Exponents Lesson #7:
Practice Test

1. The base and the exponent in the power $(-2)^4$ are respectively

   A. 4 and −2 B. 4 and 2 C. −2 and 4 D. 2 and 4

2. The coefficient in $-\frac{2x^5}{3}$ is

   A. −2 B. $-\frac{2}{3}$ C. 5 D. 2

3. $-a^0$ is equivalent to

   A. 0 B. 1 C. $-a$ D. −1

4. Consider the following two statements about repeated multiplication.

   Statement 1. $5pq^3 = 5 \times p \times q \times q \times q$ Statement 2. $6(xy)^2 = 6 \times 6 \times x \times x \times y \times y$

   Which one of the following is true?

   A. Statement 1 is correct and Statement 2 is incorrect.

   B. Statement 2 is correct and Statement 1 is incorrect.

   C. Both statements are correct.

   D. Both statements are incorrect.

5. Which of the following can be simplified to a^6?

   I $a^3 \times a^2$ II $a^4 + a^2$ III $a^{12} \div a^2$ IV $a^8 - a^2$

   A. I and III only

   B. II and IV only

   C. I, II, III, and IV

   D. none of I, II, III, and IV

6. $5a^3 \times 2a^4$ can be simplified to

   A. $7a^{12}$ B. $10a^7$ C. $10a^{12}$ D. $7a^7$

Use the following information to answer the next question.

$(2^a)^4 = 2^8$	$(3^2)^b = 3^8$
$\frac{4^c}{4^2} = 4^3$	$5^d \cdot 5^3 = 5^9$

Numerical Response

1. Write the value of a in the first box.
Write the value of b in the second box.
Write the value of c in the third box.
Write the value of d in the fourth box.

(Record your answer in the numerical response box from left to right)

7. $\frac{5a^{16}}{10a^4}$ can be written as

A. $\frac{1}{2}a^{12}$ **B.** $2a^{12}$ **C.** $\frac{1}{2}a^4$ **D.** $2a^4$

Use the following information to answer the next two questions.

$(-2p^3q)(-3pq^2)(-4q^6)^2$ can be written in the form $a\,p^xq^y$ where a, x, and y are integers.

8. The value of a is

A. 96

B. −96

C. 24

D. −24

Numerical Response

2. The value of $x + y$ is _____ .

(Record your answer in the numerical response box from left to right)

9. x^{-3} is equivalent to

A. $\frac{1}{x^3}$ **B.** $\frac{1}{x^{-3}}$ **C.** $-3x$ **D.** $\frac{1}{x^{\frac{1}{3}}}$

10. $\frac{6x^3}{2x^{-4}}$ can be simplified to

A. $3x^{-1}$ B. $3x^7$ C. $4x^7$ D. $4x^{-1}$

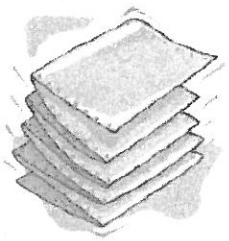
11. $5x^{-2}$ is equivalent to

A. $\frac{1}{5x^2}$ B. $-10x$ C. $\frac{1}{25x^2}$ D. $\frac{5}{x^2}$

12. If $(4.6 \times 10^{-3}) \times (3.5 \times 10^7) = 1.61 \times 10^n$, then the value of n is

A. 3
B. 4
C. 5
D. 6

13. A piece of paper is 8.1×10^{-5} m thick. Approximately how many pieces of paper are required to make a stack two metres high?



A. 25 000
B. 40 000
C. 250 000
D. 400 000

14. Expressed in radical form $x^{\frac{3}{5}}$ is equivalent to

A. $\sqrt[3]{x^5}$ B. $5\sqrt{x^3}$ C. $\sqrt[5]{x^3}$ D. $\frac{1}{5}\sqrt{x^3}$

Numerical Response

3. The number 27.1×10^4 can be written in scientific notation in the form $a \times 10^n$. The value of $a + n$ is ____.

(Record your answer in the numerical response box from left to right)

15. If a is positive, which of the following must be negative?

A. $a^{-\frac{4}{5}}$ **B.** $a^{-\frac{5}{4}}$ **C.** $(-a)^{-\frac{4}{5}}$ **D.** $-a^{\frac{5}{4}}$

Numerical Response

4. If $p = 4$ and $q = -8$ the value of $p^{\frac{3}{2}} - q^{-\frac{2}{3}}$ to the nearest hundredth is ____.

(Record your answer in the numerical response box from left to right)

Numerical Response

5. $\left(\sqrt[3]{a^4}\right)\left(\sqrt{a^3}\right)$ can be written in the form $a^{\frac{p}{6}}$. The value of p is _____.

(Record your answer in the numerical response box from left to right)

Written Response - 5 marks

Use the following information to answer the next question.

