , and $h = 30 \div 5 = 6 \text{ cm}$                                                   | A1    |

**END OF PAPER**

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