

# Exponents Review ~ Developing

Name: \_\_\_\_\_

## Base and Exponent

Identify the base and exponent.

1) $8^3$ Base = _____ Exponent = _____	2) $(-5)^4$ Base = _____ Exponent = _____	3) $(-4)^6$ Base = _____ Exponent = _____
4) $3^5$ Base = _____ Exponent = _____	5) $7^5$ Base = _____ Exponent = _____	6) $6^4$ Base = _____ Exponent = _____
7) $(-1)^3$ Base = _____ Exponent = _____	8) $(-9)^7$ Base = _____ Exponent = _____	9) $2^8$ Base = _____ Exponent = _____
10) $9^2$ Base = _____ Exponent = _____	11) $4^9$ Base = _____ Exponent = _____	12) $(-2)^8$ Base = _____ Exponent = _____
13) $(-7)^4$ Base = _____ Exponent = _____	14) $8^2$ Base = _____ Exponent = _____	15) $2^6$ Base = _____ Exponent = _____
16) $5^7$ Base = _____ Exponent = _____	17) $(-7)^2$ Base = _____ Exponent = _____	18) $(-6)^9$ Base = _____ Exponent = _____
19) $9^3$ Base = _____ Exponent = _____	20) $3^8$ Base = _____ Exponent = _____	21) $(-4)^0$ Base = _____ Exponent = _____

Name: \_\_\_\_\_

**Exponents**

**(A) Rewrite in expanded form:**

1)  $23^7$

= \_\_\_\_\_

2)  $3^8$

= \_\_\_\_\_

3)  $5^9$

= \_\_\_\_\_

4)  $18^6$

= \_\_\_\_\_

**(B) Rewrite in exponent form:**

1)  $4 \times 4 \times 4 \times 4 \times 4 \times 4 \times 4$

= \_\_\_\_\_

2)  $22 \times 22 \times 22 \times 22 \times 22 \times 22$

= \_\_\_\_\_

3)  $9 \times 9 \times 9 \times 9$

= \_\_\_\_\_

4)  $17 \times 17 \times 17 \times 17 \times 17$

= \_\_\_\_\_

**(C) Rewrite in standard form:**

1)  $2^{10}$

= \_\_\_\_\_

2)  $11^3$

= \_\_\_\_\_

3)  $4^4$

= \_\_\_\_\_

4)  $13^2$

= \_\_\_\_\_

5)  $5^4$

= \_\_\_\_\_

6)  $9^3$

= \_\_\_\_\_

7)  $8^3$

= \_\_\_\_\_

8)  $15^2$

= \_\_\_\_\_

9)  $1^9$

= \_\_\_\_\_

10)  $6^4$

= \_\_\_\_\_

Name: \_\_\_\_\_

Evaluate the Expressions

1) $3^6 + 2^9$	2) $2^{10} - 4^3$	3) $10^3 + 13^2$
4) $8^2 + 3^4$	5) $4^5 + 5^2$	6) $4^2 \times 12^2$
7) $3^7 \div 3^4$	8) $8^4 \div 2^4$	9) $9^2 \times 2^5$
10) $6^4 + 7^2$	11) $2^2 \times 3^4$	12) $8^3 - 5^2$
13) $12^5 \div 8^3$	14) $3^4 \times 4^2$	15) $6^9 \div 3^9$
16) $9^5 \div 3^7$	17) $4^3 \times 4^2$	18) $5^5 - 3^7$
19) $10^3 - 8^2$	20) $11^3 - 9^3$	21) $7^3 - 14^2$

Name: \_\_\_\_\_

### Exponent Rules

Use product rule to rewrite each expression as single positive exponent.

1) $5^8 \times 5^5$	2) $18^4 \times 18^3$	3) $13^6 \times 13^5$
4) $16^3 \times 16^6$	5) $12^7 \times 12^3$	6) $9^9 \times 9^2$

Use quotient rule to rewrite each expression as single positive exponent.

