# EXPONENTS

## A POSITIVE EXPONENTS

### A.1 WRITING REPEATED MULTIPLICATION IN EXPONENT FORM

**Ex 1:** Write in exponent form:

$$2 \times 2 \times 2 = \square$$

**Ex 2:** Write in exponent form:

$$3 \times 3 \times 3 \times 3 = \square$$

**Ex 3:** Write in exponent form:

$$5 \times 5 = \square$$

**Ex 4:** Write in exponent form:

$$7 \times 7 \times 7 = \square$$

**Ex 5:** Write in exponent form:

$$10 \times 10 \times 10 \times 10 \times 10 = \square$$

### A.2 WRITING IN EXPONENT FORM FROM VERBAL EXPRESSIONS

**Ex 6:** Write in exponent form:

$$2 \text{ raised to the power } 3 = \square$$

**Ex 7:** Write in exponent form:

$$5 \text{ raised to the power } 2 = \square$$

**Ex 8:** Write in exponent form:

$$7 \text{ raised to the power } 4 = \square$$

**Ex 9:** Write in exponent form:

$$10 \text{ raised to the power } 5 = \square$$

### A.3 CALCULATING POWERS

**Ex 10:** Evaluate the power:

$$2^3 = \square$$

**Ex 11:** Evaluate the power:

$$5^2 = \square$$

**Ex 12:** Evaluate the power:

$$3^4 = \square$$

**Ex 13:** Evaluate the power:

$$10^3 = \square$$

### A.4 EXPRESSING NUMBERS IN EXPONENT FORM

**Ex 14:** Write in exponent form:

$$8 = \square$$

**Ex 15:** Write in exponent form:

$$27 = \square$$

**Ex 16:** Write in exponent form:

$$16 = \square$$

**Ex 17:** Write in exponent form:

$$100 = \square$$

### A.5 INTERPRETING POWERS

**MCQ 18:** Determine if the following statement is True or False:

$$2^3 = 2 + 2 + 2$$

☐ True

☐ False

**MCQ 19:** Determine if the following statement is True or False:

$$3^2 = 2 \times 2 \times 2$$

☐ True

☐ False

**MCQ 20:** Determine if the following statement is True or False:

$$4^3 = 4 \times 4 \times 4$$

☐ True

☐ False

**MCQ 21:** Determine if the following statement is True or False:

$$3 \times 4 = 4 + 4 + 4$$

☐ True

☐ False

**MCQ 22:** Determine if the following statement is True or False:

$$3^2 = 2 \times 2 \times 2$$

☐ True

☐ False

### A.6 EVALUATING EXPRESSIONS WITH POWERS

**Ex 23:** Evaluate the expression:

$$2^3 \times 3^2 = \square$$

**Ex 24:** Evaluate the expression:

$$3^2 \times 10^2 = \square$$

**Ex 25:** Evaluate the expression:

$$6 \times 10^3 = \square$$

**Ex 26:** Evaluate the expression:

$$2.5 \times 10^2 = \square$$

### A.7 CHECKING EQUALITY BETWEEN PRODUCTS AND POWERS

**MCQ 27:** Determine if the following statement is True or False:

$$2 \times 2 \times 3 \times 3 = 2^4$$

☐ True

☐ False

**MCQ 28:** Determine if the following statement is True or False:

$$2 \times 2 \times 2 = 3^2$$

☐ True

☐ False

**MCQ 29:** Determine if the following statement is True or False:

$$2 \times 3 \times 2 \times 3 = 2^2 \times 3^2$$

☐ True

☐ False

**MCQ 30:** Determine if the following statement is True or False:

$$5 \times 5 \times 5 \times 4 = 5^3 \times 2^2$$

☐ True

☐ False

### A.8 WRITING REPEATED MULTIPLICATION OF AN ALGEBRAIC EXPRESSION IN EXPONENT FORM

**Ex 31:** Write in exponent form:

$$x \times x \times x = \square$$

**Ex 32:** Write in exponent form:

$$x \times x = \square$$

**MCQ 33:** Which expressions are equal to $x$?

**Choose all answers that apply:**

☐ $x^2$

☐ $x^1$

☐ 1

**Ex 34:** Write in exponent form:

$$x \times x \times x \times x = \square$$

### A.9 WRITING ALGEBRAIC EXPRESSIONS IN EXPONENT FORM FROM VERBAL DESCRIPTIONS

**Ex 35:** Write in exponent form:

$$x \text{ squared} = \square$$

**Ex 36:** Write in exponent form:

$$x \text{ to the power of } 4 = \square$$

