1.12 Indices and the Index Laws: 1-hour Pack

Calculators not allowed · about 60 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Find the value of n.

$3^n = 2187$

(1)

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

(2)

3 Use index laws to simplify each product. Give your answer as a single power.

(a) $x^3 \, x^4$ **(1)**

(b) $2^3 \times 2^5$ **(1)**

(c) $a^1 \times a^6$ **(1)**

4 Write $9^6 \div 9^2$ as a single power of 9.

(1)

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5 Work out $2^{-2} + 9^0$.

(2)

---

6 Work out $10^9 \div 10^5$.

(2)

---

7 Find the value of n.

$5^n = 15625$

(1)

---

8 Work out $10^3 \div 10^2$.

(2)

---

9 Work out $2^{-3} + 5^0$.

(2)

---

10 Work out $(2^4)^2$.

(2)

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11 Use index laws to simplify each quotient. Give your answer as a single power or a number.

(a) x^7 / x^2 **(1)**

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

(c) b^4 / b^4 **(1)**

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12 Simplify $6y^4 \times 6y^2$.

(2)

---

13 Write $(10^8 \times 10^6) \div 10^7$ as a single power of 10.

(2)

---

14 Find the value of x in $3^x \times 3^2 = 3^{12}$.

(2)

---

15 Write $7^9 \times 7^7$ as a single power of 7.

(1)

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16 Write $(2^9 \times 2^6) \div 2^7$ as a single power of 2.

(2)

---

17 Work out $10^5 \times 10^3$.

(2)

---

18 Find the value of n.
$5^n = 1953125$

(1)

---

19 Simplify $8z^2 \times 5z^6$.

(2)

---

20 Simplify $5y^3 \times 4y^5$.

(2)

---

21 Work out $9^0 + 4 \times 2^0$.

(2)

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22 Simplify $3n^4 \times 3n^3$.

(2)

---

23 Work out $3^{-3} + 2^0$.

(2)

---

24 Simplify $(7n^7)^3$.

(2)

---

25 Write 3^{-3} as a fraction.

(1)

---

26 Write down the value of 3^3.

(1)

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Mark scheme · 1.12 Indices and the Index Laws: 1-hour Pack

Question 1

7 cao — B1

Answer: **7**

Question 2

uses the laws of indices to write as a single power or evaluates each power correctly — M1

729 cao — A1

Answer: **729**

Question 3

(a) x^7 cao — B1

(a) Answer: $\mathbf{x^7}$

(b) 2^8 or 256 cao — B1

(b) Answer: $\mathbf{2^8}$

(c) a^7 cao — B1

(c) Answer: $\mathbf{a^7}$

Question 4

9^4 cao — B1

Answer: $\mathbf{9^4}$

Question 5

$2^{-2} = 1/4$ or $9^0 = 1$ — M1

5/4 cao — A1

Answer: **5/4**

Question 6

uses the laws of indices to write as a single power or evaluates each power correctly — M1

10000 cao — A1

Answer: **10000**

Question 7

6 cao — B1

Answer: **6**

Question 8

uses the laws of indices to write as a single power or evaluates each power correctly — M1

10 cao — A1

Answer: **10**

Question 9

$2^{-3} = 1/8$ or $5^0 = 1$ — M1

9/8 cao — A1

Answer: **9/8**

Question 10

uses the laws of indices to write as a single power or evaluates each power correctly — M1

256 cao — A1

Answer: **256**

Question 11

(a) x^5 cao — B1

(a) Answer: $\mathbf{x^5}$

(b) 3^2 or 9 cao — B1

(b) Answer: $\mathbf{3^2}$

(c) 1 cao — B1

(c) Answer: **1**

Question 12

correct coefficient — B1

correct power — B1

Answer: $\mathbf{36y^6}$

Question 13

uses the laws of indices correctly for one stage — M1

10^7 cao — A1

Answer: $\mathbf{10^7}$

Question 14

x + 2 = 12 or equivalent — M1

10 cao — A1

Answer: **10**

Question 15

7^{16} cao — B1

Answer: $\mathbf{7^{16}}$

Question 16

uses the laws of indices correctly for one stage — M1

2^8 cao — A1

Answer: $\mathbf{2^8}$

Question 17

uses the laws of indices to write as a single power or evaluates each power correctly — M1

100000000 cao — A1

Answer: **100000000**

Question 18

9 cao — B1

Answer: **9**

Question 19

correct coefficient — B1

correct power — B1

Answer: $\mathbf{40z^8}$

Question 20

correct coefficient — B1

correct power — B1

Answer: $\mathbf{20y^8}$

Question 21

any number to the power 0 is 1 — M1

5 cao — A1

Answer: **5**

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Question 22

correct coefficient	**B1**
correct power	**B1**

Answer: **$9n^7$**

Question 23

$3^{-3} = 1/27$ or $2^0 = 1$	**M1**
28/27 cao	**A1**

Answer: **28/27**

Question 24

correct coefficient	**B1**
correct power	**B1**

Answer: **$343n^{21}$**

Question 25

1/27 cao	**B1**

Answer: **1/27**

Question 26

27 cao	**B1**

Answer: **27**

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