1) $4^8 \div 4^5$	2) $19^7 \div 19^6$	3) $7^5 \div 7^4$
4) $10^3 \div 10$	5) $12^{15} \div 12^8$	6) $9^8 \div 9^8$

Use power rule to rewrite each expression as single positive exponent.

1) $(15^9)^7$	2) $(7^3)^6$	3) $(17^4)^7$
4) $(3^5)^4$	5) $(2^8)^8$	6) $(5^3)^2$

Name: \_\_\_\_\_

**Exponent Rules**

Use laws of exponents and simplify. Write your answers in positive exponents.

1) $\frac{p^8}{p^6}$	2) $c^6 \cdot c^5$	3) $(h^9)^{10}$
4) $(y^2)^9$	5) $w^4 \cdot w^7$	6) $\frac{a^{10}}{a^2}$
7) $(b^{10})^8$	8) $n^2 \cdot n^{10}$	9) $(p^4)^6$
10) $r^4 \cdot r^3$	11) $(s^7)^5$	12) $\frac{k^5}{k}$
13) $\frac{w^9}{w^3}$	14) $u^7 \cdot u^6$	15) $\frac{z^7}{z^6}$

Name: \_\_\_\_\_

**Exponent Rules**

Use laws of exponents and simplify. Write your answers in positive exponents.

1) $(n^6)^5$	2) $s^4 \cdot s^{10}$	3) $\frac{b^7}{b^5}$
4) $(k^{10})^7$	5) $\frac{y^8}{y^8}$	6) $(z^4)^9$
7) $\frac{m^9}{m^4}$	8) $r^{10} \cdot r^6$	9) $g^9 \cdot g^2$
10) $\frac{r^{10}}{r^5}$	11) $(p^3)^8$	12) $h^4 \cdot h^5$
13) $(d^4)^6$	14) $q^8 \cdot q^2$	15) $\frac{l^6}{l^4}$

# Exponents Review ~ Proficient

Name: \_\_\_\_\_

## Base and Exponent

Identify the base and exponent.

1) $8^3$ Base = _____ Exponent = _____	2) $(-5)^4$ Base = _____ Exponent = _____	3) $(-4)^6$ Base = _____ Exponent = _____
4) $-3^{-5}$ Base = _____ Exponent = _____	5) $7^5$ Base = _____ Exponent = _____	6) $6^4$ Base = _____ Exponent = _____
7) $(-1)^3$ Base = _____ Exponent = _____	8) $-(-9)^7$ Base = _____ Exponent = _____	9) $2^8$ Base = _____ Exponent = _____
10) $9^2$ Base = _____ Exponent = _____	11) $4^9$ Base = _____ Exponent = _____	12) $(-2)^8$ Base = _____ Exponent = _____
13) $(-7)^4$ Base = _____ Exponent = _____	14) $8^2$ Base = _____ Exponent = _____	15) $-2^6$ Base = _____ Exponent = _____
16) $5^7$ Base = _____ Exponent = _____	17) $(-7)^2$ Base = _____ Exponent = _____	18) $-(-6)^9$ Base = _____ Exponent = _____
19) $-9^3$ Base = _____ Exponent = _____	20) $3^8$ Base = _____ Exponent = _____	21) $(-4)^0$ Base = _____ Exponent = _____