**Ex 37:** Write in exponent form:

$$x \text{ cubed} = \square$$

**Ex 38:** Write in exponent form:

$$x \text{ to the power of } 5 = \square$$

## B NEGATIVE EXPONENTS

### B.1 WRITING NEGATIVE EXPONENTS AS FRACTIONS

**Ex 39:** Write as a fraction:

$$3^{-2} = \square$$

**Ex 40:** Write as a fraction:

$$10^{-3} = \square$$

**Ex 41:** Write as a fraction:

$$2^{-1} = \square$$

**Ex 42:** Write as a fraction:

$$5^{-2} = \square$$

### B.2 WRITING FRACTIONS AS NEGATIVE EXPONENTS

**Ex 43:** Write using a negative exponent:

$$\frac{1}{4} = \square$$

**Ex 44:** Write using a negative exponent:

$$\frac{1}{27} = \square$$

**Ex 45:** Write using a negative exponent:

$$\frac{1}{1000} = \square$$

**Ex 46:** Write using a negative exponent:

$$\frac{1}{25} = \square$$

## C EXPONENT LAW 1

### C.1 SIMPLIFYING PRODUCTS OF POWERS

**Ex 47:** Simplify:

$$7^3 \times 7^2 = \square$$

**Ex 48:** Simplify:

$$2^4 \times 2^3 = \square$$

**Ex 49:** Simplify:

$$3^5 \times 3^2 = \square$$

**Ex 50:** Simplify:

$$10^6 \times 10^2 = \square$$

**Ex 51:** Simplify:

$$2^3 \times 2 = \square$$

**Ex 52:** Simplify:

$$3 \times 3^4 = \square$$

### C.2 SIMPLIFYING PRODUCTS OF ALGEBRAIC POWERS

**Ex 53:** Simplify:

$$x^2 \times x^3 = \square$$

**Ex 54:** Simplify:

$$x \times x^2 = \square$$

**Ex 55:** Simplify:

$$x^2 \times x^2 = \square$$

**Ex 56:** Simplify:

$$x^3 \times x = \square$$

### C.3 IDENTIFYING CORRECT EXPONENTIAL EXPRESSIONS

**MCQ 57:** Which expressions are equal to $2^2 + 2^1$?

**Choose all answers that apply:**

☐ 6

☐ $2^3$

☐ $4^3$

**MCQ 58:** Which expressions are equal to $5^2 \times 5^1$ ?

**Choose all answers that apply:**

☐ 25

☐ 125

☐ $5^3$

**MCQ 59:** Which expressions are equal to $3^2 + 3^1$ ?

**Choose all answers that apply:**

☐ 12

☐ $3^3$

☐ $9^3$

**MCQ 60:** Which expressions are equal to $4^3 \times 4^2$ ?

**Choose all answers that apply:**

☐ $4^5$

☐ 64

☐ 1024

### C.4 SIMPLIFYING EXPRESSIONS OF POWERS

**Ex 61:** Simplify:

$$x^{-2}\, x^3 = \square$$

**Ex 62:** Simplify:

$$2^2\, 2^{-3}\, 2^{-3} = \square$$

**Ex 63:** Simplify:

$$x\, x^3\, x^{-2} = \square$$

**Ex 64:** Simplify:

$$x^3 \times x^{-3} = \square$$

# D EXPONENT LAW 2

## D.1 SIMPLIFYING FRACTIONS OF POWERS

**Ex 65:** Simplify:

$$\frac{7^5}{7^2} = \square$$

**Ex 66:** Simplify:

$$\frac{5^6}{5^4} = \square$$

**Ex 67:** Simplify:

$$\frac{2^3}{2^5} = \square$$

**Ex 68:** Simplify:

$$\frac{3}{3^5} = \square$$

**Ex 69:** Simplify:

$$\frac{7^2}{7^6} = \square$$

## D.2 SIMPLIFYING FRACTIONS OF ALGEBRAIC POWERS

**Ex 70:** Simplify:

$$\frac{x^5}{x^2} = \square$$

**Ex 71:** Simplify:

$$\frac{x^6}{x^4} = \square$$

**Ex 72:** Simplify:

$$\frac{x^3}{x^5} = \square$$

**Ex 73:** Simplify:

$$\frac{x}{x^5} = \square$$

**Ex 74:** Simplify:

$$\frac{x^2}{x^6} = \square$$

# E EXPONENT LAW 3

## E.1 SIMPLIFYING POWERS OF POWERS

**Ex 75:** Simplify:

$$\left(5^2\right)^3 = \square$$

**Ex 76:** Simplify:

$$\left(7^3\right)^2 = \square$$

**Ex 77:** Simplify:

$$\left(3^2\right)^4 = \square$$

**Ex 78:** Simplify:

$$\left(2^5\right)^2 = \square$$

## E.2 SIMPLIFYING POWERS OF POWERS

**Ex 79:** Simplify:

$$\left(x^2\right)^3 = \square$$

**Ex 80:** Simplify:

$$\left(x^3\right)^2 = \square$$

**Ex 81:** Simplify:

$$\left(x^2\right)^4 = \square$$

**Ex 82:** Simplify:

$$\left(x^5\right)^2 = \square$$

# F EXPONENT LAW 4

## F.1 SIMPLIFYING POWERS OF PRODUCTS

**Ex 83:** Simplify:

$$(3 \times 5)^2 = \square$$

