



1.9D Powers and Roots: Fluency and Exam Drill

EDEXCEL Edexcel 1MA1 · Calculator allowed · about 40 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

1 Work out 9^2 .

(Total for Question 1 is 1 mark)

2 Work out 4^3 .

(Total for Question 2 is 1 mark)

3 Work out $\sqrt{121}$.

(Total for Question 3 is 1 mark)

4 Work out the cube root of 27.

(Total for Question 4 is 1 mark)

5 Write $5 \times 5 \times 5$ in index form.

(Total for Question 5 is 1 mark)

6 Work out 2^5 .

(Total for Question 6 is 1 mark)

7 Simplify $3^2 \times 3^3$.

(Total for Question 7 is 2 marks)

8 Simplify $(10^2) / (10^4)$. Give your answer in ordinary number form.

(Total for Question 8 is 2 marks)

9 Work out 2^0 .

(Total for Question 9 is 1 mark)

10 Which two consecutive integers does $\sqrt{7}$ lie between?

(Total for Question 10 is 1 mark)

11 Which two consecutive integers does the cube root of 50 lie between?

(Total for Question 11 is 1 mark)

12 Simplify $\sqrt{180}$ giving your answer in simplest form.

(Total for Question 12 is 2 marks)

13 Write 0.0004 in index form (standard form with a power of 10).

(Total for Question 13 is 2 marks)

14 Simplify $(4^2)^3$ and give your answer as an ordinary number.

(Total for Question 14 is 2 marks)

15 Show that $\sqrt{3^5} = 3^{5/2}$.

(Total for Question 15 is 2 marks)

16 Solve $2^x = 32$. Give the value of x .

(Total for Question 16 is 2 marks)

17 The area of a square is 256 cm^2 . Work out the length of one side in cm.

(Total for Question 17 is 2 marks)

18 Express cube root(54) in simplest form.

(Total for Question 18 is 2 marks)

Mark scheme · 1.9D Powers and Roots: Fluency and Exam Drill

Question 1

- **B1** 81 cao
- **Answer:81**
(9 times 9 = 81).

Question 2

- **B1** 64 cao
- **Answer:64**
(4 x 4 x 4 = 64).

Question 3

- **B1** 11 cao
- **Answer:11**
($\sqrt{121} = 11$).

Question 4

- **B1** 3 cao
- **Answer:3**
($3^3 = 27$).

Question 5

- **B1** 5^3 cao
- **Answer: 5^3**

Question 6

- **B1** 32 cao
- **Answer:32**
($2^5 = 32$).

Question 7

- **M1** use index law: add powers ($3^2 \times 3^3 = 3^{2+3}$)
- **A1** 243 cao
- **Answer:243**
($3^{2+3} = 3^5 = 243$).

Question 8

- **M1** use index law: subtract powers to get $10^{2-4} = 10^{-2}$
- **A1** 0.01 cao
- **Answer:0.01**
($10^{-2} = 0.01$).

Question 9

- **B1** 1 cao
- **Answer:1**
(any non-zero number to the power 0 equals 1).

Question 10

- **B1** 2 and 3 cao
- **Answer:Between 2 and 3**
(since $2^2 = 4$ and $3^2 = 9$, and $4 < 7 < 9$).

Question 11

- **B1** 3 and 4 cao
- **Answer: Between 3 and 4**
(since $3^3 = 27$ and $4^3 = 64$, and $27 < 50 < 64$).

Question 12

- **M1** factor 180 as 36×5 and take square root of square factor
- **A1** $6\sqrt{5}$ cao
- **Answer: $6\sqrt{5}$**
($\sqrt{180} = \sqrt{36 \times 5} = 6\sqrt{5}$).

Question 13

- **M1** move decimal point 4 places to write as 4×10^n
- **A1** 4×10^{-4} cao
- **Answer: 4×10^{-4}**
($0.0004 = 4 \times 10^{-4}$).

Question 14

- **M1** use index law $(a^m)^n = a^{mn}$ to get $4^{2 \times 3} = 4^6$
- **A1** 4096 cao
- **Answer: 4096**
($(4^2)^3 = 4^6 = 4096$).

Question 15

- **M1** rewrite sqrt as power $1/2$: $\sqrt{3^5} = (3^5)^{1/2}$
- **A1** $3^{5/2}$ cao
- **Answer: $3^{5/2}$**
($(3^5)^{1/2} = 3^{5 \times 1/2} = 3^{5/2}$).

Question 16

- **M1** recognise $32 = 2^5$ or use logs to show $x = 5$
- **A1** $x = 5$ cao
- **Answer: $x = 5$**
($2^5 = 32$).

Question 17

- **M1** take square root of 256 to find side length
- **A1** 16 cm cao
- **Answer: 16 cm**
(side = $\sqrt{256} = 16$ cm).

Question 18

- **M1** factor 54 as 27×2 and take cube root of cube factor
- **A1** 3 cube root(2) cao
- **Answer: 3 cube root(2)**
(cube root(54) = cube root(27×2) = 3 cube root(2)).