1.12 Indices and the Index Laws: 30-minute Pack

Calculators not allowed · about 30 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Fully simplify each expression. Show index steps where helpful.

(a) $p^5 / p^2 \times p^0$ **(2)**

(b) $4^3 / (2^3)$ **(2)**

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2 Find the value of n.

$7^n = 40353607$

(1)

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3 Write down the value of each expression with zero or negative indices.

(a) 7^0 **(1)**

(b) 2^{-2} **(1)**

(c) $(-3)^0$ **(1)**

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4 Work out $3^6 \div 3^4$.

(2)

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5 Write $(6^8 \times 6^5) \div 6^6$ as a single power of 6.

(2)

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6 Find the value of x in $2^x \times 2^4 = 2^8$.

(2)

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7 Write $6^4 \div 6^3$ as a single power of 6.

(1)

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8 Work out $10^5 \times 10^2$.

(2)

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9 Write $(2^3)^6$ as a single power of 2.

(1)

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10 Work out $10^{-3} + 3^0$.

(2)

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11 Work out $2^0 + 4 \times 3^0$.

(2)

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12 Calculate the value. Show a short method.

(a) $3^2 \times 3^3$ **(2)**

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Mark scheme · 1.12 Indices and the Index Laws: 30-minute Pack

Question 1

(a) uses $p^0 = 1$ and subtracts indices: p^{5-2} **M1**

(a) p^3 cao **A1**

(a) Answer: **p^3**

(b) recognises $4 = 2^2$ or evaluates powers: $4^3 = 64$ and $2^3 = 8$ **M1**

(b) 8 cao **A1**

(b) Answer: **8**

Question 2

9 cao **B1**

Answer: **9**

Question 3

(a) 1 cao **B1**

(a) Answer: **1**

(b) 1/4 or 0.25 cao **B1**

(b) Answer: **1/4**

(c) 1 cao **B1**

(c) Answer: **1**

Question 4

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

9 cao **A1**

Answer: **9**

Question 5

uses the laws of indices correctly for one stage **M1**

6^7 cao **A1**

Answer: **6^7**

Question 6

x + 4 = 8 or equivalent **M1**

4 cao **A1**

Answer: **4**

Question 7

6^1 cao **B1**

Answer: **6^1**

Question 8

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

10000000 cao **A1**

Answer: **10000000**

Question 9

2^{18} cao **B1**

Answer: **2^{18}**

Question 10

$10^{-3} = 1/1000$ or $3^0 = 1$ **M1**

1001/1000 cao **A1**

Answer: **1001/1000**

Question 11

any number to the power 0 is 1 **M1**

5 cao **A1**

Answer: **5**

Question 12

(a) uses index law correctly to get 3^5 or shows $3^2 \times 3^3 = 9 \times 27$ **M1**

(a) 243 cao **A1**

(a) Answer: **243**

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