Target B-1 Extra Practice

1. Write each expression as a power. Then, evaluate.

	Power	Evaluate
a) 6×6	_____	_____
b) $4 \times 4 \times 4$	_____	_____
c) $9 \times 9 \times 9 \times 9 \times 9$	_____	_____
d) $2 \times 2 \times 2 \times 2 \times 2 \times 2$	_____	_____

2. Write each expression as a power. Identify the base and the exponent in each power. Then, evaluate.

	Power Evaluate	Base	Exponent
a) $5 \times 5 \times 5$	_____ _____	_____	_____
b) $1 \times 1 \times 1 \times 1 \times 1 \times 1 \times 1$	_____ _____	_____	_____
c) $7 \times 7 \times 7 \times 7 \times 7 \times 7$	_____ _____	_____	_____
d) 305	_____ _____	_____	_____

3. Write each power as repeated multiplication. Then, evaluate.

	Repeated Multiplication	Evaluate
a) 6^3	_____	_____
b) 2^5	_____	_____
c) 3^4	_____	_____
d) 10^6	_____	_____
e) 4^2	_____	_____
f) 20^2	_____	_____

4. Write each power as repeated multiplication. Then, evaluate.

		Repeated Multiplication	Evaluate
a)	$(-2)^4$	_____	_____
b)	-2^4	_____	_____
c)	$(-4)^3$	_____	_____
d)	-4^3	_____	_____
e)	$-(-6)^3$	_____	_____
f)	$-(-6)^4$	_____	_____

5. Complete the table.

Repeated Multiplication	Exponential Form	Value
a) $(-3) \times (-3) \times (-3) \times (-3)$		
b) $(-2) \times (-2) \times (-2) \times (-2) \times (-2)$		
c)	$(-6)^5$	
d)		-125

6. Bacteria reproduce by splitting in two. If a single bacteria divides every 20 min, how many bacteria will a single bacteria produce after 8 h?

a) Write the answer in exponential form. _____

b) Calculate the answer. _____

c) What assumption did you make to answer the question?

Extra Practice Answers

1. a) 6^2, 36 **b)** 4^3, 64
c) 9^5, 59 049 **d)** 2^6, 64
2. a) 5^3, 5, 3, 125 **b)** 1^7, 1, 7, 1
c) 7^6, 7, 6, 117 649
d) 305^1, 305, 1, 305
3. a) 6 × 6 × 6, 216
b) 2 × 2 × 2 × 2 × 2, 32
c) 3 × 3 × 3 × 3, 81
d) 10 × 10 × 10 × 10 × 10 × 10, 1 000 000
e) 4 × 4, 16 **f)** 20 × 20, 400
4. a) (−2) × (−2) × (−2) × (−2), 16
b) −(2 × 2 × 2 × 2), −16
c) (−4) × (−4) × (−4), −64
d) −(4 × 4 × 4), −64
e) −[(−6) × (−6) × (−6)], 216
f) −[(−6) × (−6) × (−6) × (−6)], −1296
5. Example:

Repeated Multiplication	Exponential Form	Value
a) (−3) × (−3) × (−3) × (−3)	$(-3)^4$	81
b) (−2) × (−2) ×(−2) ×(−2) ×(−2)	$(-2)^5$	−32
c) (−6) × (−6) × (−6) × (−6) × (−6)	$(-6)^5$	−7776
d) (−5) ×(−5) ×(−5)	$(-5)^3$	−125

6. a) 2^{24} **b)** 16 777 216
c) Example: That no bacteria died.

Target B-1

Extra Practice 1

Lesson 2.1: What Is a Power?

1. Identify the base of each power.
a) 6^3 **b)** 2^7 **c)** $(-5)^4$ **d)** -7^0

2. Use repeated multiplication to show why 3^5 is not the same as 5^3.

3. Complete this table.

Power	Base	Exponent	Repeated Multiplication	Standard Form
4^4				
$(-10)^3$				
	–6	2		
			$1 \times 1 \times 1 \times 1 \times 1$	

4. Write each product as a power, then evaluate.
a) 6×6
b) $3 \times 3 \times 3 \times 3 \times 3 \times 3$
c) $10 \times 10 \times 10 \times 10$
d) $-(8 \times 8 \times 8)$
e) $(-8)(-8)(-8)$
f) $-(-8)(-8)(-8)$

5. Write each power as repeated multiplication, then evaluate.
a) 7^5 **b)** 4^6 **c)** -9^3 **d)** $(-5)^5$

6. Evaluate each power. For each power:
- Are the brackets needed?
- If your answer is yes, what purpose do the brackets serve?

a) $(-6)^5$ **b)** $-(6)^5$ **c)** $-(-6)^5$ **d)** (-6^5)

7. Predict whether each answer is positive or negative, then evaluate.
a) $(-3)^2$ **b)** $(-3)^3$ **c)** -3^2 **d)** $-(-3)^3$

8. Is the value of -2^4 different from the value of $(-2)^4$? Explain.

9. Stamps are sold in a 10 by 10 sheet. The total value of a sheet of stamps is $60.00.
a) Express the number of stamps as a power and in standard form.
b) Use grid paper. Draw a picture to represent this power.
c) What is the value of one stamp?

