1.15 Roots, Powers and Exact Values: 1-hour Pack

Calculators not allowed · about 60 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Write $\sqrt{18}$ in the form $a\sqrt{2}$, where a is a whole number.

(2)

2 Write down the value of $\sqrt{25}$.

(1)

3 $\sqrt{99}$ lies between two consecutive whole numbers. Write down the two numbers.

(2)

4 Simplify the surd $\sqrt{50}$ and give the answer in simplest exact form.

(2)

5 Write down the value of $\sqrt{225}$.

(1)

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6 Work out $3^3 \times 4^2$.

(2)

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7 Work out $7^3 - 3^4$.

(2)

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8 Work out $\sqrt{121}$ + the cube root of 64.

(2)

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9 Work out $\sqrt{6} \times \sqrt{216}$. Give your answer as a whole number.

(2)

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10 Which is greater, 2^6 or 6^3? You must show your working.

(2)

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11 Simplify $\sqrt{72}$ giving the exact form $a\sqrt{b}$ with b simplified.

(2)

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12 Write $\sqrt{99}$ in the form $a\sqrt{11}$, where a is a whole number.

(2)

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13 Work out $3^2 - 6^2$.

(2)

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14 Work out $\sqrt{6} \times \sqrt{24}$. Give your answer as a whole number.

(2)

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15 $\sqrt{138}$ lies between two consecutive whole numbers. Write down the two numbers.

(2)

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16 The cube root of 120 lies between two consecutive whole numbers. Write down the two numbers.

(2)

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17 Write $\sqrt{275}$ in the form $a\sqrt{11}$, where a is a whole number.

(2)

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18 Solve $x^2 - 7 = 2$.

(3)

19 Solve $x^2 = 36$.

(2)

20 Find each cube root exactly.

(a) cube root of 64 **(1)**

.....

(b) cube root of 216 **(1)**

.....

21 Evaluate the powers exactly.

(a) 2^5 **(1)**

.....

(b) 5^3 **(1)**

.....

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22 Multiply the surds and simplify: $\sqrt{5} \times \sqrt{20}$.

(2)

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23 A square tile has a side length equal to the cube root of 64 cm.

Diagram NOT accurately drawn



cube root of 64 cm

(a) Find the side length of the tile. **(1)**

.....

(b) Find the area of the tile. **(2)**

.....

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Mark scheme · 1.15 Roots, Powers and Exact Values: 1-hour Pack

A correct answer earns full marks unless the question asks for working, a method, proof or explanation.

Question 1

$18 = 9 \times 2$ or $\sqrt{9} = 3$ seen	M1
$3\sqrt{2}$ cao	A1

Answer: **$3\sqrt{2}$**

Question 2

5 cao	B1

Answer: **5**

Question 3

$9^2 = 81$ or $10^2 = 100$ seen	M1
9 and 10 cao	A1

Answer: **9 and 10**

Question 4

factor 50 as 25×2 or identify largest square factor	M1
$5\sqrt{2}$ cao	A1

Answer: **$5\sqrt{2}$**

Question 5

15 cao	B1

Answer: **15**

Question 6

$3^3 = 27$ or $4^2 = 16$ found	M1
432 cao	A1

Answer: **432**

Question 7

$7^3 = 343$ or $3^4 = 81$ found	M1
262 cao	A1

Answer: **262**

Question 8

11 or 4 found	M1
15 cao	A1

Answer: **15**

Question 9

$\sqrt{1296}$ or 6×6 seen	M1
36 cao	A1

Answer: **36**

Question 10

$2^6 = 64$ and $6^3 = 216$	M1
6^3 cao	A1

Answer: **6^3**

Question 11

factor 72 as 36×2 or identify 36 as largest square factor	M1
$6\sqrt{2}$ cao	A1

Answer: **$6\sqrt{2}$**

Question 12

$99 = 9 \times 11$ or $\sqrt{9} = 3$ seen	M1
$3\sqrt{11}$ cao	A1

Answer: **$3\sqrt{11}$**

Question 13

$3^2 = 9$ or $6^2 = 36$ found	M1
-27 cao	A1

Answer: **-27**

Question 14

$\sqrt{144}$ or 6×2 seen	M1
12 cao	A1

Answer: **12**

Question 15

$11^2 = 121$ or $12^2 = 144$ seen	M1
11 and 12 cao	A1

Answer: **11 and 12**

Question 16

$4^3 = 64$ or $5^3 = 125$ seen	M1
4 and 5 cao	A1

Answer: **4 and 5**

Question 17

$275 = 25 \times 11$ or $\sqrt{25} = 5$ seen	M1
$5\sqrt{11}$ cao	A1

Answer: **$5\sqrt{11}$**

Question 18

$x^2 = 9$ (adds 7 to both sides)	M1
$\sqrt{9} = 3$	M1
$x = 3$ or $x = -3$ cao	A1

Answer: **$x = 3$ or $x = -3$**

Question 19

$\sqrt{36} = 6$ or one correct solution	M1
$x = 6$ or $x = -6$ cao	A1

Answer: **$x = 6$ or $x = -6$**

Question 20

(a) 4 cao	B1

(a) Answer: **4**

(b) 6 cao	B1

(b) Answer: **6**

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Question 21

(a) 32 cao **B1**

(a) Answer: **32**

(b) 125 cao **B1**

(b) Answer: **125**

Question 22

use $\sqrt{5} \times \sqrt{20} = \sqrt{100}$ or simplify $\sqrt{20}$ to $2\sqrt{5}$ first **M1**

10 cao **A1**

Answer: **10**

Question 23

(a) 4 cm cao **B1**

(a) Answer: **4 cm**

(b) use area = side^2, i.e. 4^2, ft from part a **M1**

(b) 16 cm² cao **A1**

(b) Answer: **16 cm^2**

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