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Chapter 6 Test Review

Section 6.1 Practice:

In Exercises 1–6, evaluate the expression.

1. $(-3)^0 = 1$

2. $7^0 = 1$

3. $3^{-5} \cdot \frac{1}{3^5} = \frac{1}{243}$

4. $(-5)^{-3} \cdot \frac{1}{(-5)^3} = -\frac{1}{125}$

5. $\frac{3^{-2}}{9^0} \cdot \frac{1}{3^2 \cdot 1} = \frac{1}{9}$

6. $\frac{6^{-1}}{-5^0} \cdot \frac{1}{6 \cdot 1} = \frac{1}{6}$

In Exercises 7–18, simplify the expression. Write your answer using only positive exponents.

7. $x^{-6} \cdot \frac{1}{x^6}$

8. $z^0 = 1$

9. $7x^{-4}y^0 \cdot \frac{7 \cdot 1}{x^4} = \frac{7}{x^4}$

10. $12f^0g^{-9} \cdot \frac{12 \cdot 1}{g^9}$

11. $\frac{3^{-2}a^0}{b^{-2}} \cdot \frac{b^2}{3^2} = \frac{b^2}{9}$

12. $\left(\frac{1}{2c^2}\right)^{-4} \cdot \frac{1^{-4}}{2^{-4}c^{-8}} = \frac{2^4c^8}{1^4} = 16c^8$

Section 6.2 Practice:

In Exercises 1 and 3, rewrite the expression in rational exponent form AND evaluate it.

1. $25^{3/2} = \sqrt{25^3} = \sqrt{15625} = 125$

2. $\sqrt[4]{13} = 13^{1/4} = 1.90$

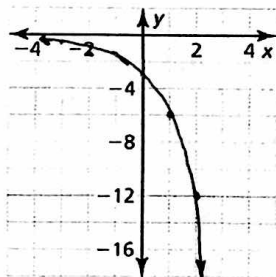
3. $\sqrt[3]{-125} = -125^{1/3} = -5$

↓
on Calculator
 $-125^{(1/3)} = -5$

Section 6.3 Practice:

In exercises 1 and 2 graph the function and describe the domain and range, and evaluate each function at $f(0)$ and $f(5)$

1. $f(x) = -3(2)^x$



Domain: $(-\infty, \infty)$

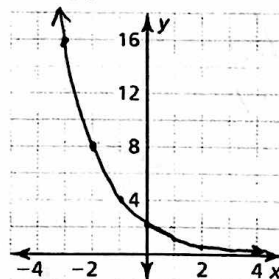
Range: $(0, -\infty)$

$f(0) = -3$ $f(5) = -96$

$$f(0) = -3(2)^0 = -3$$

$$f(5) = -3(2)^5 = -3(32)$$

2. $f(x) = 2(.5)^x$



Domain: $(-\infty, \infty)$

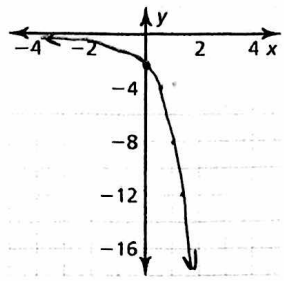
Range: $(0, \infty)$

$f(0) = 2$ $f(5) = 0.0625$

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3. $f(x) = -2(4)^x$

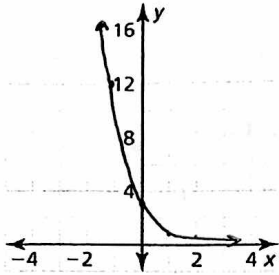


Domain: $(-\infty, \infty)$

Range: $(-\infty, 0)$

$f(0) = -2$ $f(5) = -2048$
 $f(5) = -2(4)^5$

4. $f(x) = 3(0.25)^x$



Domain: $(-\infty, \infty)$

Range: $(0, \infty)$

$f(0) = 3$ $f(5) = 0.0029$
 $f(0) = 3(0.25)^0$ $f(5) = 3(0.25)^5 =$

6.5 Practice: Solving variables in the exponent

1. $(\frac{1}{3})^x = 27$

$3^{-x} = 3^3$
 $x = -3$

4. $3^{2x} = 3^4$

$2x = 4$
 $x = 2$

2. $8^{5x} = 4^{4x+7}$
 $(2^3)^{5x} = (2^2)^{4x+7}$

$15x = 8x + 14$
 $7x = 14$
 $x = 2$

5. $2^{x-1} = 4$

$2^{x-1} = 2^2$
 $x-1 = 2$
 $x = 3$

3. $3^{8x} = 3^{5x-6}$

$8x = 5x - 6$
 $3x = -6$
 $x = -2$

6. $5^{3x-4} = 25$

$5^{3x-4} = 5^2$
 $3x-4 = 2$
 $+4 +4$
 $3x = 6$
 $x = 2$

6.4 Practice: Exponential growth, decay and compound interest

Determine if each table represents an exponential growth function, exponential decay function, or neither.

1.

x	0	1	2	3
y	200	100	50	25

$x^{\frac{1}{2}}$ $x^{\frac{1}{2}}$ $x^{\frac{1}{2}}$

Exponential Decay

2.

x	0	1	2	3
y	4	12	36	108

x^3 x^3 x^3

Exponential Growth

3.

x	y
0	3
1	5
2	7
3	9

+2
+2
+2
Neither

4.

x	-1	0	1	2	3
y	16	4	1	1/4	1/16

$x^{\frac{1}{4}}$ $x^{\frac{1}{4}}$ $x^{\frac{1}{4}}$ $x^{\frac{1}{4}}$

Exponential Decay

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5. A college's tuition of \$135 per credit hour increases by 5% each year.

- a. Write a function that represents the cost of a credit hour after t years.

$$C(t) = 135(1.05)^t$$

- b. How much will a credit hour cost 5 years from now?

$$C(5) = 135(1.05)^5 = \$172.30 \text{ per credit in 5 years.}$$

6. You buy an iPhone for \$450. The value of the iPhone decreases 20% each year.

- a. Write a function to represent how much your iPhone is worth in dollars after t years.

$$W(t) = 450(0.80)^t$$

- b. What is the value of your iPhone after 2 years?

$$W(2) = 450(0.80)^2 = \$288$$

- c. What is the value of your iPhone after 6 years?

$$\$117.97$$

- d. When will the value of your iPhone be worth zero?

It will never reach a value of zero.

7. There are currently 2 bunnies that live in your garden. The population of bunnies triples every year.

- a. Complete the table to that represents the number of bunnies living in your yard.

x	0	1	2	3
y	2	6	18	54

$$2 \cdot 3^0$$

$$2 \cdot 3^t$$

- b. Write the equation that can be used to calculate the number of bunnies after t years.

$$B(t) = 2 \cdot (3)^t$$

- c. How many bunnies will be in your yard after 5 years?

$$B(5) = 486 \text{ after 5 years}$$

8. You invest \$10,000 in a CD (certificate of deposit, similar to a long-term savings account) that is increasing 2.2% every year.

- a. Write a function that represents the amount of money in your CD (y) after t years.

$$m(t) = 10000(1.022)^t$$

- b. How much money will be in the account after 3 years?

$$m(3) = \$10,674.6$$

- c. When will you double your money?

After 32 years.