

# Practice Test: Exponents

Math 9

## Exponents Practice Test

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

/50

1. Write each expression as a power. Identify the base and the exponent in each power. Then, evaluate. [6]

	Power	Base	Exponent	Evaluate
a) $(-2) \times (-2) \times (-2) \times (-2)$	$(-2)^4$	$-2$	$4$	$16$
b) $47$	$47^1$	$47$	$1$	$47$
c) $5 \times 5 \times 5$	$5^3$	$5$	$3$	$125$

2. Write each power as repeated multiplication, then evaluate. [8]

	Repeated Multiplication	Evaluate
a) $(-3)^3$	$(-3) \times (-3) \times (-3)$	$-27$
b) $-8^2$	$-8 \times 8$	$-64$
c) $-(-2)^6$	$-(-2) \times (-2) \times (-2) \times (-2) \times (-2) \times (-2)$	$-64$
d) $5^4$	$5 \times 5 \times 5 \times 5$	$625$

3. Write each expression as a single power, then evaluate. [12]

$$\begin{aligned} \text{a) } (-9)^2 \times (-9)^1 &= (-9)^3 \\ &= -729 \end{aligned}$$

$$\begin{aligned} \text{b) } \left(\frac{7}{4}\right)^2 \times \left(\frac{7}{4}\right)^3 &= \left(\frac{7}{4}\right)^5 \\ &= \frac{16807}{1024} \end{aligned}$$

$$\begin{aligned} \text{c) } \frac{(-2)^{13}}{(-2)^6} &= (-2)^7 \\ &= -128 \end{aligned}$$

$$\begin{aligned} \text{d) } 3^8 \div 3^6 &= 3^2 \\ &= 9 \end{aligned}$$

$$\begin{aligned} \text{e) } (4^3)^2 &= 4^6 \\ &= 4096 \end{aligned}$$

$$\begin{aligned} \text{f) } [(-2)^4]^2 &= (-2)^8 \\ &= 256 \end{aligned}$$

4. Write each expression as a single power. [3]

$$\text{a) } m^5 \times m^9 = m^{14}$$

$$\text{b) } \frac{x^{12}}{x^4} = x^8$$

$$\text{c) } (a^7)^3 = a^{21}$$

5. Evaluate each expression. Work must be shown to receive full marks. [14]

1 a)  $4 \times 2^3$   
 $= 4 \times 8$   
 $= 32$

2 b)  $5^2 + 3^0$   
 $= 25 + 1$   
 $= 26$

1 c)  $2(-3^4)$   
 $= 2(-81)$   
 $= -162$

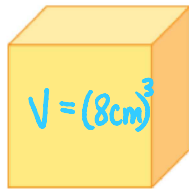
1 d)  $-(-4)^2$   
 $= -16$

3 e)  $-6^0 + 3(5^2) - 12 \div 2^2$   
 $= -1 + 3(25) - 12 \div 4$   
 $= -1 + 75 - 3$   
 $= 71$

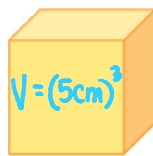
3 f)  $144 \div 2^3 + (2^4 - 7)^2$   
 $= 144 \div 8 + (16 - 7)^2$   
 $= 144 \div 8 + (9)^2$   
 $= 18 + 81$   
 $= 99$

3 g)  $\frac{(2^4)^3 \times (2^2)^4}{(2^2 \times 2^6)^2}$   
 $= \frac{2^{12} \times 2^8}{(2^8)^2}$   
 $= \frac{2^{20}}{2^{16}}$   
 $= 2^4$   
 $= 16$

6. Write an expression with powers to determine the difference between the volume of the small cube and the volume of the large cube. What is the difference? Include units and a sentence answer. [2]



8 cm



5 cm

subtract

$$8^3 - 5^3$$

$$= 512 - 125$$

$$= 387$$

The difference is  $387\text{cm}^3$ .

7. A circle is inscribed in a square with side length 12 cm. Determine the area of the shaded region. Include units and a sentence answer. [2]



12 cm

$$\text{Square area} - \text{Circle area}$$

$$= 12^2 - \pi(6)^2$$

$$= 144 - 36\pi$$

$$\approx 30.9$$

The area of the shaded region is  $30.9\text{cm}^2$ .

8. A population of 200 bacteria has the perfect conditions to double every 20 min. How many bacteria will there be after each amount of time? Include units. [3]

a) 20 min  $200(2)$   
 $= 400$  bacteria

b) 60 min  $200(2)^3$   
 $= 1600$  bacteria

c) 4 h  $200(2)^{12}$   
 $= 819\,200$  bacteria

$60\text{min} = 3 \times 20\text{min}$

$1\text{h} = 3 \times 20\text{min}$

$4\text{h} = 4 \times 3 \times 20\text{min} = 12 \times 20\text{min}$