**Ex 84:** Simplify:

$$(2 \times 3)^4 = \square$$

**Ex 85:** Simplify:

$$(3 \times 7)^3 = \square$$

**Ex 86:** Simplify:

$$(3 \times 5 \times 7)^2 = \square$$

### F.2 SIMPLIFYING POWERS OF PRODUCTS

**Ex 87:** Simplify:

$$(2 \times x)^3 = \square$$

**Ex 88:** Simplify:

$$(x \times 3)^2 = \square$$

**Ex 89:** Simplify:

$$(5 \times x)^4 = \square$$

**Ex 90:** Simplify:

$$(x \times 2)^5 = \square$$

## G EXPONENT LAW 5

### G.1 SIMPLIFYING POWERS OF FRACTIONS

**Ex 91:** Simplify:

$$\left(\frac{5}{3}\right)^2 = \square$$

**Ex 92:** Simplify:

$$\left(\frac{2}{7}\right)^3 = \square$$

**Ex 93:** Simplify:

$$\left(\frac{1}{2}\right)^2 = \square$$

**Ex 94:** Simplify:

$$\left(\frac{1}{3}\right)^3 = \square$$

### G.2 SIMPLIFYING POWERS OF ALGEBRAIC FRACTIONS

**Ex 95:** Simplify:

$$\left(\frac{x}{2}\right)^4 = \square$$

**Ex 96:** Simplify:

$$\left(\frac{1}{x}\right)^3 = \square$$

**Ex 97:** Simplify:

$$\left(\frac{2}{x}\right)^4 = \square$$

**Ex 98:** Simplify:

$$\left(\frac{x}{10}\right)^2 = \square$$

## H ORDER OF OPERATIONS

### H.1 EVALUATING EXPRESSIONS WITH EXPONENTS IN 2 STEPS

**Ex 99:** Evaluate this expression:

$$2 \times 5^2 = \square$$

**Ex 100:** Evaluate this expression:

$$2^3 - 1 = \square$$

**Ex 101:** Evaluate this expression:

$$(2 + 1)^2 = \square$$

**Ex 102:** Evaluate this expression:

$$2^3 \div 4 = \square$$

**Ex 103:** Evaluate this expression:

$$(5 - 2)^2 = \square$$

### H.2 EVALUATING EXPRESSIONS WITH EXPONENTS IN 3 STEPS

**Ex 104:** Evaluate this expression:

$$2^3 \times (8 - 6) = \square$$

**Ex 105:** Evaluate this expression:

$$(2 + 1)^2 - 1 = \square$$

**Ex 106:** Evaluate this expression:

$$(3^2 - 1) \times 4 = \square$$

**Ex 107:** Evaluate this expression:

$$\frac{3^2 - 1}{2} = \square$$

## H.3 FINDING THE OPERATORS

**Ex 108:**

$$3^3 \begin{matrix} \square + \\ \square - \\ \square \times \\ \square \div \end{matrix} 2^2 = 23$$

**Ex 109:**

$$2^4 \begin{matrix} \square + \\ \square - \\ \square \times \\ \square \div \end{matrix} 3^2 = 144$$

**Ex 110:**

$$2^3 \begin{matrix} \square + \\ \square - \\ \square \times \\ \square \div \end{matrix} 4 = 2$$

**Ex 111:**

$$(2+1)^2 \begin{matrix} \square + \\ \square - \\ \square \times \\ \square \div \end{matrix} 1 = 10$$

## H.4 COMBINING NEGATIVE POWERS WITH ARITHMETIC

**Ex 112:** Write as a fraction:

$$1 + 2^{-1} = \square$$

**Ex 113:** Write as a fraction:

$$3^{-1} - 1 = \square$$

**Ex 114:** Write as a fraction:

$$5 \times 3^{-2} = \square$$

**Ex 115:** Write as a fraction:

$$\frac{4}{5} \times 2^{-2} = \square$$

## H.5 SIMPLIFYING ALGEBRAIC EXPRESSIONS

**Ex 116:** Simplify the expression:

$$2x^2 + 3x^2 = \square$$

**Ex 117:** Simplify the expression:

$$3x^2 - x^2 = \square$$

**Ex 118:** Simplify the expression:

$$2x^2 + 3x + x = \square$$

**Ex 119:** Simplify the expression:

$$x^2 + 2x + x^2 + 5x + 1 = \square$$

**Ex 120:** Simplify the expression:

$$3x^2 + 4 + 2x + x^2 + 6x + 1 = \square$$

**Ex 121:** Simplify the expression:

$$(2x - x)^2 = \square$$

## H.6 SIMPLIFYING EXPRESSIONS OF POWERS

**Ex 122:** Simplify:

$$\frac{2^3}{2} \times 2^3 = \square$$

**Ex 123:** Simplify:

$$x^3 \times \frac{x^4}{x^2} = \square$$

**Ex 124:** Simplify:

$$\frac{x}{x^2}\, x^{-1} = \square$$

**Ex 125:** Simplify:

$$\frac{2^2}{2 \times 2^3} = \square$$

**Ex 126:** Simplify:

$$\left(\frac{x}{2}\right)^2 \times 4 = \square$$

**Ex 127:** Simplify:

$$\frac{x^3 \times \left(x^2\right)^2}{x^4} = \square$$