

**Math 3206**  
**Unit 3 - Exam 2**  
**Exponential Functions**

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

1. Simplify:  $(-2)^3$ .  
A) -8                      B) -6                      C) 6                      D) 8
2. Simplify:  $-3^4$   
A) -81                      B) -12                      C)  $\frac{1}{81}$                       D) 81
3. Evaluate  $(5^{-1})^{-2}$ .  
A) -25                      B)  $\frac{1}{-25}$                       C) 10                      D) 25
4. Evaluate  $\left(\frac{2}{3}\right)^4$ .  
A)  $\frac{16}{81}$                       B)  $\frac{24}{81}$                       C)  $\frac{8}{12}$                       D)  $\frac{16}{27}$
5. Evaluate:  $\left(\frac{1}{2}\right)^{-2}$ .  
A) -4                      B)  $-\frac{1}{4}$                       C)  $\frac{1}{4}$                       D) 4
6. Which statement is true?  
A)  $(7^4)(7^5) = 7^9$   
B)  $\frac{7^8}{7^4} = 7^2$   
C)  $(7^3)(7^4) = 7^{12}$   
D)  $(7^3)^2 = 7^5$
7. Which of the following has the largest value?  
A)  $3^2 - 3$   
B)  $25^0$   
C)  $2^{-1}$   
D)  $(-2)^8 \div (-2)^6$
8. Simplify  $\frac{y^{20}}{y^{-4}}$ .  
A)  $y^{-16}$                       B)  $y^{-5}$                       C)  $y^{16}$                       D)  $y^4$
9. Simplify  $(2x^4y^5)^3$   
A)  $6x^{12}y^{15}$                       B)  $8x^7y^8$                       C)  $8x^{12}y^{15}$                       D)  $8x^{64}y^{125}$
10. What is the simplest form of  $(2x^3)^2(x^3)$ ?  
A)  $2x^8$                       B)  $2x^9$                       C)  $4x^8$                       D)  $4x^9$

11. Simplify:  $\frac{a^6(a^4)^0}{a^{-4}}$ .
- A)  $a^2$       B)  $a^6$       C)  $a^{10}$       D)  $a^{14}$
12. Simplify:  $\frac{6^{15} \times 6^3}{6^6 \times 6^5}$ .
- A)  $6^6$       B)  $6^7$       C)  $6^8$       D)  $6^9$
13. Simplify:  $\frac{2a^{-3}b^5}{(2a^{-1}b)^3}$ .
- A)  $\frac{b^2}{4}$       B)  $\frac{b^2}{3}$       C)  $b^2$       D)  $\frac{b^2}{4a^5}$
14. Express  $2.3 \times 10^{-5}$  in decimal notation.
- A) 0.000 000 23    B) 0.000 023    C) 230 000    D) 2 300 000
15. Write in decimal form:  $7.7 \times 10^3$ .
- A) -0.0077      B) 0.0077      C) 0.077      D) 7700
16. The diameter of a human hair is about 0.000 07 m. What is this number in scientific notation?
- A)  $7.0 \times 10^{-5}$     B)  $7.0 \times 10^{-4}$     C)  $7.0 \times 10^4$     D)  $7.0 \times 10^5$
17. Multiply:  $(4 \times 10^3) \times (5 \times 10^{-6})$
- A)  $2 \times 10^{-4}$       B)  $2 \times 10^{-3}$       C)  $2 \times 10^{-2}$       D)  $2 \times 10^{11}$
18. Add:  $(2 \times 10^4) + (4 \times 10^3)$ .
- A)  $2.4 \times 10^4$     B)  $4.2 \times 10^4$     C)  $6 \times 10^4$     D)  $6 \times 10^7$
19. Which is equivalent to  $\left(\frac{1}{81}\right)^{x+3}$  ?
- A)  $3^{-4x-12}$       B)  $3^{-4x-3}$       C)  $3^{-4x+3}$       D)  $3^{-4x+12}$
20. Solve:  $3x^{-3} = 81$ .
- A) -9      B)  $\frac{1}{9}$       C)  $\frac{1}{3}$       D) 3

Part II: Answer all questions and show all workings.

1. Write as a single exponent. (4 Marks)

A)  $(-7)^2 \times (-7)^3$  \_\_\_\_\_

B)  $\left((-4)^2\right)^3$  \_\_\_\_\_

C)  $(-m)^6 (-m)^2$  \_\_\_\_\_

D)  $y^{12} \div y^5$  \_\_\_\_\_

2. Write each as a single power. (6 Marks)

A)  $\frac{(3^6)^3}{(3^{-3})^{-2}}$

B)  $\left((4)^2\right)^3 \times \left((4)^{-5}\right)^3$

3. Simplify. (20 Marks)

A)  $\frac{3^5 \times 3^9}{(3^3)^2 \times 3^4}$

B)  $(x^4 y^3)^2 (3x^3 y^5)^3$

C)  $\frac{(x^{-2} y^8)^5}{(x^5 y^4)^3}$

D)  $\frac{(2a^3 bc^2)^3}{(3a^2 b^0 c)^2}$

4. Calculate. Write your answer in scientific notation. (12 Marks)

A)  $(3 \times 10^{-3}) \times (7 \times 10^{-4})$

B)  $(400 \times 10^{-5}) \div (8 \times 10^{-9})$

C)  $(200 \times 10^4) + (9 \times 10^6)$

D)  $(35 \times 10^{-2}) - (600 \times 10^{-4})$

5 Solve for the indicated variable using the appropriate laws of exponents. (24 marks)

A)  $3^{3-2x} = 27^{x+1}$

B)  $45^{7x-35} = 1$

C)  $25^{x+1} = 125^{4x-3}$

D)  $\left(\frac{1}{36}\right)^{2x+1} - 6 = 210$