The average person is 1.65 m tall.
The average human has 1.25×10^5 hairs on his/her head.
The current population of the earth is approximately 6.80×10^9.
The circumference of the Earth is about 4.00×10^7 metres.
The mass of the Earth is about 5.98×10^{24} kg.
The mass of the Sun is about 1.99×10^{30} kg.
The mass of the lightest planet Mercury is about 3.30×10^{23} kg.
The mass of an electron is approximately 9.11×10^{-31} kg.

1.

- Determine, to the nearest million, the number of people laid end to end it would it take to encircle the earth.

- Determine an estimate for the total number of hairs on the heads of all the people on the earth. Answer in scientific notation to the nearest hundredth.

- Approximately how many electrons would have the same mass as the planet Mercury. Answer in scientific notation to the nearest hundredth.

- How many times heavier is the Sun than the combined mass of the Earth and Mercury? Answer in standard decimal form to the nearest one thousand.

Answer Key

1. C **2.** B **3.** D **4.** A **5.** D **6.** B **7.** A **8.** A

9. A **10.** B **11.** D **12.** C **13.** A **14.** C **15.** D

1.

2	4	5	6

2.

1	9		

3.

7	.	7	1

4.

7	.	7	5

5.

1	7		

Written Response #1

- 24 000 000
- 8.50×10^{14}
- 3.62×10^{53}
- 315 000

Exponents Lesson #7:
Practice Test

1. The base and the exponent in the power $(-2)^4$ are respectively

   A. 4 and −2 **B.** 4 and 2 **C.** −2 and 4 **D.** 2 and 4

2. The coefficient in $-\frac{2x^5}{3}$ is

   A. −2 **B.** $-\frac{2}{3}$ **C.** 5 **D.** 2

3. $-a^0$ is equivalent to

   A. 0 **B.** 1 **C.** $-a$ **D.** −1

4. Consider the following two statements about repeated multiplication.

   Statement 1. $5pq^3 = 5 \times p \times q \times q \times q$ Statement 2. $6(xy)^2 = 6 \times 6 \times x \times x \times y \times y$

   Which one of the following is true?

   A. Statement 1 is correct and Statement 2 is incorrect.

   B. Statement 2 is correct and Statement 1 is incorrect.

   C. Both statements are correct.

   D. Both statements are incorrect.

5. Which of the following can be simplified to a^6?

   I $a^3 \times a^2$ a^5 II $a^4 + a^2$ × III $a^{12} \div a^2$ a^{10} IV $a^8 - a^2$ ×

   A. I and III only

   B. II and IV only

   C. I, II, III, and IV

   D. none of I, II, III, and IV

6. $5a^3 \times 2a^4$ can be simplified to

   A. $7a^{12}$ **B.** $10a^7$ **C.** $10a^{12}$ **D.** $7a^7$

Use the following information to answer the next question.

$(2^a)^4 = 2^8$ $a = 2$	$(3^2)^b = 3^8$ $b = 4$
$\frac{4^c}{4^2} = 4^3$ $c = 5$	$5^d \cdot 5^3 = 5^9$ $d = 6$

Numerical Response

1. Write the value of a in the first box.
Write the value of b in the second box.
Write the value of c in the third box.
Write the value of d in the fourth box.

(Record your answer in the numerical response box from left to right)

2	4	5	6

7. $\frac{5a^{16}}{10a^4}$ can be written as

(A.) $\frac{1}{2}a^{12}$ **B.** $2a^{12}$ **C.** $\frac{1}{2}a^4$ **D.** $2a^4$

Use the following information to answer the next two questions.

$(-2p^3q)(-3pq^2)(-4q^6)^2$ can be written in the form $a\,p^x q^y$ where a, x and y are integers.

8. The value of a is $(-2p^3q)(-3pq^2)(16q^{12})$

$= 96p^4q^{15}$

$a = 96$

$x = 4$, $y = 15$ $\Rightarrow x + y = 19$

(A.) 96

B. −96

C. 24

D. −24

Numerical Response

2. The value of $x + y$ is _____ .

(Record your answer in the numerical response box from left to right)

1	9		

9. x^{-3} is equivalent to

(A.) $\frac{1}{x^3}$ **B.** $\frac{1}{x^{-3}}$ **C.** $-3x$ **D.** $\frac{1}{x^{\frac{1}{3}}}$

10. $\frac{6x^3}{2x^{-4}}$ can be simplified to

A. $3x^{-1}$ (B.) $3x^7$ C. $4x^7$ D. $4x^{-1}$

11. $5x^{-2}$ is equivalent to $5 \cdot \frac{1}{x^2}$

A. $\frac{1}{5x^2}$ B. $-10x$ C. $\frac{1}{25x^2}$ (D.) $\frac{5}{x^2}$

12. If $(4.6 \times 10^{-3}) \times (3.5 \times 10^7) = 1.61 \times 10^n$, then the value of n is

A. 3 16.1×10^4
B. 4 $= 1.61 \times 10 \times 10^4$
(C.) 5 $= 1.61 \times 10^5$ $n = 5$
D. 6

13. A piece of paper is 8.1×10^{-5} m thick. Approximately how many pieces of paper are required to make a stack two metres high?

