

**Unit Two Practice Test: Powers and Exponent Laws****Multiple Choice**

Identify the choice that best completes the statement or answers the question.

- \_\_\_\_\_ 1. Write the base of  $-(-6)^5$ .  
a. 6                      b. -6                      c.  $-6 \times 5$                       d. 5
- \_\_\_\_\_ 2. Evaluate:  $4^6$   
a. 1296                      b. 4096                      c. 10                      d. 24
- \_\_\_\_\_ 3. Write one billion as a power of 10.  
a.  $10^9$                       b.  $10^8$                       c.  $10^{10}$                       d.  $10^8$
- \_\_\_\_\_ 4. Evaluate:  $(-15)^0$   
a. -1                      b. 1                      c. 0                      d. -15
- \_\_\_\_\_ 5. Evaluate:  $-(10^0)^7$   
a. -7                      b. 1                      c. 7                      d. -1
- \_\_\_\_\_ 6. State which operation you would do first to evaluate  $8 + 9 \times 6^2 - 5$ .  
a. Square 6                      c. Subtract 5 from 6  
b. Add 8 and 9                      d. Multiply 9 and 6
- \_\_\_\_\_ 7. Evaluate:  $5^3 - (-6)^3$   
a. 33                      b. -91                      c. 341                      d. -3
- \_\_\_\_\_ 8. Evaluate:  $(2+3)^2 - (3-5)^3$   
a. 17                      b. -85                      c. 16                      d. 33
- \_\_\_\_\_ 9. Write the product of  $5^2 \times 5^4$  as a single power.  
a.  $10^6$                       b.  $5^6$                       c.  $25^6$                       d.  $5^8$
- \_\_\_\_\_ 10. Write the quotient of  $\frac{6^8}{6^4}$  as a single power.  
a.  $6^4$                       b. 2                      c.  $6^2$                       d.  $6^{12}$
- \_\_\_\_\_ 11. Express  $\frac{(-5)^6 \times (-5)^6}{(-5)^4}$  as a single power.  
a.  $(-5)^9$                       b.  $(-5)^8$                       c.  $(-5)^{32}$                       d.  $(-5)^3$
- \_\_\_\_\_ 12. Write  $[(-4) \times (-5)]^5$  as a product of powers.  
a.  $(-4)^5 + (-5)^5$                       c.  $(-4)^5 \times (-5)^5$   
b.  $4^5 \times 5^5$                       d.  $5(-4) + 5(-5)$

- \_\_\_\_\_ 13. Write  $\left(\frac{5}{3}\right)^3$  as a quotient of powers.
- a.  $5^3 - 3^3$                       b.  $2^3$                                       c.  $\frac{5^3}{3^1}$                                       d.  $\frac{5^3}{3^3}$
- \_\_\_\_\_ 14. Evaluate:  $\left[(-4)^0\right]^5$
- a. 5                                      b. -5                                      c. 1                                      d. -1
- \_\_\_\_\_ 15. Which answer is negative?
- i)  $(-7)^{10}$   
ii)  $-(7)^{10}$   
iii)  $-(-7)^{10}$
- a. i only                                      b. i and iii                                      c. i and ii                                      d. ii and iii
- \_\_\_\_\_ 16. Evaluate:  $10^7$
- a. 100 000 000                      b. 10 000 000                      c. 1 000 000                      d. 70
- \_\_\_\_\_ 17. Which is the correct value of  $2^2 + 3 \times 5 - 3$ ?
- i) 14  
ii) 10  
iii) 16  
iv) 32
- a. ii                                      b. iii                                      c. i                                      d. iv
- \_\_\_\_\_ 18. Evaluate:  $(-2)^4 \times (-2)^2 \div (-2)^0$
- a. -32                                      b. 64                                      c. 256                                      d. -64
- \_\_\_\_\_ 19. Evaluate:  $10^4 \times 10^3 + 10^5$
- a. 1 000 000 000 000                      c. 120  
b. 10 100 000                      d. 1 000 000 100 000
- \_\_\_\_\_ 20. Write  $\left[(-7) \times 2\right]^5$  as a product of powers.
- a.  $(-7)^5 \times 2^5$                       b.  $(-7)^5 + 2^5$                       c.  $(-5)^5$                                       d.  $5(-7) \times 2$
- \_\_\_\_\_ 21. Which expressions have positive values?
- i)  $\left[(-7)^6\right]^7$   
ii)  $\left[-(-7)^6\right]^7$   
iii)  $-(7^6)^7$   
iv)  $-[-(-7)^6]^7$
- a. ii and iv                                      b. i and iv                                      c. i and ii                                      d. ii and iii

**Short Answer**

22. Write the base and the exponent of this power:  $(-8)^4$

.

23. Write 704 065 using powers of 10.

.

24. Evaluate:  $4^2 - [6 \div (-2)]^3$

.

25. Simplify, then evaluate.

$$(-2)^5 \times (-2)^7 \div (-2)^6$$

.

26. Simplify, then evaluate.

$$\left(\frac{2^2}{8^0}\right)^3$$

.

27. State which operation you would do first to evaluate  $(6)^0 + [8 \div (-2)]^2 - 5$ .

.

28. Insert brackets to make each statement true.

a)  $3^2 + 4 \times 5 - 2^2 = 13$

b)  $3^2 + 4 \times 5 - 2^2 = 61$

.