Extra Practice 1

Lesson 2.1

1. **a)** 6 **b)** 2 **c)** –5 **d)** 7

2. $3^5 = 3 \times 3 \times 3 \times 3 \times 3 = 243$ and $5^3 = 5 \times 5 \times 5 = 125$

3.

Power	Base	Exponent	Repeated Multiplication	Standard Form
4^4	4	4	$4 \times 4 \times 4 \times 4$	256
$(-10)^3$	–10	3	(–10)(–10)(–10)	–1000
$(-6)^2$	–6	2	(–6)(–6)	36
1^5	1	5	$1 \times 1 \times 1 \times 1 \times 1$	1

4. **a)** $6^2 = 36$ **b)** $3^6 = 729$
c) $10^4 = 10\,000$
d) $-8^3 = -512$ **e)** $(-8)^3 = -512$
f) $-(-8)^3 = 512$

5. **a)** $7 \times 7 \times 7 \times 7 \times 7 = 16\,807$
b) $4 \times 4 \times 4 \times 4 \times 4 \times 4 = 4096$
c) $-9 \times 9 \times 9 = -729$
d) $(-5)(-5)(-5)(-5)(-5) = -3125$

6. **a)** $(-6)^5 = -7776$; the brackets are needed; they indicate that the base is –6.
b) $-(6)^5 = -7776$; the brackets are not needed; the base is 6 and the power is negative.
c) $-(-6)^5 = 7776$; the brackets are needed; they indicate that the base is –6 and the sign of the expression is opposite to the sign of the value of $(-6)^5$.
d) $(-6^5) = -7776$; the brackets are not needed.

7. **a)** $(-3)^2$ is positive because the answer is the product of an even number of negative integers: 9
b) $(-3)^3$ is negative because the answer is the product of an odd number of negative integers: –27
c) -3^2 is negative because the answer is the opposite of the product of an even number of positive integers: –9
d) $-(-3)^3$ is positive because the answer is the opposite of the product of an odd number of negative integers: 27

8. Yes, their values are different; $-2^4 = -2 \times 2 \times 2 \times 2 = -16$ and $(-2)^4 = (-2)(-2)(-2)(-2) = 16$

9. **a)** $10^2 = 100$
b) Students should draw a 10 by 10 square on grid paper.
c) 60¢ or $0.60

Target B-1

Extra Practice 2

Lesson 2.2: Powers of Ten and the Zero Exponent

1. Evaluate each power.

a) 4^0 **b)** 23^0 **c)** $(-6)^0$

d) 1^0 **e)** -1^0 **f)** $(-1)^0$

2. Write each number as a power of 10.

a) 10 000 **b)** 1 000 000 **c)** one billion

d) ten **e)** 1

3. Use powers of 10 to write each number.

a) 700 000 000 000 **b)** 7000

c) 77 077 **d)** 7 000 007

4. Write each number in standard form.

a) (8×10^5)

b) $(9 \times 10^7) + (9 \times 10^6) + (5 \times 10^5)$

c) $(2 \times 10^3) + (2 \times 10^2) + (6 \times 10^0)$

d) $(5 \times 10^5) + (4 \times 10^8) + (8 \times 10^0) + (3 \times 10^4)$

5. Write these numbers in standard form, then order them from least to greatest.

fifty-five hundred	50 500	$(5 \times 10^6) + (5 \times 10^0)$
five hundred thousand	5×10^4	500 500

6. **a)** Complete this table for a base of 10.

Exponent	Power	Standard Form
6	10^6	
5		
4		
3		
2		
1		
0		

b) Use patterns to describe why the power with an exponent of 0 is equal to 1.

Extra Practice 2

Lesson 2.2

1. **a)** 1 **b)** 1 **c)** 1
d) 1 **e)** –1 **f)** 1

2. **a)** 10^4 **b)** 10^6 **c)** 10^9
d) 10^1 **e)** 10^0

3. **a)** 7×10^{11} **b)** 7×10^3
c) $(7 \times 10^4) + (7 \times 10^3) + (7 \times 10^1) + (7 \times 10^0)$
d) $(7 \times 10^6) + (7 \times 10^0)$

4. **a)** 800 000 **b)** 99 500 000
c) 2206 **d)** 400 530 008

5. In standard form: 5500, 50 500, 5 000 005, 500 000, 50 000, 500 500
From least to greatest: 5500, 50 000, 50 500, 500 000, 500 500, 5 000 005

6. **a)**

Exponent	Power	Standard Form
6	10^6	1 000 000
5	10^5	100 000
4	10^4	10 000
3	10^3	1000
2	10^2	100
1	10^1	10
0	10^0	1

b) In the 2nd column, the exponents are decreasing by 1 each time. In the 3rd column, the number of zeros after the 1 decreases by 1; each time we divide by 10 to get the number below, and in the last row: $10 \div 10 = 10^0 = 1$