Name: \_\_\_\_\_

**Exponents**

**(A) Rewrite in expanded form:**

1)  $(-12)^4$

= \_\_\_\_\_

2)  $2^9$

= \_\_\_\_\_

3)  $(-24)^3$

= \_\_\_\_\_

4)  $-7^8$

= \_\_\_\_\_

**(B) Rewrite in exponent form:**

1)  $18 \times 18 \times 18$

= \_\_\_\_\_

2)  $(-3) \times (-3) \times (-3) \times (-3) \times (-3)$

= \_\_\_\_\_

3)  $-(23 \times 23 \times 23 \times 23)$

= \_\_\_\_\_

4)  $(-8) \times (-8) \times (-8) \times (-8)$

= \_\_\_\_\_

**(C) Rewrite in standard form:**

1)  $(-5)^4$

= \_\_\_\_\_

2)  $12^2$

= \_\_\_\_\_

3)  $-(-8)^3$

= \_\_\_\_\_

4)  $(-1)^7$

= \_\_\_\_\_

5)  $(-10)^3$

= \_\_\_\_\_

6)  $-9^3$

= \_\_\_\_\_

7)  $13^2$

= \_\_\_\_\_

8)  $(-14)^2$

= \_\_\_\_\_

9)  $-2^6$

= \_\_\_\_\_

10)  $7^3$

= \_\_\_\_\_



Name : \_\_\_\_\_

## Parentheses in PEMDAS

Solve.

1)  $(83 - 38) \div 3^2$

Ans =

2)  $(36 \div 9)^3 - 87$

Ans =

3)  $(7^2 + 41) \div 3 - 94$

Ans =

4)  $(14 \times 5) + 2^5$

Ans =

5)  $3^2 + (26 - 9) \times 2$

Ans =

6)  $7 + 66 \div (2^4 - 5)$

Ans =

7)  $(64 + 24) \div 2^3$

Ans =

8)  $(55 - 45)^2 \div 4$

Ans =

9)  $14 + 75 - (31 \times 3^2)$

Ans =

10)  $3^3 + 77 \div (27 - 16)$

Ans =

Name: \_\_\_\_\_

**Exponential Rules**

Use laws of exponents to rewrite each expression as single positive exponent:

1) $\frac{18^4 \times 18^5}{18^6}$	2) $((-9)^3)^4 \times (-9)^6$	3) $(11^{-4})^3 \div (11^6)^2$
4) $((-7)^4)^8 \div (-7)^9$	5) $\frac{13^7 \times 13^8}{13^{-8}}$	6) $((-13)^2)^6 \times (-13)^7$
7) $(8^5)^7 \div 8^9$	8) $19^6 \times (19^4)^5$	9) $\frac{20^{10} \times 20^8}{20^{-9}}$
10) $(3^8)^3 \times 3^5 \times 3^{-4}$	11) $\frac{3^{15}}{3^{-4} \times 3^{10}}$	12) $(6^5)^{12} \div (6^7)^8$
13) $\frac{(-5)^{25}}{(-5)^6 \times (-5)^4}$	14) $6^7 \times (6^5)^3 \times 6^{-9}$	15) $(-5)^7 \div ((-5)^4)^0$

Name: \_\_\_\_\_

**Exponent Rules**

Use laws of exponents and simplify. Write your answers in \_\_\_\_\_ exponents.

1) $\left(\frac{x^7 y^3}{x^2 y}\right)^4$	2) $(a^3 b)^4 (ab^6)^2$	3) $\left(\frac{8m^5 n^7}{2mn^5}\right)^3$
4) $(5p^3 q^2)(2p^4 q)^2$	5) $\frac{(8k^{-5})(2k^3)}{4k^6}$	6) $(b^3 c^7)^2 (b^3 c^2)^{-3}$
7) $\left(\frac{6lm^8}{3l^2 m^6}\right)^2$	8) $\left(\frac{2r^{-5} s^6}{r^3 s^4}\right)(3r^9 s^{-4})$	9) $(u^3 v^6)\left(\frac{9u^{-5} v^2}{3u^6 v^8}\right)$
10) $\frac{8t^5 w^6}{(2v^3 w^2)(v^6 w)}$	11) $\left(\frac{3s^{12} t^7}{6s^3 t^5}\right)^4$	12) $(3l^2 m^3)(2m^{-5})^2 (lm^4)^{-3}$
13) $(4u^2 v)^{-3} (u^{-5} v^6)^2 (u^8 w^9)^0$	14) $\left(\frac{6x^3 y^5}{2xy^2 z^0}\right)^5$	15) $\frac{(2a^{-3} b)(6b^5 c^{17})}{4c^9}$

Name: \_\_\_\_\_

**Exponent Rules**

Use laws of exponents and simplify. Write your answers in \_\_\_\_\_ exponents.