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

ID: A

29. Simplify, then evaluate.

$$\frac{(-2)^4 \times (-2)^2}{(-2)^4 \times (-2)^0}$$

30. Write  $[11 \times (-12) \times 13]^3$  as a product of powers.

31. Simplify, then evaluate.

$$\frac{(2^4)^3 \times (2^2)^4}{(2^2 \times 2^6)^2}$$

32. Simplify, then evaluate.

$$(4^9 \div 4^6)^2 - (2^8 \div 2^6)^2$$

### Problem

33. Evaluate:  $5(3)^3 - 3(-5)^3$   
Show your steps.

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

ID: A

34. One estimate shows that the number of people without access to safe drinking water is about one billion. How much water is required if each person who does not have access to safe drinking water is given 10 L of safe drinking water?

Give your answer in standard form and using powers of 10.

35. Evaluate:  $\frac{(10)^2 - (4)^2}{(6)^2 - 2(2)^2}$

Show your calculations.

36. Identify, then correct, any errors in the work shown.

$$\begin{aligned} (3^2 \times 3^3)^2 &= (3^{2 \times 3})^2 \\ &= (3^6)^2 \\ &= 3^{6+2} \\ &= 3^8 \\ &= 6561 \end{aligned}$$

37. Where possible, replace  $\square$  with a “+” or “-” sign to make each product positive.

a)  $-(\square 8)^{11}$

b)  $\square(-8)^{12}$

c)  $-(\square 8)^{12}$

d)  $\square(-8)^{11}$

Can all products be made positive? Explain.

38. Simplify, then evaluate. Show your work.

$$\frac{(10^2)^4 \times (5^3)^4}{(5^4)^2 \times (10^2)^5} \times \frac{(10^5)^3 \times (2^4)^3}{(2^2)^4 \times (10^2)^2}$$

**Unit Two Practice Test: Powers and Exponent Laws  
Answer Section****MULTIPLE CHOICE**

1. B
2. B
3. A
4. B
5. D
6. A
7. C
8. D
9. B
10. A
11. B
12. C
13. D
14. C
15. D
16. B
17. B
18. B
19. B
20. A
21. B

**SHORT ANSWER**

22. Base:  $-8$       Exponent: 4
23.  $704\,065 = (7 \times 10^5) + (4 \times 10^3) + (6 \times 10^1) + (5 \times 10^0)$
24. 43
25.  $(-2)^6 = 64$
26.  $\left(\frac{2^2}{8^0}\right)^3 = \left(\frac{2^2}{1}\right)^3 = 2^6 = 64$
27. Divide 8 by  $-2$
28. a)  $3^2 + 4 \times (5 - 2^2) = 13$   
b)  $(3^2 + 4) \times 5 - 2^2 = 61$
29.  $(-2)^2 = 4$
30.  $11^3 \times (-12)^3 \times 13^3$

31.  $\frac{(2^4)^3 \times (2^2)^4}{(2^2 \times 2^6)^2} = \frac{2^{20}}{2^{16}} = 2^4 = 16$
32.  $(4^9 \div 4^6)^2 - (2^8 \div 2^6)^2 = (4^3)^2 - (2^2)^2 = 4^6 - 2^4 = 4080$

**PROBLEM**

33.  $5(3)^3 - 3(-5)^3 = 5 \times 27 - 3 \times (-125) = 135 + 375 = 510$
34. Each person is to be given 10 L of safe drinking water.  
 1 billion  $\times 10$  L = 1 000 000 000  $\times 10$  = 10 000 000 000 =  $1 \times 10^{10}$  L  
 $1 \times 10^{10}$  L = 10 000 000 000 L  
 The amount of water required is about  $1 \times 10^{10}$  L, or 10 000 000 000 L.
35.  $\frac{(10)^2 - (4)^2}{(6)^2 - 2(2)^2} = \frac{100 - 16}{36 - 8} = \frac{84}{28} = 3$

36. Errors:  
 In line 1, the exponents of 3 should be added instead of multiplied.  
 In line 3, the exponents of 3 should be multiplied instead of added.

Correction:

$$(3^2 \times 3^3)^2 = (3^{2+3})^2 = (3^5)^2 = 3^{5 \times 2} = 3^{10} = 59\,049$$

37. a) Replace  $\square$  with a “-” sign.  
 b) Replace  $\square$  with a “+” sign.  
 c)  $-(\square 8)^{12}$  is always negative.  
 d) Replace  $\square$  with a “-” sign.

Not all products can be made positive.

In part c, there is an even number of factors in the power  $(\square 8)^{12}$ .

$(\square 8)^{12}$  is always positive, which means  $-(\square 8)^{12}$  is always negative.

38. 
$$\frac{(10^2)^4 \times (5^3)^4}{(5^4)^2 \times (10^2)^5} \times \frac{(10^5)^3 \times (2^4)^3}{(2^2)^4 \times (10^2)^6} = \frac{10^8 \times 5^{12}}{5^8 \times 10^{10}} \times \frac{10^{15} \times 2^{12}}{2^8 \times 10^{12}} = \frac{10^{(8+15)} \times 5^{12} \times 2^{12}}{10^{(10+12)} \times 5^8 \times 2^8}$$

$$= \frac{10^{23} \times 5^{12} \times 2^{12}}{10^{22} \times 5^8 \times 2^8} = 10^1 \times 5^4 \times 2^4$$

$$= 10 \times 625 \times 16 = 100\,000$$