(A.) 25 000 $\frac{2}{8.1 \times 10^{-5}} = 24691$
B. 40 000
C. 250 000
D. 400 000

14. Expressed in radical form $x^{\frac{3}{5}}$ is equivalent to

A. $\sqrt[3]{x^5}$ B. $5\sqrt{x^3}$ (C.) $\sqrt[5]{x^3}$ D. $\frac{1}{5}\sqrt{x^3}$

Numerical Response

3. The number 27.1×10^4 can be written in scientific notation in the form $a \times 10^n$. The value of $a + n$ is ____.

(Record your answer in the numerical response box from left to right)

7	.	7	1

$2.71 \times 10 \times 10^4 = 2.71 \times 10^5$

$a = 2.71$ $n = 5$ $a + n = 7.71$

15. If a is positive, which of the following must be negative?

A. $a^{-\frac{4}{5}}$ B. $a^{-\frac{5}{4}}$ C. $(-a)^{-\frac{4}{5}}$ (D.) $-a^{\frac{5}{4}}$

$\frac{1}{\sqrt[5]{a^4}}$ $\frac{1}{\sqrt[4]{a^5}}$ $\frac{1}{\sqrt[5]{(-a)^4}}$ $-\sqrt[4]{a^5}$

positive positive positive negative

Numerical Response **4.** If $p = 4$ and $q = -8$ the value of $p^{\frac{3}{2}} - q^{-\frac{2}{3}}$ to the nearest hundredth is ____.

(Record your answer in the numerical response box from left to right)

7	.	7	5

$4^{\frac{3}{2}} - (-8)^{-\frac{2}{3}}$

$= (\sqrt{4})^3 - \frac{1}{(\sqrt[3]{-8})^2}$

$= 2^3 - \frac{1}{(-2)^2} = 8 - \frac{1}{4} = 7.75$

Numerical Response **5.** $\left(\sqrt[3]{a^4}\right)\left(\sqrt{a^3}\right)$ can be written in the form $a^{\frac{p}{6}}$. The value of p is ____.

(Record your answer in the numerical response box from left to right)

1	7		

$(a^{\frac{4}{3}})(a^{\frac{3}{2}})$

$= a^{\frac{4}{3}+\frac{3}{2}}$

$= a^{\frac{17}{6}}$ $p = 17$

Written Response - 5 marks

Use the following information to answer the next question.

The average person is 1 .65 m tall.
The average human has 1.25×10^5 hairs on his/her head.
The current population of the earth is approximately 6.80×10^9.
The circumference of the Earth is about 4.00×10^7 metres.
The mass of the Earth is about 5.98×10^{24} kg.
The mass of the Sun is about 1.99×10^{30} kg.
The mass of the lightest planet Mercury is about 3.30×10^{23} kg.
The mass of an electron is approximately 9.11×10^{-31} kg.

1.

- Determine, to the nearest million, the number of people laid end to end it would it take to encircle the earth.

$$\frac{4.00 \times 10^7}{1.65} = 24242424 = 24000000$$

- Determine an estimate for the total number of hairs on the heads of all the people on the earth. Answer in scientific notation to the nearest hundredth.

$$(1.25 \times 10^5)(6.80 \times 10^9) = 8.50 \times 10^{14}$$

- Approximately how many electrons would have the same mass as the planet Mercury. Answer in scientific notation to the nearest hundredth.

$$\frac{3.30 \times 10^{23}}{9.11 \times 10^{-31}} = 3.62 \times 10^{53}$$

- How many times heavier is the Sun than the combined mass of the Earth and Mercury? Answer in standard decimal form to the nearest one thousand.

$$\frac{1.99 \times 10^{30}}{(5.98 \times 10^{24} + 3.30 \times 10^{23})} = 315372 = 315000$$

Answer Key

1. C	**2.** B	**3.** D	**4.** A	**5.** D	**6.** B	**7.** A	**8.** A
9. A	**10.** B	**11.** D	**12.** C	**13.** A	**14.** C	**15.** D	

1.

2	4	5	6

2.

1	9		

3.

7	.	7	1

4.

7	.	7	5

5.

1	7		

Written Response #1

- 24 000 000
- 8.50×10^{14}
- 3.62×10^{53}
- 315 000