1)  $\left(\frac{p^{-7}q^2}{p^2q}\right)^2$

2)  $(a^{-2}b)^3(ab^{-7})$

3)  $\left(\frac{-6u^{-5}v^2}{-2u^4v^2}\right)^2$

4)  $(-8m^{-3}n^2)(2m^5n)^3$

5)  $\frac{(5r^{-2})(2r^{-6})}{7r^5}$

6)  $\left(\frac{-3x^2y^3}{x^{-4}y^2}\right)(-2x^{-8}y^{-2})$

7)  $\left(\frac{-9m^7n^3}{3m^4n^{-5}}\right)^2$

8)  $(s^4t^2)^3(s^{-5}t^3)^2$

9)  $(-8r^3s^{-5})\left(\frac{r^7s^{-5}}{2r^{-4}s^7}\right)$

10)  $\frac{6l^7m^{-3}}{(l^5m^{-2})(2lm)}$

11)  $\left(\frac{-4b^{12}c^3}{-8b^4c^0}\right)^3$

12)  $(-5a^2b^4)(2bc^{-3})^2(-3c^4)^3$

13)  $\frac{(4l^3m^{-2})(2m^{-3}n^5)}{8n}$

14)  $\left(\frac{9p^2q^{-3}}{27pq^3r^{-2}}\right)^0$

15)  $(-8x^2y)(y^3z^{-2})^2(2x^{-3}y^2)^3$

# Exponents Review ~ Extending

Name: \_\_\_\_\_

## Base and Exponent

Identify the base and exponent.

1) $\left(\frac{2}{3}\right)^2$ Base = _____ Exponent = _____	2) $6^4$ Base = _____ Exponent = _____	3) $-(-9)^3$ Base = _____ Exponent = _____
4) $\left(-\frac{5}{8}\right)^0$ Base = _____ Exponent = _____	5) $\left(\frac{8}{9}\right)^4$ Base = _____ Exponent = _____	6) $\left(-\frac{1}{6}\right)^6$ Base = _____ Exponent = _____
7) $-5^7$ Base = _____ Exponent = _____	8) $\left(-\frac{3}{8}\right)^4$ Base = _____ Exponent = _____	9) $\left(\frac{4}{7}\right)^3$ Base = _____ Exponent = _____
10) $\left(-\frac{7}{4}\right)^2$ Base = _____ Exponent = _____	11) $-2^9$ Base = _____ Exponent = _____	12) $\left(\frac{5}{4}\right)^6$ Base = _____ Exponent = _____
13) $\left(\frac{4}{5}\right)^7$ Base = _____ Exponent = _____	14) $\left(\frac{1}{8}\right)^5$ Base = _____ Exponent = _____	15) $(-2)^7$ Base = _____ Exponent = _____
16) $-(-8)^{-3}$ Base = _____ Exponent = _____	17) $\left(\frac{6}{7}\right)^{-5}$ Base = _____ Exponent = _____	18) $(-3)^8$ Base = _____ Exponent = _____

Name: \_\_\_\_\_

Exponents

(A) Rewrite in expanded form:

1)  $\left(\frac{4}{7}\right)^3$

= \_\_\_\_\_

2)  $(6.3)^5$

= \_\_\_\_\_

3)  $(0.9)^6$

= \_\_\_\_\_

3)  $- \left(-\frac{8}{5}\right)^4$

= \_\_\_\_\_

(B) Rewrite in exponent form:

1)  $\frac{5}{9} \times \frac{5}{9} \times \frac{5}{9} \times \frac{5}{9} \times \frac{5}{9} \times \frac{5}{9} \times \frac{5}{9} \times \frac{5}{9} \times \frac{5}{9}$

