Index laws with algebra: 10 practice questions

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Name: _____ Date: _____

Attempt all questions and show your working. Suggested time: 15 to 20 minutes. Assume no letter in this test stands for zero.

Section A: Consolidating (Questions 1-4)

Question 1

Simplify, writing each answer as a single power.

(a) $a^5 \times a^3$

(b) $b^{10} \div b^4$

(c) $(c^3)^4$

Question 2

Evaluate, writing fractions or decimals where needed.

(a) 2^{-1}

(b) 5^0

(c) 10^{-2}

(d) 3^{-2}

Question 3

Write each expression with positive indices only.

(a) x^{-3}

(b) $4y^{-2}$

(c) $(1)/(m^{-5})$

Question 4

Simplify:

(a) $3x^2 \times 5x^4$

(b) $12a^7 \div 4a^2$

Section B: Standard (Questions 5-10)

Question 5

Simplify:

(a) $4a^3b^2 \times 3ab^5$

(b) $-2x^2y \times 7x^3y^4$

(c) $\frac{1}{2}m^4 \times 6m$

Question 6

Simplify:

(a) $(24p^6q^3)/(8p^2q)$

(b) $(15x^4y^2)/(20xy^5)$

(c) $(-18a^5b)/(6a^5b)$

Question 7

Simplify:

(a) $(3x^2y)^4$

(b) $(-2a^3)^5$

(c) $((x^2)/(3y))^3$

Question 8

Simplify, writing each answer with positive indices.

(a) $x^5 \times x^{-8}$

(b) $6a^{-2} \times 2a^{-3}$

(c) $(2m^{-3})^2$

(d) $10k^3 \div 5k^7$

Question 9

Simplify:

(a) $(2x^3)^2 \times 3x^4$

(b) $(4a^2b)^3 \div 8a^5b^2$

(c) $(5p^4q \times (pq^2)^3)/(10p^5q^6)$

Question 10

Use the index laws to evaluate without a calculator.

(a) $2^7 \times 2^{-4}$

(b) $(5^3)^2 \div 5^5$

(c) $(\frac{2}{3})^{-2}$

Index laws with algebra: answers

Question 1

Answer: (a) a^8 (b) b^6 (c) c^{12}

Question 2

Answer: (a) ½ (or 0.5) (b) 1 (c) 1/100 (or 0.01) (d) 1/9

Question 3

Answer: (a) $(1)/(x^3)$ (b) $(4)/(y^2)$ (c) m^5

Question 4

Answer: (a) $15x^6$ (b) $3a^5$

Question 5

Answer: (a) $12a^4b^7$ (b) $-14x^5y^5$ (c) $3m^5$

Question 6

Answer: (a) $3p^4q^2$ (b) $(3x^3)/(4y^3)$ (c) -3

Question 7

Answer: (a) $81x^8y^4$ (b) $-32a^{15}$ (c) $(x^6)/(27y^3)$

Question 8

Answer: (a) $(1)/(x^3)$ (b) $(12)/(a^5)$ (c) $(4)/(m^6)$ (d) $(2)/(k^4)$

Question 9

Answer: (a) $12x^{10}$ ($4x^6 \times 3x^4$) (b) $8ab$ ($64a^6b^3 \div 8a^5b^2$) (c) $(p^2q)/(2)$ (also accept $½p^2q$ or $0.5p^2q$)

Question 10

Answer: (a) 8 (2^3) (b) 5 ($5^6 \div 5^5$) (c) 9/4 (also accept 2¼ or 2.25)