Q1.

Steph is solving a problem.

Cube A has a surface area of 150 cm²

Cube B has sides half the length of cube A

What is the volume of cube B?

To solve this problem, Steph decides to

- halve the surface area
- calculate the square root of the answer
- then divide by 6
- then cube this answer to work out the volume.

Evaluate Steph's method.

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(Total 2 marks)

Q2.

Work out the value of $125^{-\frac{2}{3}}$

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Answer .....

(Total 3 marks)

Q3. Estimate the value of $101.4^{\frac{1}{2}} + 6.43^{0} \times 7.99^{\frac{2}{3}}$

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Answer .....

(Total 4 marks)

Q4.

(a) Simplify $\sqrt{x^5 \times x^9}$

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Answer .....

(2)

(b) Solve $y^{-3} = 125$

y = ...

(2)
(Total 4 marks)

Q5. Work out the value of $8^{-\frac{2}{3}}$

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Answer .....

(Total 2 marks)

Q6. $2^m = 32$ and $9^p = 3^m$

Work out the values of m and p

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m = ... p = ...

(Total 4 marks)

Q7.

Express $\frac{1}{\sqrt[3]{x^2}}$ in the form x^a

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Answer .....

(Total 3 marks)

Q8. Find **two** sets of values for c and d such that

$16^c = 2^d$

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c = ... and d = ...

or c = ... and d = ...

(Total 3 marks)

Q9. Work out the value of $64^{\frac{2}{3}}$

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Answer .....

(Total 2 marks)

Q10.(a) Work out the value of $9^{-\frac{3}{2}}$

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Answer .....

(3)

(b) Work out **all** solutions of the equation

$$8^m = 2^{m^2}$$

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Answer .....

(3)

(Total 6 marks)

Q11. Work out the value of $27^{\frac{2}{3}}$

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Answer .....

(Total 2 marks)

Q12. (a) Show clearly that $4^{\frac{3}{2}} = 8$

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(2)

(b) Hence, or otherwise, work out the value of y if $4^y = 8^6$

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Answer y = ...

(2)

(Total 4 marks)

Q13. Write these numbers in order of size starting with the smallest.

You **must** show your working.

$27^{\frac{2}{3}}$ $64^{\frac{1}{3}}$ $4^{\frac{3}{2}}$

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Answer ..... , ... , ...

(Total 3 marks)

Q14.

A sphere has radius x centimetres.
A hemisphere has radius y centimetres.
The shapes have equal volumes.

Work out the value of $\frac{y}{x}$

Give your answer in the form $a^{\frac{1}{3}}$ where a is an integer.

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$\frac{y}{x}$ = ...

(Total 3 marks)

Q15. Put these in order starting with the smallest.
You **must** show the value of each number in your working.

$9^{\frac{1}{2}}$ $(-7)^0$ $\left(\frac{1}{8}\right)^{-\frac{1}{3}}$

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Smallest.....

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Largest.....

(Total 4 marks)