= \_\_\_\_\_

2)  $(9.4 \times 9.4 \times 9.4 \times 9.4 \times 9.4 \times 9.4)$

= \_\_\_\_\_

3)  $4.3 \times 4.3 \times 4.3 \times 4.3 \times 4.3 \times 4.3 \times 4.3$

= \_\_\_\_\_

4)  $\left(-\frac{2}{3}\right) \times \left(-\frac{2}{3}\right) \times \left(-\frac{2}{3}\right) \times \left(-\frac{2}{3}\right) \times \left(-\frac{2}{3}\right)$

= \_\_\_\_\_

(C) Rewrite standard form:

1)  $\left(\frac{1}{4}\right)^4$

= \_\_\_\_\_

2)  $(0.5)^3$

= \_\_\_\_\_

3)  $-(1.6)^2$

= \_\_\_\_\_

4)  $\left(\frac{9}{2}\right)^3$

= \_\_\_\_\_

5)  $(3.8)^3$

= \_\_\_\_\_

6)  $- \left(-\frac{8}{3}\right)^2$

= \_\_\_\_\_

7)  $\left(-\frac{7}{5}\right)^3$

= \_\_\_\_\_

8)  $(5.2)^4$

= \_\_\_\_\_

Name : \_\_\_\_\_

## Nested parentheses in PEMDAS

Solve.

1)  $2 - 3^2 \div (1 + (2 \times 4))$

Ans =

2)  $5 - ((4 + 2^4) \times 8) \div 16 + 11$

Ans =

3)  $14 \div 2 + ((6 \times 7) + 4^3) \div 2$

Ans =

4)  $((7 \times 3) + 9) \div 10 - 5^2$

Ans =

5)  $((3 \times 6^2) + 5) - 9 \div 3$

Ans =

6)  $((4 \times 2^5) \div 4) - 15 + 12$

Ans =

7)  $72 + ((59 - 5) \div 3^3) \times 5 + 13$

Ans =

8)  $8 + ((3^2 \times 6) - 18) \div 9$

Ans =

9)  $81 + 45 \div ((4 + 1) \times 3) - 4^3$

Ans =

10)  $15 - ((11 + 4) \times 2^2) + 10$

Ans =

Name: \_\_\_\_\_

**Exponential Rules**

Use laws of exponents to rewrite each expression as single exponent:

1) $\left(\frac{3^7 \times 3^3}{3^9}\right)^5$	2) $\left(\frac{10^9 \times 10^5}{10^6 \times 10^4}\right)^2$	3) $\left(\left(13^7 \times \frac{13^5}{13^3 \times 13^4}\right)^2\right)^6$
4) $\left(\left(\frac{11^9}{11^2 \times 11^3}\right)^{-2}\right)^4$	5) $12^5 \times \left(\frac{12^6 \times 12^3}{12^4}\right)^{-2}$	6) $\left(\frac{19^3 \times 19^2}{19^4}\right)^{-5} \times (19^2)^5$
7) $\left(\left(\frac{5^2}{5^6}\right)^{-3} \times \left(\frac{5^3}{5^4}\right)^{-2}\right)^{-2}$	8) $\left(\frac{(15^{-5} \times 15^3)^2}{15^{-6}}\right)^4$	9) $\left(\left(\frac{2^{-7} \times 2^{-3}}{2^{-5}}\right)^4 \times 2^7\right)^2$
10) $\left(\frac{7}{9}\right)^5 \times \left(\frac{\left(\frac{7}{9}\right)^3}{\left(\frac{7}{9}\right)^{-2} \times \left(\frac{7}{9}\right)^{-4}}\right)^2$	11) $\left(\frac{\left(\frac{2}{3}\right)^{-4} \times \left(\frac{2}{3}\right)^3}{\left(\frac{2}{3}\right)^5}\right)^{-2}$	12) $\left(\frac{(3^2)^{-5} \times (3^5)^{-2}}{(3^{-3})^4 \times (3^{-5})^3}\right)^7$
13) $\left(\frac{\left(\frac{4}{7}\right)^5 \times \left(\frac{4}{7}\right)^4}{\left(\frac{4}{7}\right)^{-3} \times \left(\frac{4}{7}\right)^{-4}}\right)^2$	14) $\left(\frac{\left(\frac{-5}{9}\right)^3 \times \left(\frac{-5}{9}\right)^4}{\left(\frac{-5}{9}\right)^{-3} \times \left(\frac{-5}{9}\right)^{-3}}\right)^{-2}$	15) $\left(\frac{15}{17}\right)^2 \times \left(\frac{\left(\frac{15}{17}\right)^5}{\left(\frac{15}{17}\right)^{-4} \times \left(\frac{15}{17}\right)^{-3}}\right)^3$



Name: \_\_\_\_\_

**Exponent Rules**

Use laws of exponents and simplify. Write your answers in exponents.

1) $\left(\frac{x^7y^3}{x^2y}\right)^4$	2) $(a^3b)^4(ab^6)^2$	3) $\left(\frac{8m^5n^7}{2mn^5}\right)^3$
4) $(5p^3q^2)(2p^4q)^2$	5) $\frac{(8k^{-5})(2k^3)}{4k^{-6}}$	6) $(b^{-3}c^{-7})^{-2}(b^3c^{-2})^{-3}$
7) $\left(\frac{6lm^2}{3l^3m^6}\right)^2$	8) $\left(\frac{2r^{-5}s^6}{r^3s^4}\right)(3r^9s^{-4})$	9) $(u^{-3}v^5)\left(\frac{9u^{-5}v^2}{3u^6v^{-8}}\right)$
10) $\frac{8v^5w^{-6}}{(2v^{-3}w^2)(v^6w)}$	11) $\left(\frac{3s^{-2}t^7}{6s^3t^{-5}}\right)^4$	12) $(3l^{-2}m^3)(2m^{-5})^2(lm^4)^{-3}$
13) $(4u^2v)^3(u^{-5}v^6)^2(u^{-8}w^{-9})$	14) $\left(\frac{6x^{-3}y^5}{2xy^2z^6}\right)^5$	15) $\frac{(2a^{-3}b)(6b^5c^{-7})}{4c^{-9}}$

Name: \_\_\_\_\_

**Exponent Rules**

Use laws of exponents and simplify. Write your answers in \_\_\_\_\_ exponents.

1) $\left(\frac{p^{-7}q^2}{p^2q^{-8}}\right)^2$	2) $(a^{-2}b)^{-3}(ab^{-7})$	3) $\left(\frac{-6u^{-5}v^2}{-2u^4n^3}\right)^2$
4) $(-8m^{-3}n^2)(2m^5n)^3$	5) $\frac{(5r^{-2})(2r^{-6})}{7r^5}$	6) $\left(\frac{-3x^2y^3}{x^{-4}y^2}\right)(-2x^{-8}y^{-2})$
7) $\left(\frac{-9mn^{-3}}{3m^4n^{-5}}\right)^2$	8) $(s^4t^2)^3(s^{-5}t^3)^2$	9) $(-8r^3s^{-5})\left(\frac{r^7s^{-5}}{2r^{-4}s^7}\right)$
10) $\frac{6l^7m^{-3}}{(l^5m^{-2})(2lm^3)}$	11) $\left(\frac{-4b^{-2}c^3}{-8b^4c^{-7}}\right)^3$	12) $(-5a^2b^4)(2bc^{-3})^2(-3c^4)^3$
13) $\frac{(4l^3m^{-2})(2m^{-3}n^5)}{8n^7}$	14) $\left(\frac{9p^2q^{-3}}{27pq^3r^{-2}}\right)^2$	15) $(-8x^2y)(y^3z^{-2})^{-2}(2x^{-3}y^2)^3$